

Sample Tray Re-Surfacing, Alpha Sciences Inc.

The sample trays used in the Alpha Sciences Alpha Particle Counters are made of an acrylic material, chosen for its strength, durability, aesthetics and inherent low alpha emission when new and clean. However, because of its molecular make up at the surface, it is relatively porous and can become contaminated in a number of ways. An uncovered tray left out in a room for several hours can collect a significant amount of the alpha emitter Radon in normal room air, usually in the form of dust. A sample placed on the tray can leave behind residue in the form of oils, grease, glue, powder etc. If this residue works its way into the top surface of the tray, regular cleaning will not remove it. Options include purchasing a new tray or re-surfacing the original tray. Most of the trays here at Alpha Sciences have been through this re-surfacing several times in their lives, before they are replaced (4 – 5 years).

When sample trays are new and clean, they can be protected against contamination by storing the tray in a plastic bag, sealed against room air. If stored in a cabinet, store the trays vertically to prevent dust from landing on them. If working with samples that are loose, flakey, dusty etc., consider a spacer of some sort between the sample and the tray. When loading or unloading a sample, have the tray out only long enough to do the work and then either place the tray back in the counter or store it away from room air

If a sample tray has reached a point where it has been contaminated (causing higher backgrounds) and cannot be cleaned by regular means, a re-surfacing will generally resolve the issue. Re-surfacing involves physically removing the top surface of the sample tray. This porous surface which traps the contaminants is also soft enough that a carpet razor can be used to literally shave the top surface down to a virgin layer of plastic. Of course, once exposed, this new surface is susceptible to contamination just as the original surface was, so practice good use and storage techniques.

Re-Surfacing the sample tray:



Fig. 1

Clean the surface of the sample tray with IPA to remove any loose foreign material. Use a new carpet razor that has been wiped clean with IPA as well.

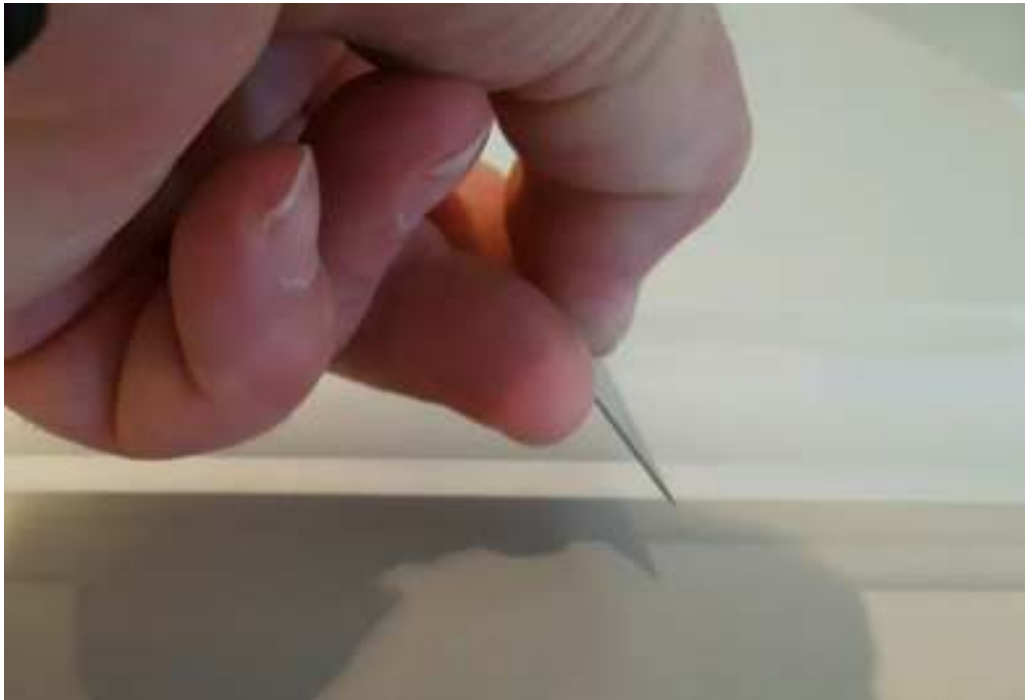


Fig. 2

Starting around the mid-line of the tray, place the razor on the tray surface close to the angle shown above. The objective is to drag the razor back and shave the top layer, rather than push and gouge it. Apply moderate pressure.

