



Quick Summary - TLDR; *Mr. Kirmuss has provided microscope images to support his claim that his record cleaning machine (JKA-RC-1) is removing 11 microns of height from the record surface, and this proves it is stripping off Last Preservative from the vinyl. Given the fact that an application of Last is only 3ml, and that the majority of it evaporates from the record, there is simply not enough volume of fluid to account for 11 μm of height. Saran plastic wrap is 13 μm thick, and an 11 μm coating would be actually visible to the eye. 11 μm is a distressingly large amount of volume to be stripping from a record. Such quantities would actually degrade the sound of the music. But Mr. Fremer finds that he likes the sound of a record after cleaning in this machine, so we don't think this is happening.*

We think a simpler answer is that Mr. Kirmuss is comparing apples to oranges. He must surely know that the grooves vary in height across a record for many reasons. His images clearly measure different areas of the disc; one with the straight grooves of quiet, lower-frequency music, and one with the exaggerated jags of louder, higher-frequency music. This matters because of the difference in berm heights of the grooves.

During the creation of the original disc, the cutting stylus modulates as it plows through the medium. It will go up and down, varying the depth of the groove as it encounters different frequencies of sound. The plowing stylus creates a berm that rises above the land of the record surface. The berm increases in height as the stylus pushes aside more material during energetic moments. Our conclusion is the most likely explanation for the height difference is that he is measuring the record at two very different musical moments. But no one can tell for sure from the limited information provided. We have included an SEM image of a groove illustrating the berm height variance.

A Response from The Last Factory regarding Mr. Kirmuss' various comments about Last Preservative

Lately we have received concerned phone calls from customers alerting us to the fact that Mr. Kirmuss is making negative remarks about LAST formulas, and his ability to remove the Preservative from vinyl records with his new cleaning machine. While we have not tested his machine's abilities, we are alarmed that in the process of making his demonstrations and descriptions on his website, he makes false assertions about LAST and its properties. There are many statements to rebut, so we'll try to get through several without making this letter overly long.

Mr. Kirmuss assertions: "LAST is a coating." Also the "sugar" or "white toothpaste" substance that is pulled out of the vinyl record is from LAST coating.

LAST Preservative not only isn't a coating; there is nothing in it that can harden, dry or congeal to become one. Anyone who has applied LAST Preservative to a record can see that it is a clear, slippery fluid. It would not come out of Mr. Kirmuss' machine as the "white toothpaste" he describes. Last Preservative has a high affinity for vinyl, and it penetrates the surface to a depth of a dozen or so molecular layers. The excess fluid is removed with the applicator during proper application. The primary goal is not to lubricate, but to modify the vinyl itself to reduce the destructive shock wave of the stylus exerting 50,000+ PSI while plowing forward in the groove. We think of it as essentially permanent (200+ plays) though perhaps the repeated energetic effervescence of Mr. Kirmuss' ultrasonic system *may* remove some small amount on the very top surface.

Regarding coatings and their problems, record vinyl has various manufacturing additives including mold release compounds and internal lubricants. It is likely this white debris is what Mr. Kirmuss was working hard to remove. We know, as with our own formulas, the record companies keep their formulations as tightly held secrets. They put a lot of effort into making a compound that works. At the LAST factory we of course have a couple of our own cleaning solutions, but this isn't a sales pitch and from Mr. Fremer's review, Mr. Kirmuss' machine does a good and thorough job of cleaning.

Mr. Kirmuss: "You can't change a molecular structure throughout a whole PVC that's gone under polymerization. You can't."

Technically you CAN change the molecular structure of PVC – for instance with light, heat, age, or even chemically. But more to the point, Last does NOT claim to change the molecular properties of the PVC itself. Last Preservative has a high affinity to vinyl and it has a very small size compared to the long-chain vinyl molecules. After application, it is not on the surface for more than the few moments it takes to get integrated into the PVC amalgam. It diffuses into the voids and crevasses to a depth of ten or more molecular layers. The Preservative enters and “locks into” these voids, thereby acting as a permanent shock-absorber for the vinyl. It acts to buffer the propagation of the stylus-created shock wave, thus preventing damage when played.

