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Chemical Compounds Corporation

***"Making the World Shine Since 1949"***

### ***Nuvite Recommended Polishing Procedures For NuShine II Metal Polish***

The following polishing procedures are a compilation of many methods developed through our own use of our products in field and lab testing, and from the many customers who have offered their own findings through their experiences.

Although the following is a recommended procedure, it may not be the only procedure to provide good results. Metal polishing is at least as much an art as a procedure, but we have found that the following method will give you outstanding results in the shortest amount of time –and with the least amount of hard work. Join in the fun, and give your aircraft, boat, bike, car or RV the personalized touch of a truly "knock your socks off", outstanding polish finish – with the absolute best depth, clarity and image obtainable, anywhere, any way – period! Believe it or not... users of Nuvite NuShine II have coined the phrase "The Nuvite Look" to describe the excellence of polish jobs on aircraft.

...Well, we couldn't say it better ourselves!



## “The Better the Polish Job, The Longer It Lasts!”

It's true! -once the surface is polished to that clear, deep image Nuvite NuShine II offers, (aka. “That Nuvite Look”) and the more times it gets that Nuvite polish job, the longer it will last. This is because the metal surface becomes better and better. The surface is more “healed”. The Nuvite system of graded polishes allows you to truly remove embedded oxidation. Oxidation left in the polished surface rapidly increases the breeding of more oxidation, causing the polish job to dull quicker. The cleaner the surface of oxidation, the longer the polish job lasts.

### “One Grade of Polish Can't Do It All”

Nuvite's NuShine II polishes are



designed, specifically, to be a "System" of differing polishes – with characteristics that do specific tasks that will save you time and a great deal of effort to accomplish the particular phase of the process leading to the outstanding results you, and we, desire.

(i.e.: “The Nuvite Look!”)

## The Nuvite NuShine II Metal Polish System

**Finishing Grades:** *surface of the metal has been “healed” or prepared with the compounding grades below.*

**NuShine II Grade S** – the finishing grade that gives the really deep, clear image when used as a final finish over a properly prepared, oxidation-free surface. (Here's “The Nuvite Look”)

**NuShine II Grade A** – a medium-finish grade that gives a clear, clean shine and can be used as a light cutting grade to remove very slight oxidation, such as when a good polish job starts to slightly degrade. Also useful for hand polishing in tight spots where buffers cannot reach. Will give good finishes good, bright look similar to usual commercial grade polishes, but still should be followed by Grade S to get the spectacular “Nuvite Look”.

### Compounding Grades:

*Before a polished metal surface can present a really clear deep image, it needs to be prepared for the final finish -to “heal the surface”. One or more of the NuShine II cutting grades may need to be used before the final “Nuvite Look” can be achieved.*

**NuShine II Grade C** – C is a cutting grade polish that we recommend to prep for using Grade S. Use Grade C on aluminum that has been polished or on new, good finish clad. Grade C will remove the cloudy/hazy white background (called “undercast”) found in many otherwise good polish finishes.

(See Specific Procedures)

**NuShine Grade G6** – When the

Finish polishing your aircraft will put that “Exclamation Point” of your pride in the project. No other finish, however good or expensive will out-draw show crowd interest as well-polished aluminum (–experts, and the “Ohh and Ahh'ers” as well!).

Nuvite stands ready to help you at any point along the way to help you get to that beautiful final finish.

We are available toll-free for Technical Support at (888) 326-6489.

Call if you have questions.

Thank you for using  
Nuvite Chemical Compounds  
Corporation products!

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) comes in contact with surfaces that are clean and free from any earlier polish-

ing 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).