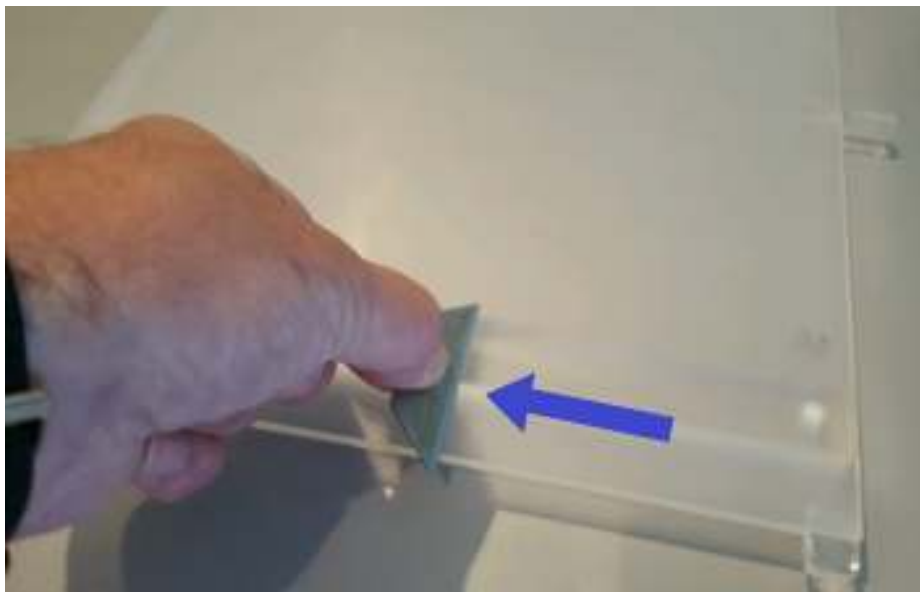


Fig. 3

Starting around the mid-line of the tray (Fig. 3), drag the razor towards the edge (Fig 4.) and shave the tray surface. Pressure on the razor should be hard enough that you will need to hold the tray still with the other hand.

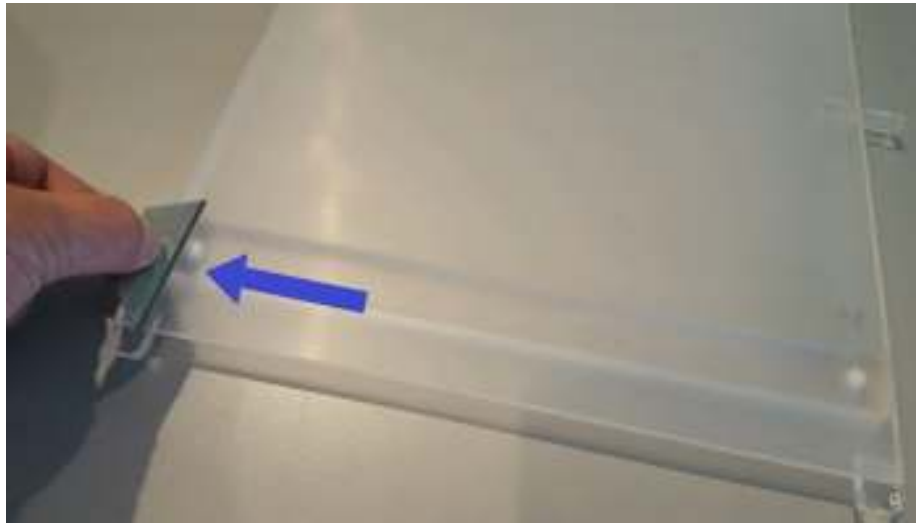


Fig. 4

Continue dragging the razor completely off the edge of the tray. Scrape the entire surface of the tray, from roughly middle to edge. Then rotate the tray and repeat to get the other side. You can tilt the tray in the light to see where the surface has been scrapped or not. The handle doesn't need to be cleaned this way. You can see in the image above how the transparency of the plastic is now opaque from re-surfacing.



Fig. 5

Plastic residue from the scraping.

The residue will have a static charge and will cling to your hand, the tray and the razor. You can clean your hand and the razor occasionally using short bursts from a can of compressed air over a large trash can.

Once the entire tray top has been re-surfaced, it too can be cleaned over a large trash can with compressed canned air and wiped with IPA, or simply wiped with IPA. Insert the tray in the counter and start a background test.