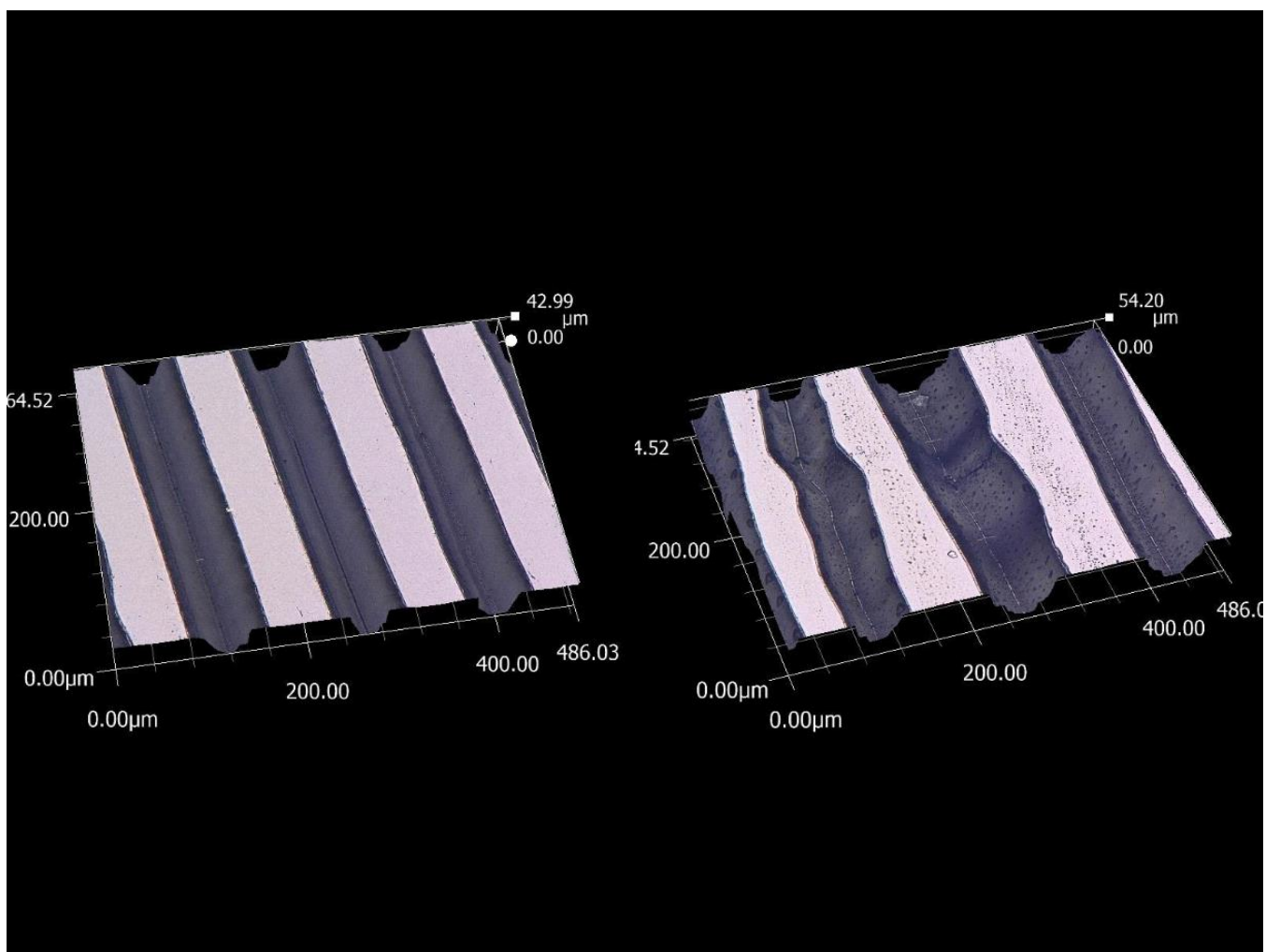
Mr. Kirmuss claims proof of removal of Last Preservative, with description and images provided

"The right side image shows a record that saw the release agent first removed using our process, then we applied LAST per the instructions with the felt. We dried the record for 30 days before playing it. And before restring it, stripping off Last. "

"You will note where the record height is 54.2 microns. Also note where the coating has captured dust particles. "

"We also measured the signal level at 30 days before restoration."

