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| **Vacuum Viewport UHV Cleaning** |
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| **Document Owner:** | R. Fiedler | **Department Owner:** | SRF Operations |

# Purpose

The purpose of this document is to provide UHV cleaning instructions for vacuum viewports.

**Master Procedure:**

This Master Procedure is intended to be generalized such that it could apply to most items. The Project Manager or Scientific Lead for the project is encouraged to provide project specific instructions to supplement this procedure, which are to be attached to the applicable Traveler or in a project specific procedure.

**Safety:**

Individuals must keep safety as the first priority in the process; before beginning any job, the user must assure they have the correct PPE for the individual job. Maintaining the level of safety and secure nature of the work area is paramount. Assure personal safety by using caution in movement and taking necessary steps to avoid unnecessary personnel in the immediate area.

Refer to the work-center OSP and ES&H Manual for specifics.

# Scope

This procedure applies to viewports with a stainless steel flange and a transparent glass window. The window may be borosilicate, fused silica, or sapphire.

If the glass material is unknown or may have a coating, contact the Chemroom Supervisor, Principal Investigator (PI), or Project Manager (PM) for instructions.

**RAM:**

Occasionally, work may need to be performed on radioactive materials (ionizing radiation Rad Worker 1 is required for individuals needing unescorted access to radiologically controlled areas.). The room posting may change. RadCon Radiological Control Technologists (RCTs) will be notified in advance of any material movement and adjust the room posting as necessary. Follow RadCon guidance and procedures. See the ES&H Manual Chapter 6310 Protection from Ionizing Radiation and Jefferson Lab Radiation Control Manual for more information. Radioactive waste should be handled and disposed of according to RadCon guidance.

# Terms and Definitions

The following terms have specific meanings within this procedure:

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| **Term** | **Definition** |
| Viewport | Examples:

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| https://www.lesker.com/newweb/images/product_photos/photo-ft-ks-vpzl-450-viewportclearglass_full.jpg | VPZL-450DUS | CF Flanged Quartz (Fused Silica) Viewports |

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| Isopropyl / IPA | Cleanroom or electronics grade quality isopropyl or isopropanol solvent |
| Acetone | Cleanroom or electronics grade quality solvent preferred |
| DI water | De-ionized water / ultra-pure water |
| Lint-free swabs | Texwipe brand Clean Tip Swabs preferred (TX710A, TX754B, or TX714A) |
| Lint-free wipes | Texwipe brand TX1009B Alpha Wipes and TX2009 Beta Wipes preferred |
| N2 | Filtered nitrogen compressed gas (ionized preferred)  |

# Procedure

**CAUTION: DO NOT use an ultrasonic cleaning on vacuum viewports.**

**The glass of a viewport should never be touched with gloves, dry wipes, or dry swabs.**

## Stage materials in a flow hood.

* Acetone
* DI water
* Isopropyl
* Lint-free swabs and wipes
* Black / dark background surface
* Bright light

## Don PPE.

### Cleanroom gloves shall be worn at all times when handling the viewport.

### Goggles are recommended when working with large volumes of solvents.

### See Room OSP, ES&H manual, contact your supervisor or IH for guidance.

## Hold the window with the thumb and forefinger in front of the light source with the dark background approximately 18 inches behind and beneath the window.

## Blow off the viewport with N2 to remove large particles.

## Dampen a swab with acetone. Remove any excess acetone from the swab so it is not dripping.

## Clean the viewport from the outer edge to the center with small circular motion, rotating the window occasionally to a new unclean section. Start with the dirtiest location (if applicable) and move progressively around the window until all visible contamination is removed.

### Move from a cleaned area to a dirty area. DO NOT go back over a cleaned area with a used swab.

### Change swabs frequently, always using a swab damp with acetone but with no excess acetone.

### Clean a new area until gross cleaning is done.

### Repeat several times until no dust, debris, or “water marks” are visible against the dark surface.

## If dust, debris or water marks cannot be removed by light rubbing with an acetone swab, repeat the same procedure in 4.6 with DI water.

### Use DI water sparingly as it will have to be dried using an acetone dampened swab thereafter.

## Hold the window in front of the dark background and use the bright light to verify the cleanliness of the viewport. Repeat steps 4.6 and 4.7 if necessary.

## After the viewport is cleaned of all visible dust, debris, and water marks, perform a final wipe of the viewport following step 4.6 with an isopropanol dampened swab from the outer edge to the center to remove the acetone residue.

## Hold the window in front of the dark background and use the bright light to verify the cleanliness of the viewport.

## Perform a final particle check on the viewport.

### If particles exceed 10 counts on the 1.0u scale after 3 minutes, repeat the cleaning process.

## Bag the viewport and proceed to the next work-center.

# References

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| **Document No.** | **Title** |
|  | [Kurt J. Lesker Viewport Cleaning Procedure](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-261355/KJL_viewportscleaningprocedure.pdf) |

# Release and Revision History

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| --- | --- | --- |
| **Rev #** | **Major Changes** | **Effective Date:** |
| 1 | Initial version | 28 Sep 2022 |

# Approvals

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