

Procedures for polishing non-clad aluminum sheet metal, i.e., Sonex, Zenith, Murphy and other kit aircraft and other vehicles using nonclad, mill-finish 6061 aluminum.

The following method using Nuvite NuShine II Metal Polishes will polish non-clad aluminum sheet stock, giving you an outstanding finish and a show-quality shine. There are several popular kit airplanes designed for and built from 6061 non-clad aluminum sheet stock.

However, almost by definition, this means it is “mill finish”, and to get a good final finish, it requires some special, time-consuming -but not “hard” work. This is because mill finish is often rougher, but also, when you polish the actual alloy, you are working with a much harder surface than would be the case if you were polishing clad material, which is soft.

The good news is that once polished, the **non-clad stock will resist dulling from atmospheric oxidation much longer than does clad material!** Our experience with non-clad material polished as follows has been excellent. You just have to spend the unneeded future upkeep time up front – but since you are building, it can be an easier task to get at the surface for polishing.

Nuvite NuShine II metal polishes are manufactured in various grades to match the needs of the original metal condition in the compounding phase of polishing. This system makes it ideal to deal with non-clad, mill-finish aluminum sheet stock. Following the use of a compounding grade of NuShine II polish, the final finish is always done with NuShine II Grade S that gives you that really bright, fine and deep image, with no machine swirl marks.

The mill finish usually means that there are fine surface lines over the whole surface from the rollers that formed the sheet. Because Nuvite NuShine II is a "blending" type of polish (does not grind away the rough spots as other kinds of polishes do), the compounding phase is meant to merely roll the microscopic high spots and low spots together into a smoother and more reflective surface. We call it "healing the surface". Once this compounding phase is complete, the lines, or “grain” will be minimized or smoothed altogether, and the surface is ready to take a high and deeply transparent shine with an excellent, mirror-like image reflectivity.

Polishing Procedures:

Compounding Phase

F9 Passes

Assure that the surface to be buffed is clean, dry and free from oils & water.



1. Using Nuvite NuShine II Grade F9, put big wet “fingerprints” of polish every 3” over a 2’ X 1 ½’ area to be compounded. Compound buff using a variable speed circular (“car”) buffer and 100 % wool “compounding” pad. (Nuvite EQ-140 or 3M #05711). “Compounding” pads can be identified by the tufted pad face that is “twilled” into tufts, similar to a cut-pile carpet. **VERY IMPORTANT:** Do not use standard “loose wool” pads.

2. “Pat” the surface with the pad before turning on the buffer to spread the polish a little so it will not “throw” when the buffer is turned on. Turn on the buffer at about 1500-2000 rpm and buff across the surface, holding the buffer at about a 15 degree angle, so that one side of the buffing face of the pad comes in contact with

the surface. Do not hold flat. Move the buffer back and forth over the area with sweeping passes. About 2 to 3 seconds per foot seems to work well as a starting suggestion. Some pressure can be placed on the buffing, but keep the buffer moving to prevent overheating the surface. Do

not slowly “grind” across the surface. Moving slowly, especially when the surface is still relatively rough, can cause overheating both the metal and the polish. Due to surface friction, heating occurs rapidly during the first pass on the mill finish. Do not keep buffing after the metal stays too hot to touch for longer than 10 seconds or so. Move to the next area, and after a couple of passes there, return to the first area after it has cooled. As the surface gets smoother, heat does not build as fast. To control heating, maintain the “sweeping” action across the surface. Do not stop and “work” a spot. The surface will get hot as you buff, but will cool quickly as you move over other areas being worked.

3. In 45 to 60 seconds, the black polish residue should come off the surface, leaving a clean, clear surface. If the black residue remains on the surface longer than 60 seconds, too much polish is being used, and the desired surface blending action is reduced. You may wish to continue working the surface a little while after the surface is clear, as the F9 is on the pad and will continue working for another 30 seconds or so.
4. Repeat the above over the same area. The more passes, the more the blending action will ease the mill roller “grain” and smooth the metal surface. We recommend four to five passes as a minimum. Each pass runs only a bit more than 60 seconds, so we are not talking an all-day project for each small area. More passes will give a smoother surface, although even more passes will not harm the metal or its’ properties. Do not allow your pads to load up (get shiny). Use a spur to refluff the pad nap about every 15 minutes. Change pads when it will not refluff the wool pile.

As a suggestion, areas that will be out of sight –top of wings on a high wing plane, bottom on low wing, and the belly, will look great after two passes, while “high-visibility” areas, such as underside of the wing (high wing – top surface of a low wing) and the fuselage turtledeck, cowl & sides get more, if necessary, passes to get that extra, up-close, smooth finish.