Nuvite encourages feedback from users of all its products. E-mail [www.nuvitechemical.com](http://www.nuvitechemical.com) or by phone at (800) 394-8351

**Check out Nuvite's other superior products:**

[www.nuvitechemical.com](http://www.nuvitechemical.com)

### **Paint Finish Care Products:**

*NuPol HD Cleaner and Paint Gloss Restorer*  
*NuPower II Drywash Cleaner/UV Protectant*  
*NuGlaze PFS Extreme Glosser/UV Protectant and PolyFluoro Sealant*

### **Waterborne Cleaners and Degreasers**

*CitriCut & CitriCut Gel Wetwash/Degreaser*  
*SS 9-3 Debugger & Surface Wipedown Cleaner*  
*Impact HD II HD Gel Degreaser*

### **Interior Care Products**

*C-49 Plastic/Fabric/Carpet & Leather Cleaner*  
*Leather Guard Premium Leather Conditioner*  
*Regard Wood & Poly Finish Furniture Crème*  
*Rid Lavatory and Galley Cleaner*  
*PCS Professional Carpet Spotter*  
*Extractor Carpet Extraction Machine Fluid*

surface is unpolished, mill-finish, or has been allowed to deteriorate, G6 may be a good answer as it will quickly but gently get to a "healed" surface finish. G6 has a high-tech media system that is designed to do a quick, aggressive oxidation cut, and immediately break down to a finer action, similar to Grade C. Use when there is normal to serious oxidation on the surface of the aluminum, or even when very light corrosion is evident. Can also be used to blend surface scratches in aluminum and will polish stainless steel.

**NuShine II Grade F7** – F7 has a very hard and sharp, but very fine media that continues its action throughout the buffing process. It is best used for removing heavy oxidation, corrosion, pits or scratches from aluminum surfaces, stretch-formed aluminum, polishing new, non-clad aluminum, or for polishing stainless steel or titanium. It is usually best to follow F7 with C and then grade S.

**NuShine II Grade F9** –F9 is used where the surface has been damaged by stripping processes, sanded or scratched by abrasive cloth. Ask your Nuvite representative for specific recommendations, but never use standard sanding papers –even wet. There are specialty micro fine surface sanding materials (specialty grade abrasives –not commercial grade sandpapers) that may be helpful in really severe situations prior to using F9. But F9 is a good surface blender and is useful even for non-clad aluminum, harder alloys and anodized surfaces needing special procedures because of the surface hardness before moving on to

grade G6 or C for further surface preparation.

### **Specific Equipment & Procedures:**

Recommended equipment:

-- An inexpensive electric circular buffer/polisher -normally called a "car" buffer -which can be purchased from Nuvite #EQ-136, @ around \$89.95, or may be found at discount department stores.

NOTE: no more than 1500 -



2000 rpm should be used.

-- Purchase a "hook & loop" mount buffing head (from Nuvite #EQ-143 or use the 3M "Hookit" System) for the buffer/polisher if it does not come with Velcro-type



backing pad. These can usually be found at about \$20.00 - \$24.00.

-- **Nuvite #EQ-140** or 3M #05711 or 05719 (or equivalent) tufted wool "Compounding Pad" for the buffing head (cost -about 10.00 - \$12.00 each) and a buffing "spur" pad cleaner -**Nuvite #EQ-144** -about \$5.00- \$6.00. (Pads can be cleaned,

washed and reused).

For finishing, one of the best ma-



chines we have seen is the Cyclo Model 5 dual head orbital buffer - (cost - about \$270.00).

Cyclo buffers are available from Nuvite, #EQ-137 or the Swift Museum Foundation (423) 744-9696, (www.swiftparts.com), Perfect Polish: www.perfectpolish.com, or several others

Another, somewhat more time consuming option is an electric orbital (non-spinning pad) auto polisher - \$29.95 & up, -can be found at any large retail auto supply store.)

-- Foam pads for Cyclo buffer above - @ \$10.00 - 12.00 set (Used as cushion pads for cotton flannel below).

-- Cotton flannel (example: 95% cotton/5% polyester backing - available from the Swift Museum Foundation (423) 744-9696, (www.swiftparts.com) or Perfect Polish at www.perfectpolish.com) or



some use heavy 100% cotton T-shirt material to wrap around orbital buffing head for finishing.

