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Sucker plate O-ring Tests

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## 1 Introduction

This document is a summary of tests done with clean sucker plates on plate glass “dummy optics”. The purpose of the tests was to see if the o-rings were leaving any sort of residue on the optic, and secondarily to make sure the sucker plates held vacuum well after 1-3 days. In all tests the sucker plate was set on horizontal plate glass in a clean room, air pumped out, and left for 1-3 days.

## 2 Tests

### 2.1 Clean plate glass & clean o-ring(DI water soak and isopropyl wipe):

Left sucker plate on glass for 3 days, the sucker plate was still firmly attached to the glass after 72 hours. No visible residue on plate glass after removal.

### 2.2 First Contact (FC) coated plate glass & clean o-ring (DI water soak and isopropyl wipe):

Left sucker plate on glass for 3 days, the sucker plate was still firmly attached to the glass after 72 hours. Could see impression of o-ring in the dried FC, when it was removed there was no visible residue on the glass surface. Additionally, the dried film did not show any signs of degradation or stripping where it was compressed by the o-ring.

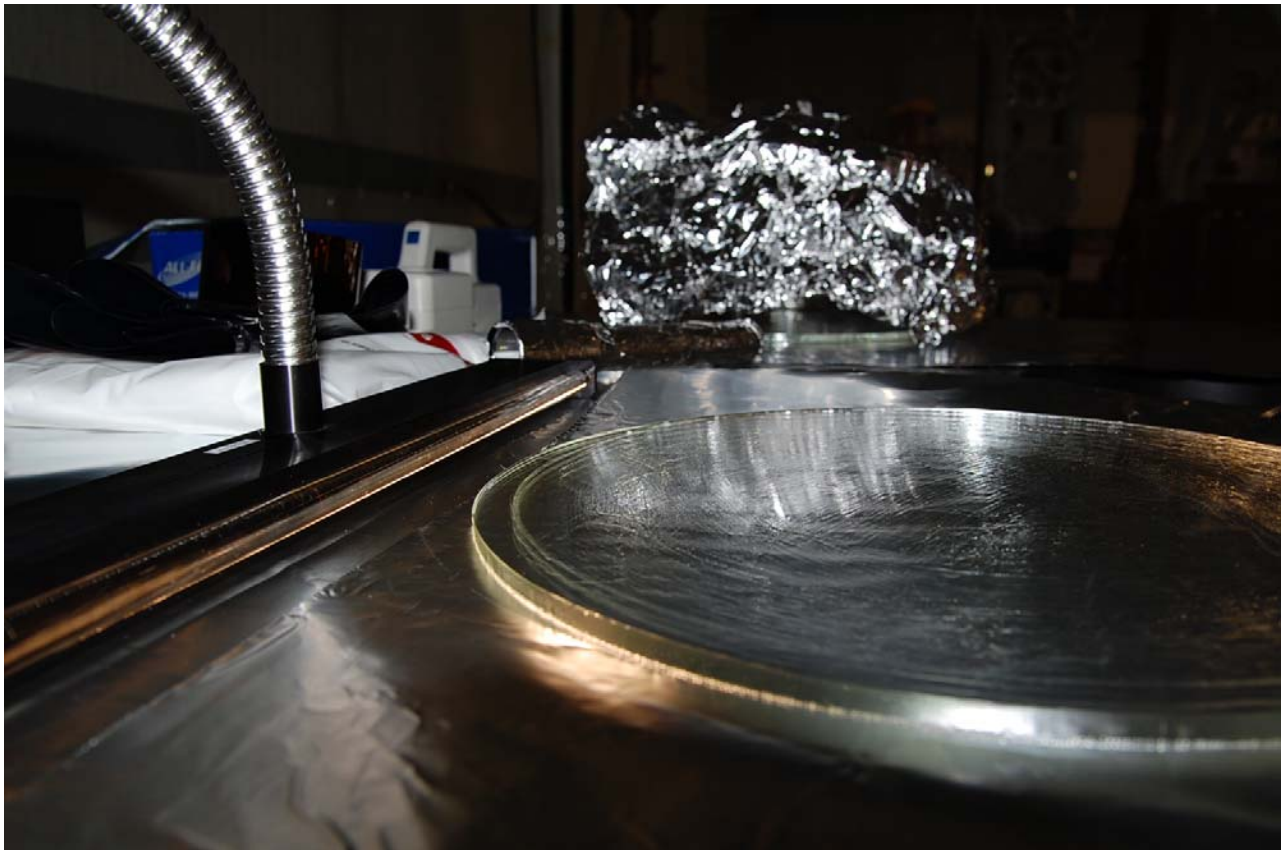


Figure 1: Note the small depression is visible where the o-ring held to the glass.

### 2.3 Clean plate glass & clean o-ring (DI water soak and “old” methanol wipe):

Wiped the o-ring clean using methanol of questionable grade and age. Left sucker plate on glass overnight, the sucker plate was still firmly attached to the glass after 24 hours. A small ring of residue was visible. It was easily removed with isopropyl and clean room wipes.