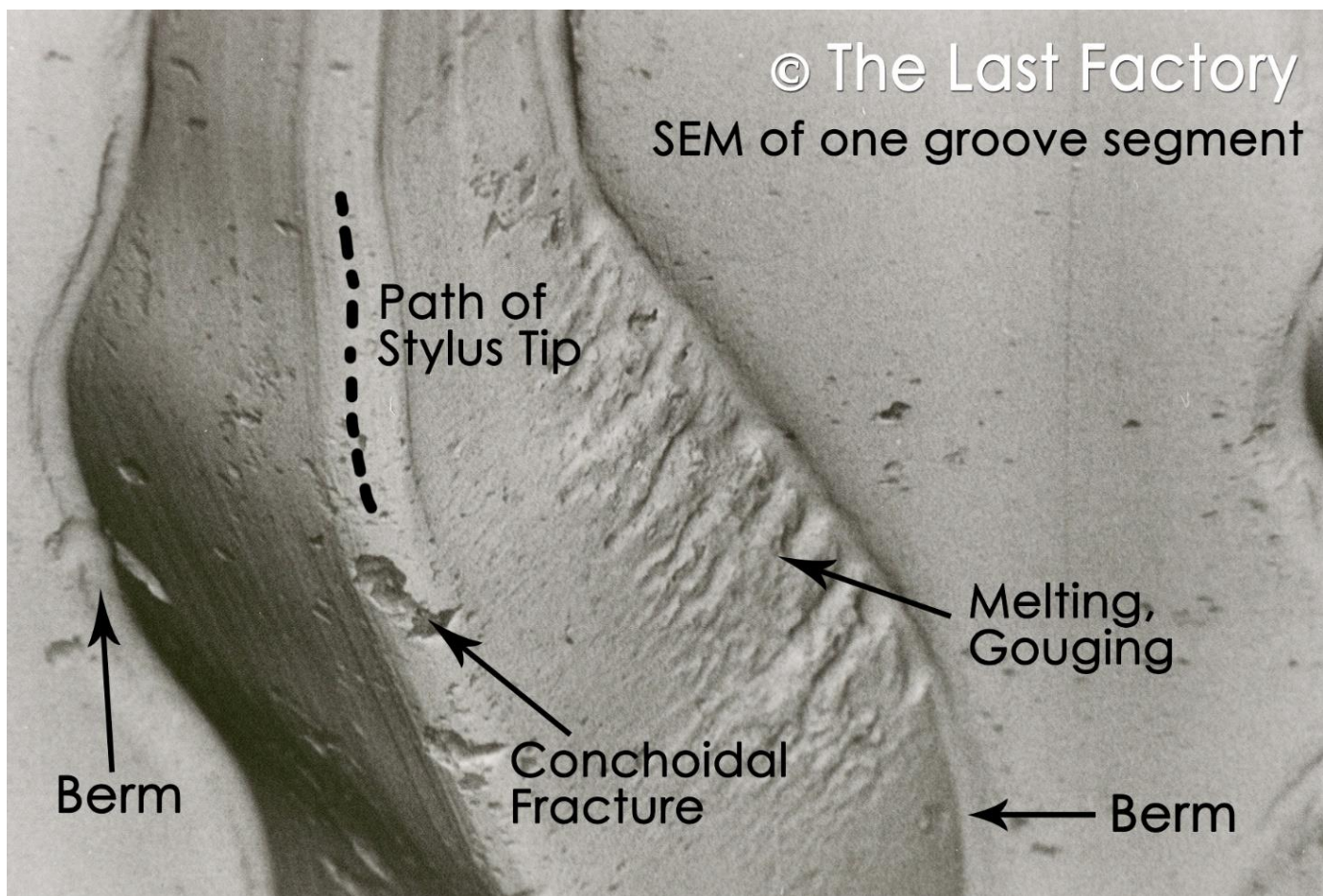
"The image to the left shows the record height now at 42.99 microns." --- C. Kirmuss



We're not sure what Mr. Kirmuss is trying to say. We think he is saying he had the depth of the record groove measured, from the bottom of the groove up to the land. He had a record measured with Last Preservative on it and it was 54.20 micrometers thick. He washed the record, supposedly stripping it, and had it remeasured to a height of 42.99 micrometers, a difference of 11.21 micrometers. He therefore assumes Last Preservative is a coating and he has successfully stripped it off.

Where to start?

1. It is painfully clear that these measurements are from two completely different points in the record. The left side grooves are very straight, indicating little sound, and the right indicates a section with more modulation.
2. In reality, the depth of the groove constantly varies over the record surface. A measurement from the bottom of the groove to the top is going to be different as the music changes. The change in depth is by design, as the cutting stylus will move up and down as well as sideways to capture the loudness and frequency of the music. The only way to make a meaningful measurement of this type is to measure the same spot before and after.
3. He states that the difference in thickness proves Last must be a coating of about 11 μm on the surface. However it is not a coating. Last Preservative sinks into the vinyl, filling the voids in the long-chain molecules of the vinyl amalgam. Even supposing that NONE of the Preservative sunk in, and it all stayed on the surface, the tiny amount one applies wouldn't be enough to cause a rise in thickness of 11 μm . In comparison, kitchen plastic wrap is about 13 μm thick. That's pretty thick, and a 11 μm coating would be plainly visible to the human eye.
4. His microscopic image is not detailed enough to show what is really happening. Here is an SEM photograph we took of a groove and its imperfections. This was from a record that was never treated with Last Preservative. It was played 50 times.



Record groove with conchoidal fractures and divots on bottom and sides. Slip-stick chatter (melting, gouging) damage on the right side. At this scale, the tiny imperfections of the vinyl are apparent on the sides of the groove, and even on the un-played flat land to the right of the groove. Record pressings are never perfect.

Note the berms on the top outer sides of the groove, caused by the original cutting stylus as it plowed its way through the master disc. The lip rises above the height of the land. More energetic music will cause a higher

berm, because the stylus wiggles more widely and pushes more material to the side as it makes a wider path. This is illustrated by the larger berm on the left side of the groove where the path suddenly widens.

In the end, the height difference he found could be due to many things. His simple tests were not designed to separate out these variables. In our opinion, we think he was measuring the increased berms of the grooves because that section had more modulation. His images provide no useful information regarding his claims about Last Preservative.

Best regards,

Walter Davies, Christine McCall and Jeff Kaskey