



**PROCESS SPECIFICATION**

TITLE

**Large Optics and COC's Cleaning Procedures**

APPROVALS:	DATE	REV	DCN NO	BY	CHK	DCC	DATE
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**Equipment, Tools and Materials**

Class 100 laminar flow bench / sink  
 Deionized water, 18 Megohms, filtered (0.2 micron filter) at point of use.  
 Dry nitrogen cylinder, 99.99% pure  
 Ionizing blow-off gun with 0.2 micron filter.  
 Cleaning bowl  
 Holding fixture  
 Inspecting fixture  
 Hot plate  
 Particle free wipes Fastorb 820, Berkshire  
 Gloves - Ansell-Edmont Latex 90-576.  
 Lens tissue "Lensx 90", Berkshire  
 Storage Optic Holder  
 Liquinox solution prepared as follows:  
 To 2 liters of filtered DI water; add 40 ml. of Liquinox detergent.  
 Place beaker on a hot plate.  
 While stirring the solution, increase temperature to 70 degrees C; once the temperature is reached, keep stirring for at least 15 minutes.  
 Remove from hot plate - Solution is ready to use.  
 Life shelf of the solution is one week while covered.

**Washing and Drying - Coated surfaces 1 and 2 -**

**Cleaning steps 1 thorough 13 are formulated to remove heavy contamination from the optics and applies to optics without magnet assemblies.**

All procedures listed under these Cleaning Procedures must be performed under a Class 100 laminar flow bench, while suited-up in clean room garments including, but not limited to: coat, booties, bonnet, gloves, facial mask. This applies to anyone handling or near any optics being cleaned.

Clean one coated mirror surface at a time.

1. To clean the first surface, while the mirror rests on the inspecting fixture, fit the holding ring with the handles pointing up, with the bottom edge of the ring about 1/2 inch from the bottom surface. Ensure that the ring clamps tightly around the optic. If necessary, turn rotating buckle of the clamp to adjust the length of the ring and tightness of the fit. Pick up the optic, turn it over, and place it on the cleaning bowl with the



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handles pointing down so that they rest on the edge of the bowl and support the optic off the bottom of the bowl.

2. Fill the cleaning bowl with hot (70 degrees C) Liquinox solution.
3. Soak the immersed surface in the solution until the solution's temperature reaches 40 degrees C.
4. Remove the fixture / mirror from the bowl.
5. Rest the fixture / mirror on its side and at an angle, on a small stack (4-5 sheets) of Berkshire Fastorb 820 tissue, allowing the mirror surface being cleaned to protrude into the sink. Immediately spray the mirror surface with running DI water taking care not to wet the edge of the mirror.

**Never allow any surface wetted with Liquinox to get dry!!!!**

6. With a soft Lenx 90 tissue, wetted with the detergent solution, wipe the bevels of the optic. Discard the tissue.
7. With a fresh tissue, wetted with Liquinox solution, thoroughly and gently, with smooth, soft strokes, scrub the entire mirror surface. Discard tissue.
8. Immediately rinse the mirror under running DI water, gently scrubbing all surfaces with a soft lens tissue. Repeat the above step at least twice using a fresh tissue every time.
9. To final rinse, spray only deionized water over the mirror being cleaned for at **least** 10 seconds. Stop the DI water flow.

*NOTE: If the water does not sheets off the mirror's surface at this time, repeat steps 2 throughout 9.*

10. Place the holding fixture/mirror resting on its edge over a stack of soft lens tissue (Lenx 90). Dry around the bevel with tissue.
11. With the ionizing gun, utilizing pure, dry nitrogen and low pressure, (45-50 lbs./in<sup>2</sup>) slowly blow the bevel of the mirror and the surface starting from the top and working towards the bottom. Ensure that no water remains on the surfaces.
12. Place the optic on the inspecting fixture with the cleaned surface facing up. Inspect the mirror in a dark room with a high intensity lamp.
13. Remove and turn around the holding ring. Fit as in step 1.
14. Clean repeating steps 2 through 12.
15. Once both surfaces are cleaned and inspected, thoroughly clean the edges with isopropyl alcohol and acetone. Place the mirrors in their appropriate holders. Keep in a clean area until ready to use.

NOTE: Always ensure that the surface not being cleaned remains dry!

### To clean mirrors with magnet assemblies

16. Place the mirror on the inspecting fixture.
17. Fit holding ring as in step 1, taking care not to bump the magnets. Clean one surface at a time.
18. Holding the mirror by the holding fixture, place one surface under running DI water.
19. Wet a Lenx 90 tissue with warm (70 degrees C) Liquinox solution.
20. Gently and thoroughly scrub the surface with the tissue, exercising caution when wiping around the magnets.
21. Rinse under running DI water scrubbing softly the surfaces with a fresh tissue.
22. Final rinse by spraying only DI water over the entire mirror for at least 10 seconds. Stop the water flow.
23. Place the holding fixture/mirror resting on its edge over a stack of soft lens tissue (Lenx 90). Dry around



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the bevel with tissue

24. With the ionizing gun, utilizing pure, filtered nitrogen, slowly blow the sides of the mirror and the wet surface starting from the top. When drying the surface with the magnets, blow on the magnets from top to bottom to ensure they are well dry.
25. Continue blowing downwards ensuring that the bottom magnets are dry. Check that no water remains on the mirror surface.
26. Clean and dry the second surface in the same fashion.
27. Inspect the mirror for streaks and water marks in a dark room, under a dark background with a high intensity light.
28. Place the mirror on the inspecting fixture and remove the holding ring, taking care not to disturb the magnet assemblies.
29. Thoroughly clean the sides of the optics with isopropyl alcohol and methanol.
30. Keep the mirror in a clean area until ready to suspend.