

# EPNER TECHNOLOGY

## CLEANING METHOD FOR LASER BLACK

1. Submerge the part in deionized water for 10 minutes in a glass dish, during which it is gently agitated by hand in the dish for a few minutes ( preferably while held with a tool that prevents black surfaces from touching the dish). When possible, remove the tool to allow rinse water into the holes into which the tool attaches, and then re-attach the tool to remove the part from the beaker (or better yet, if it can be safely handled without a tool, do all handling with new, freshly rinsed gloves instead because they will be cleaner than the handling tool). When possible, put the part in an empty dish and then gently pour deionized water over it from a beaker, to rinse off all surfaces of the part directly (but submerging it into an already full dish works fine too).
2. Remove the part from the dish and place it immediately into another deionized water rinse dish for another 10 minutes, with the same procedure as above.
3. Remove the part from the dish and place it immediately into another deionized water rinse dish for another 10 minutes, with the same procedure as above.
4. Remove the part from the dish and immediately rinse it off by pouring reagent grade isopropanol from a beaker (the high pressure flow from a squirt bottle is not safe) gently over all surfaces.
5. Immediately following the isopropanol rinse, dry all surfaces of the part with a gentle flow of pure nitrogen.
6. Inspect for any light spots or "water marks", and if necessary repeat the isopropanol rinse and dry process (this often made light spots darker).

NOTE: The following comments were from an aerospace engineer:

"No acetone or any ultrasound was used, despite suggestions that those could be done safely, because they were not part of the standard cleaning process and we did not have the time to assemble and test the necessary equipment to prove that we could do that safely. Also note: We settled on the three rinses of 10 minutes each based on measurements of the conductivity of the rinse water after each rinse. The conductivity of the rinse water was never as good (low) as the initial source water fresh out of the deionizer machine, but it didn't get any better after the 3<sup>rd</sup> rinse, so that was deemed sufficiently clean".

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Also note: "We were extremely careful about the cleanliness of the parts that touched the flight parts. All beakers and handling tools were precision cleaned with simple green, high pressure water rinse and reagent grade isopropanol rinses. Before handling the parts with gloves, the gloves were always rinsed off with water and/or isopropanol, even if they were just put on a few seconds prior, to make sure no contamination was transferred to the part or the rinse water from the gloves".

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