

## Cleaning Ultra Contaminated Canisters

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When low or non-volatile compounds have been introduced into sampling canisters, then the normal cleanup procedure using gas-phase fill and evacuation with humidified nitrogen or zero air will not be effective. An indication that such contaminants have been introduced into a canister is the inability to remove the background of volatile contaminants with a reasonable amount of cycle cleaning. Depending on whether you are using Entech's Silonite Canisters or SUMMA canisters, use the appropriate procedure below:

### Silonite Canisters

1. Prepare a slightly acidic solution by placing 2-3 drops of concentrated HCl into a liter of distilled water.
2. Evacuate the canister to be cleaned. High vacuum is not necessary.
3. Prepare a short ¼" Teflon tube (12-18") with a appropriate fitting to attach to the canister
4. Roughly measure out a volume of the mildly acidic distilled water solution that is about 10% of the volume of the canister to be cleaned (eg. 40cc for MC400 and 600cc for 6L canisters). For 6L canisters, a 1 gallon bottle can be marked at six different places on the outside to estimate the 600 ml volume)
5. Place the free end of the Teflon tube into the solution and attach the other end to the canister. Open the canister to allow the vacuum to pull the aqueous solution into the canister.
6. Vigorously shake the water in the canister for a few minutes to dissolve the particulates and salts in the canister.
7. Connect a source of pressurized nitrogen to the canister and fill to about 20 psig.
8. Turn the canister with the valve facing down, then open the canister to allow the pressure to blow out the water.
9. Repeat steps 7-8 a few times until very few water droplets are seen coming out.
10. Put the canister into an oven at 80 deg. C for 30 minutes. If possible, leave the canister valve open.
11. Remove the canister from the oven, then repeat steps 7-8 two more times to remove most of the remaining moisture from the canister
12. Perform a routine gas phase cleaning using 3-5 cycles on a cleaning system, followed by high vacuum evacuation. Be aware that if water remains in the canisters it may take longer for high vacuum to be reached. Also, too much water can cause molecular drag pumping systems to overheat and shut down, so be sure not to skip steps 10-11 above.

### SUMMA Canisters.

Perform the same procedure for SUMMA canisters, except insert the following after step 6:

- 6a. Place the canister with the internal water solution into an oven at 80 deg. C, or heat with a 100 deg. C heating band. Continue heating overnight.
- 6b. Remove the canister from the heat source, shake vigorously, then allow to cool to below 50 deg. C (1 hour)
- 6c. Continue with step 7 above.