

## Instructions for taking Low Volatility Residue (LVR) Wipe Samples

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Dennis Coyne, edited by Calum Torrie 10/9/2017.	28 Feb 2020	see LIGO DCC record Status

### 1 Scope

The following procedure is for taking FTIR wipe samples for surfaces and holes of parts to be used in the LIGO UHV system. FTIR testing is subsequently performed in accordance with specification LIGO-[E0900480](#). Note that surface sampling methods other than wiping are permitted by LIGO-[E0900480](#).

### 2 Abbreviations and Acronyms

FTIR     Fourier Transform Infrared Transmission  
UHV     Ultra-High Vacuum

### 3 Materials/Tools Required

An FTIR sampling kit consisting of: Small vials of solvent (usually now Hexanes and not Freon-TF as before) with solvent soaked fiber-free lens tissue (which has been cleaned by chemical extraction)

### 4 Procedure

- Work in a ventilated area e.g. in a clean-room with vertical downward flow, on a laminar flow bench with a horizontal flow, or within a fume hood. For clean rooms and laminar flow benches, one should consider the ventilation of the surrounding area, the volume of the sampling being acquired and add (if needed) a portable fume hood system e.g. a Sentry Air portable fume extractor (ss-300) with both HEPA and Carbon filters. The addition of the portable fume extractor is warranted if the surrounding area is small, has workers without respirators and the volume of sampling will be high, so that strong fumes can be detected in the surrounding area.
- Using small quantities of Hexane being provided and using this product in clean rooms with circulation on, respirators are not required. However, if employees wish to wear a respirator to control odors, use either 1) 3M 6100/07024 respirator with replacement filter cartridges 3M 60923 (Organic Vapors & Acid Gas) or 2) 3M 6200 respirator with replacement filter cartridges 3M 6001 (Organic Vapors) or 3M Particulate Respirator 8247. Follow these instructions for wearing a respirator voluntarily:
  1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.
  2. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against.
  3. Keep track of your respirator so that you do not mistakenly use someone else's respirator.
- Refer to SDS on the solvent used for the FTIR samples. For hexane the SDS sheet is available at [LIGO-E170337](#).
- Wear Nitrile (Preferred) or latex gloves
- Open the cap of the bottle containing the moist wipe and place it where it cannot be contaminated. Using the forceps remove the wipe sample from the bottle. Move the wiper across the surface in a raster pattern slow enough so that the solvent dries at the same rate as the motion. The wiper should be moist but not dripping with solvent. A minimum surface area of 4" x 4" is required. The maximum sampled surface area is ~600 in<sup>2</sup> (e.g. 15" x 40"). Use 2 or 3 passes over the surface area. Dip the wipe back into the solvent in the bottle as needed to keep it moist. (Having a ruler is helpful. The more accurate the area, the more accurate the test results.)
- Sample holes separately from surface areas. A minimum of 5 holes is required for sampling. A maximum of 50 holes may be sampled. Use 2 or 3 passes into each hole. Dip the wipe back into the solvent in the bottle as needed to keep it moist.
- Place the wipe back into the bottle from which it was removed and close the cap tightly.



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- Mark the bottle with the sample location. Indicate the area of the sample you took, or the number of holes sampled. If the area is restricted to less than 4" x 4", then the analytical method is more complex and this should be noted.
- Use the sample form, [F1000003](#), to record the metadata associated with the sample.
- Using the rinse bottle, rinse the forceps prior to taking your next sample.

*Important: Do not handle the wipes with your hands. Do not touch the forceps ends with your bare hands or gloves. Be sure that when you lay down the tweezers that you do not contaminate them from another source. It is a good idea to have some Ultra-High Vacuum (UHV) grade aluminum foil (not food grade foil) available on which you can place your tweezers and sample bottle cap.*