5. After working one area, move on to the next area, and so on. When through with buffing for the day, thoroughly clean the surface of any F9 polish residue around fasteners/seams/ joints, etc. Long nap microfiber cloth is very effective when polish is still fresh, and seems to have an affinity for the accumulated polish. Leaving the polish to dry makes the residue harder to remove, and may require mineral spirits.

Grade C Passes

Follow the above with a second phase of compound buffing, this time two passes only, using identical procedures, with Nuvite NuShine II Grade C. This double pass with C will brighten the surface color to a high, bright shine, but polishing marks on the surface will be visible. These are taken out with the final finish pass. Use fresh buffing pads (not impregnated with F9 polish). It is always wise to mark pads to keep

the process organized so that a stronger grade polish is not introduced during compounding with a finer grade (i.e., later in the process).

When polishing a kit type aircraft, we recommend that at least the compounding polishing should be done before assembly – on a padded bench or similar such as an assembly jig, so that overhead and “lying down” polishing effort is avoided. Completing the compounding phase while unassembled and doing the final finish after assembly will minimize the muscle strains.

Also, another recommendation: Do the “Compounding Phase” –F9 passes and the C passes, cleaning up rivet residue, etc. as you go. Then stop polishing and complete your plane – assembly, details, and fly off the hours. When the heavy “tweaking activity” is done, then go back for a touchup in those areas you have messed up with a pass of Grade C, clean up the residue, and then do the final finishing. This way, your final finish will not get damaged with the assembly and flyoff time activity, so you don’t waste effort.

And finally, -consider: some folks feel that most kit aircraft sit so low to the ground that nobody, but nobody, can see that your polish job isn’t perfect on the bottom side. Besides, when you have to rebuff..., well let’s just say buffing on overhead surfaces are somewhat less than a fun time... If you agree with this (you might even work your paint trim scheme to paint the cowl and belly/bottom of the wing...!) spend your effort to get the highly visible areas looking really good –the top of the wings (low wing), turtledeck, tail, etc., and leave some of the mill marks in, -but brightly polished - on the underside. Guaranteed it will look perfect at pattern altitude!

Final Finish

1. Using an orbital buffer, such as the Cyclo Model 5 (Nuvite EQ-137) with a 100% cotton flannel sheet (cotton “sweatshirt” material -Nuvite EQ-145) merely held tightly wrapped over the orbiting pads with your hand, final buff with Nuvite NuShine II Grade S. Orbital buffer pads do not turn (not powered), only “orbit”, so you are just buffing through the flannel.

It is very important to keep the flannel sheet face clean. Fold sheets face-to-face for stock storage. When using in the polishing environment, make sure that the flannel “fleece” or polishing face side only comes in contact with surfaces that are clean and free from any earlier polishing residue. An easy way to insure that the flannel fleece is not contaminated with dirt and dust is to use a roll of “butcher paper” and unroll a clean sheet each time for the flannel face to lay on when wrapping around the buffing head(s)

2. Put one wet “fingerprint” every 6” over 2’ X 1 ½’ area. Buff with continuously moving sweeping action. Do not slowly “grind” across the surface. Polish residue should disappear after 30-60 seconds. Buff until surface is clear and clean of polish.
3. Move on to the next area, and so on. “Clean buff” – use a lightly used flannel spot over the buffing head(s) and spot buff any leftover polish residue areas. Follow with a “dry” pass (no polish) with long, wide buffing sweeps, using a clean long nap microfiber cloth for final surface cleanup.

Although this polishing can be as much of an intense process as preparing the airframe metal for painting might be, you will find that once done, the shine and longevity of the polished non-clad material is exceptionally good. Quite a bit better than with aircraft built of clad material, although they will get better over the years as they are buffed over and over until the clad is burnished smooth and “tight” with no oxidation on the surface.

For most homebuilt, all metal, 2-passenger size aircraft, you will need approximately 2 to 3 pounds of Nuvite NuShine II Grade F9, 1 pound of Nuvite NuShine II Grade C and 1/2 pound of Nuvite NuShine II Grade S to accomplish the process as described above.

We have had reports that the polish on non-clad aircraft is not affected when wipedown, debugging and cleaning with normal wetwash cleaners such as Nuvite CitriCut, using standard dilution as directed. Do not allow CitriCut or any other citrus-type cleaners to contact your polycarbonate windscreens or side windows, however. They are not approved for polycarbonates such as “Lexan”. For acrylics such as Plexiglas, CitriCut is tested and certified for use.

Polishing has its’ advantages. It is likely you will spend a great deal less than the cost of the paint, primer labor and other materials, there are reports that the needed surface preparation for painting does not take a great deal less time (\$\$\$) and effort than this polishing process! And, of course, your aircraft will be lighter...

Another consideration is that you will most likely find the grass around your airplane to suffer greatly more traffic damage at airshows than others.