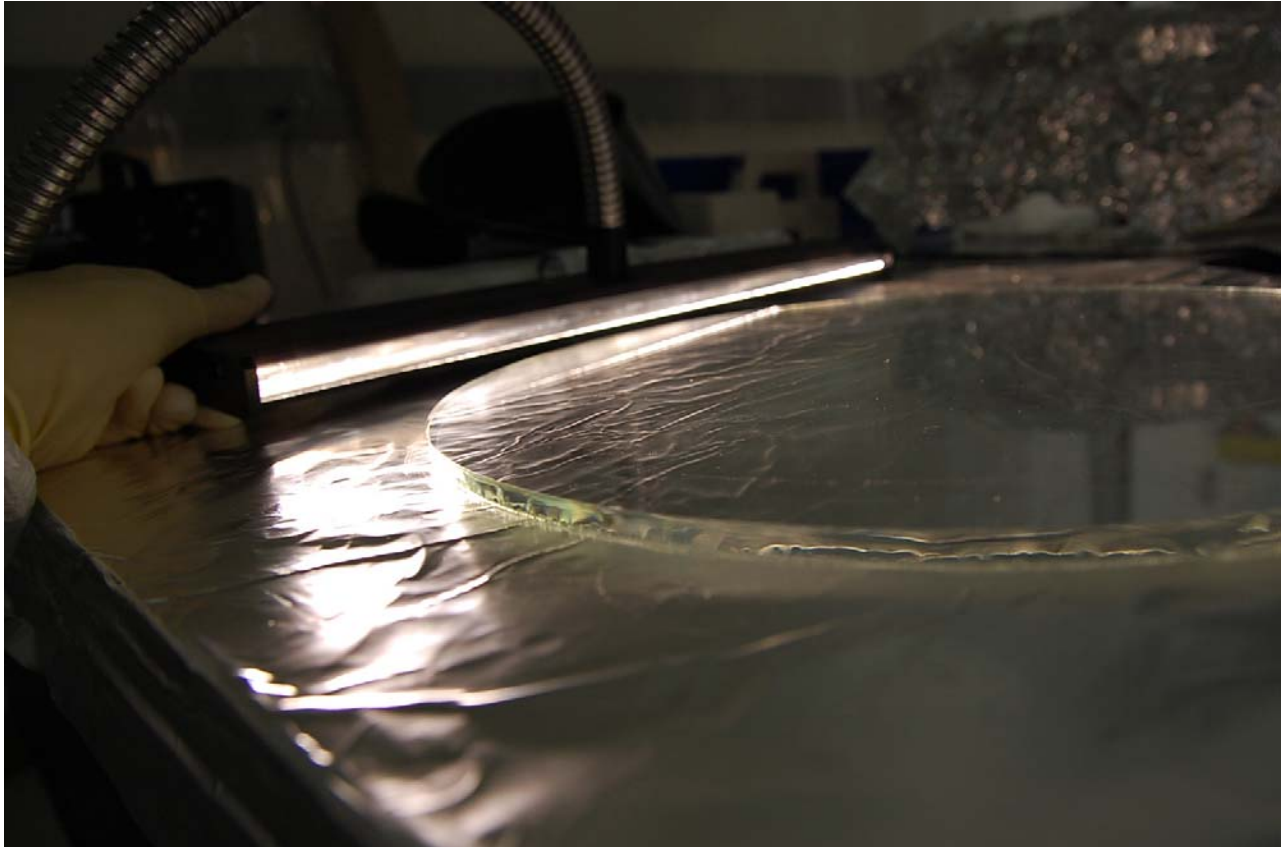


Figure 2: A ring of residue on the plate glass is barely visible using the barlight.

### 2.4 Dirty plate glass and clean o-ring (DI water soak and isopropyl wipe):

Left sucker plate on overnight, the sucker plate was still firmly attached to the glass after 24 hours. When sucker plate was removed a ring was visible. It looked as though the “ring” was simply the absence of dust. (the rest of the surface was very dusty, since it had not been cleaned) Could not see a ring left after wiping the dust off with a dry glove.

## 2.5 Dirty plate glass and clean o-ring “Scratch Test”

Placed a clean sucker plate (isopropanol cleaned o-ring) on dirty plate glass, wrapped in foil and bubblewrap and set in the back of Kurt Buckland’s car for a ride up and down the freeway. We were trying to mimic scratches caused by dust caught in the o-ring vibrating around in transport. There were no visible scratches or rings on the glass where the o-ring sat.

## 2.6 Clean plate glass and clean o-ring(DI water soak and spectroscopic grade methanol wipe)

Cleaned o-ring with spectroscopic grade methanol which is the highest grade methanol. If buying from vwr, any spectroscopic grade chemicals go by “Omnisolv” if buying from vwr. Left sucker plate on overnight, after removing there was no visible residue.

## 3 Summary

The only test where a residue definitely showed up on the plate glass was when the o-ring was cleaned with old methanol. Since there was no visible residue after using the higher grade methanol, it would be good to avoid using old methanol near optics. Spectroscopic grade is recommended. There has not been any problems with o-rings cleaned with the procedure outlined in [T1000105](#) , even when using old reagent grade isopropanol.

### Important Note:

For o-rings already in clean sucker plates, avoid taking them out to clean them, it is very easy to puncture the o-ring trying to take them out. A punctured o-ring shouldn’t be used, since it may cause the sucker plate to lose vacuum. If they look dirty, a quick wipe with isopropyl should be adequate.