### Procedures:

#### 1. For lightly pitted, or very dull metal, or small surface scratches:

(For repair of scratched or severely corroded metal, contact Nuvite for specific procedure suggestions.)

-Remove any oils, paraffins (from smoke oils) and dirt from the surface before polishing. Surface should be dry with normal humidity conditions for best results.

Use Nuvite NuShine II – Grade F7 or G6 polish (depending on surface condition) starting with new or clean wool compounding pad on circular type buffer:

Place one finger across the top surface of the polish, just wet your finger with polish (do NOT dip out a quantity of polish –only wet you finger with polish) and put a wet "fingerprint" of about half a finger length every 3" or so over an area of 18" – 24" square to be polished. Work quickly – do not allow the polish to dry.

Place the pad onto the "fingerprinted" area, and smear the polish around a little before turning on the polisher. The polisher should not run more than about 1800. We do not recommend that higher than 2000 rpm be used.

Tilt the pad up very slightly (10-15 degrees or so) so that one side of the pad touches the surface as it spins (do not lay flat). Move the polisher over the surface at a speed of about one to two seconds per foot of travel as it spins. It is not necessary to press hard against the surface. Light, but firm pressure is all that is needed.

put wet "fingerprints" of polish every 3" over a 2' X 1 1/2' area to be compounded. Compound buff using 2000-2500 rpm rotary 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. Do not use standard "loose wool" pads.

Move the buffer back and forth over the area with sweeping passes. Do not slowly "grind" across the surface. The black polish residue should come off the surface, leaving a clean, clear surface after about 30 – 45 seconds. If the black residue remains on the surface longer than 30- 45 seconds, too much polish is being used, and the desired surface burnishing action is reduced. Depending on surface roughness, more passes with Grade F9 may be advisable –twice is usual.

Thoroughly clean the surface of any F9 polish residue around fasteners/seams/joints, etc. Microfiber cloth is very effective when polish is still fresh, and seems to have an affinity for the accumulated polish.

Follow the above with a second compound buff, using identical procedures, with Nuvite NuShine II Grade G6. 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).

### Final finish:

Using an orbital buffer with a 100% cotton flannel sheet wrapped over the buffing pad(s), final buff with Nuvite NuShine II Grade S. Put one wet "fingerprint" every 6" over 2' X 1 1/2' area. Buff with continuously moving sweeping action. Do not slowly "grind" across the surface. Polish residue should disappear after 30-45 seconds. Buff until surface is clear and clean of polish.

"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 flannel for final surface cleanup.

## Stretch-Formed Aluminum Polishing Procedure

The stretch-forming process pulls the surface clad out of its' rolled smooth condition – or in the case of prepolished sheet (commonly known as (“Speculair” or PSQ: Premium Skin Quality) - its' rolled and polished condition. Under a microscope, the surface will look like “pulled taffy – or orange peel”. The following process can be used to level and burnish the surface to a mirror shine condition. Using the specialized sanding procedure described with discretion, the clad layer will not be compromised or penetrated, and Nuvite NuShine II compounding and finishing polishes can be used to restore the surface appearance to near perfection, with clarity, and extreme depth of reflected image.

### Determine surface texture severity

Mill grade aluminum usually has more roughness, Speculair (prepolished) grade is usually less textured.

**Surface Prep:** - Mill grade: Start process by carefully DA sanding using specialty abra-

sives to preserve as much clad thickness as possible. Carefully sand surface with high-speed DA sander and Micro-Surface Corporation Micro-Mesh #1500AO disk, using “Tap Magic” aluminum cutting fluid. When surface is nearly smooth, follow with a DA sand with Micro-Mesh #1800AO disk.

To preserve as much clad as possible, leave slight surface unevenness after sanding. The Nuvite NuShine II polish process will burnish to smooth surface during Compounding Phase.

### “Speculair” PSQ

**(prepolished):** Severe surface unevenness: Same as mill grade above. If not severe, compound with wool pad on rotary (car-type) buffer at 2000-2500 rpm using Nuvite NuShine II Grade F9. Several passes may be necessary as each will further burnish the roughness and “heal” the surface irregularities.

Clean cutting fluid residue from surface before beginning buff polishing.

### Polishing Procedure :

**Compounding Phase:** Using Nuvite NuShine II Grade F9,



(If it were a horizontal surface, about the weight of the buffer or very slightly more.) Scratched area may require working back and forth, then up and down, then trace an “X” pattern over the scratched area several times to blend the scratches. Do not stop moving the pad back and forth and “bear down” on one area to blend the scratch. It can cause too much surface heating.

Black residue will form over the buffing area. Continue moving the buffer back and forth/up and down across the surface. After about 30 – 45 seconds, the black residue will begin to lighten and disappear if you have the correct amount of polish. Continue moving over the area until the black residue is gone and the clean aluminum surface shows. Black residue may remain around the edges of your buffed area, but that will be cleared as we move to the next adjoining area to be buffed. If further work is needed to clear the cloudiness or scratches remain

prominent, repeat the above process.

Repeat the above steps on the next adjoining area, and so on until the panel, or whole vehicle is complete. When the wool compounding pad “cakes up” (looks shiny) with polish, fluff the nap of the pad by “spurring” with a buffing spur or a screwdriver blade held vertical against the face of the spinning pad.

**2. New, clad aluminum or already polished metal with moderate to severe cloudiness in the reflecting image:**

–Remove any oils, paraffins (from smoke oils) and dirt from the surface before polishing. Surface should be dry with normal humidity conditions for best results.

Use Nuvite NuShine II – Grade G6 or C polish (depending on surface condition) with new or clean wool compounding pad on circular type buffer:

Place one finger across the top surface of the polish, just wet your finger with polish (do NOT dip out a

quantity of polish –only wet your finger with polish) and put a wet "fingerprint" of about half a finger length every 3" or so over an area of 18" – 24" square to be polished. Work quickly – do not allow the polish to dry.

Place the pad onto the "fingerprinted" area, and smear the polish around a little before turning on the polisher. The polisher should not run more than about 1800. We do not recommend that higher than 2000 rpm be used.

Tilt the pad up very slightly (10-15 degrees or so) so that one side of the pad touches the surface as it spins (do not lay flat). Move the polisher over the surface at a speed of about one to two seconds per foot of travel as it spins. It is not necessary to press hard against the surface. Light, but firm pressure is all that is needed. (on a horizontal surface, about the weight of the buffer or very slightly more.) Do not stop moving the pad back and forth and "bear down" on one area. It can cause too much surface heating.

Black residue will form over the buffing area. Continue moving the buffer back and forth/up and down across the surface. After about 30 – 45 seconds, the black residue will begin to lighten and disappear if you have the correct amount of polish. Continue moving over the area until the black residue is gone and the clean aluminum surface shows. Black residue may remain

around the edges of your buffed area, but that will be cleared as we move to the next adjoining area to be buffed. . If further work is needed to clear the cloudiness, repeat the above process.

Repeat the above steps on the next adjoining area, and so on until the panel, or whole vehicle is complete. When the wool compounding pad "cakes up" (looks shiny) with polish, fluff the nap of the pad by "spurring" with a buffing spur or a screwdriver blade held vertical against the face of the spinning pad.

Before starting with finishing Grade S, use a dry, clean microfiber cloth or similar to hand wipe the surface clean of the cutting grade polish. If needed, mineral spirits or washing the whole area with mild detergent may be done to remove any surface polish, rivet head or panel line accumulations of residue.

### Finishing:

Use Nuvite NuShine II - Grade S polish and either cotton flannel or heavy 100% cotton T-shirt material on orbital (non-spinning pad) polisher.

Wrap flannel or T-shirt material over the face of the polisher pad(s), being sure to leave any motor air

**6. "Show Finish" Hangaring suggestion:** In high humidity climates, in closed hangars with concrete floors – keep a small fan running slowly during the high humidity months – not blowing hard – just moving the air a bit. In extreme situations, borrow some used, discarded carpet from the dumpster out behind the carpet store, and place it on the concrete floor under the "footprint" of the airplane. No need to cover the whole floor – just where the plane sits.

**7. Nuvite NuShine II Metal Polishes work great on boats, truck tanks/trailers and travel trailers.** The aluminum used for aviation purposes is very commonly used in the construction of both small boats, truck tanks & trailers and travel trailers—both current-day and in the past. The major concern is whether there is a clearcoat or anodized surface put on the aluminum at the factory. If your aluminum surface has deteriorated, and you want to polish, contact the factory or businesses familiar with your boat, tank or trailer and ascertain whether there is a coating that must be stripped off prior to polishing. If you

find that you need further information about how to easily remove these types of surface treatments, contact Nuvite at (800)394-8351 or Tech Support at (888)326-6489.

**8. Nuvite NuShine II metal polish works great on brass, nickel, silver, stainless steel, titanium...** just about any metal, and Grade S works as a paint surface polish as well!

**9. Yes, Nushine II will usually take exhaust heat "bluing" off chrome exhaust pipes** on motorcycles and exhaust stacks.

**10. Polished aluminum can be cleaned without hazing the polish job** with Nuvite NuImage polished metal cleaner.

**11. Synthetic scrubbing pads are generally too coarse when stripping paint from aluminum,** and the scratches in the surface will be extremely hard to blend. Avoid using them when you want to subsequently polish the metal surface.

**12. NuShine II polish may be used by hand** but compounding by machine as described is most effective.



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

**Also: FYI –**

**1. Yes, you can paint over areas polished with Nuvite NuShine II polishes** —with thorough, standard surface preparation. Although, as a suggestion, painting after the compounding phase, and before you do the final finish would be ideal. Final polishing will not harm cured paint or masked areas.

**2. If you have surface scratches and blemishes** that the above polishing procedures will not remove, contact Nuvite for specific procedures.

**3. No, we do not know of any coating that will help to protect your polish job** beyond the protection built into NuShine II. Anything between you and the finish you will achieve WILL dull the image you see, and when you are ready to polish again, you will have to etch strip the coating away to keep it from fouling the buffing pads, the polish, and the expected result. Stripping will cause you

to have to start the “healing” process all over again.

**4. If you allow water to dry on the surface** of your polished airplane, it is almost certain to get hard-to-remove white spots in the image. This comes from the dust from the air that contains salts and alkalines that dissolve in the water spots. As the spot dries, the water goes away, leaving a stronger and stronger “brine” of chemicals that will etch into your surface. It does the same thing on paint. It can be avoided by wiping the surfaces dry with a synthetic chamois or similar prior to the moisture drying up.

**5. Most likely, you will find the need to repolish again before the first year is up** —just a quick pass with Grade C and finish with Grade S as before —not the whole compounding process. However, after that, experience has shown, that with reasonable care, your polish job will remain quite acceptable for as long as a year or maybe longer, depending on weather encountered and storage care. This is consistent with the metal surface being “healed” to a tight, oxidation-free surface.



vent opening unobstructed.

Place one finger across the top surface of the jar of polish, and put a wet "fingerprint" of about half a finger length every 6" or so over an area of 18-24" square to be polished. (Note that this is half the amount of polish used in the other grades.)

Pull the cotton flannel or T-shirt material tight over the face of the polisher and hold with your hand as you grip the polisher handholds.

Smear the face of the polisher around the area to be polished before turning on the polisher, then turn it on and again move the polisher over the area at about three seconds per foot of travel. Use only light pressure.

Move the polisher back and forth/up and down – work the areas around raised rivets and panel lines

some extra, maybe even tipping the pad a small amount on these areas. Black residue will appear as before.

After 30 – 45 seconds, the black residue will begin to disappear as you continue buffing over the area, and the bright, clear shine will begin to appear. Work back over rivets and panel lines to clean the residue from these areas as well as possible.

When the area is clean of surface polish, stop the polisher, move the flannel/T-shirt material to a new, clean spot of the material, and final buff over the whole area, continuing the cleaning and brightening of the finish and picking up any light residue caught around rivets and panel lines.

Final finish with clean flannel cloth material by hand, lightly cleaning close in around rivet heads and with folded material to get back against the edges of the panel lines. Be careful not to drag any polish out onto the clean, clear, open panel polish image. Final fluff over the whole area with clean, soft cotton if necessary.

**Step back and enjoy!  
You've now got  
"The Nuvite Look!"**



# Special Metal Polishing and Techniques From the Field

## Repolishing : Cloudy Background Appearance i. e. “Undercast”

Many times, the metal has been polished in the past – oftentimes recently, but the image reflected has a gray, cloudy, almost “smoky” appearance. This can either be oxidation left on the surface that has been shined up, or it can be oxidation that has gathered on the shine by the effects of acid rain, washing with high pH soap or it just has been too long since the last polish job! This cloudiness is known as “undercast”.

The reason for the various grades of polish in the Nuvite NuShine II System is that you cannot remove such oxidation with a grade of polish that will give you a final finish without a great deal of work. Removing undercast requires the use of a more aggressive grade of polish than that which will give you a good final finish. The use of one of these more aggressive grades of polish is known as “compounding” the surface.

## Compounding to Remove Undercast

Either NuShine Grade G6 or C will remove undercast. Use Grade G6 if you suspect that the surface has never been well polished, or has been let go for some time. Use Grade C if it was a previously well polished surface and has started to haze up a little. Some customers have found it really tough to get rid of the hazy look if they had tried a different kind of polish first, especially if it was heavily oily. We suspect wax from some polishes is sometimes imbedded into the surface that causes cloudiness to be really hard to get out. Try dewaxing before compounding, and repeat to see if you are “gaining on” the hazy appearance.

Be careful of using wool pads or cotton flannel that has been used to polish paint at some point, as waxes and etc. seem to be awfully hard to wash out. Sometimes the pad picks up wax that is already on the paint from earlier wax jobs. Again, try a dewaxing wipedown (get wax remover from auto refinisher supply)

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 flannel for final surface cleanup.

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).

Although this can be as much a process as preparing 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 1 pound of Nuvite NuShine II Grade F9, ½ pound of Nuvite NuShine II Grade C and ¼ 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 will not be affected when wipedown debugging and cleaning with normal wet-wash cleaners such as Nuvite CitriCut, using standard dilution as directed. Do not allow CitriCut or any other citrus-type cleaners to contact your polycarbonate wind-screens 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, the needed surface preparation for painting does not take a great deal less time and effort that this polishing process, and your aircraft will be lighter..

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 turtle-deck, cowl & sides get four passes to get that extra, up-close, smooth finish.

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. Microfiber cloth is very effective when polish is still fresh, and seems to have an affinity for the accumulated polish.

Follow the above with a second phase of compound buffing, 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.

Final finish: Using an orbital buffer, such as the Cyclo Model 5 (Nuvite EQ-137) with a 100% cotton flannel sheet (cotton “sweatshirt” material) wrapped over the buffing pad(s) (Nuvite EQ-145), final buff with Nuvite NuShine II Grade S. 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 30-45 seconds. Buff until surface is clear and clean of polish.

Move on to the next area, and so on.

“Clean buff” – use a lightly used flannel spot over the

- and use tons of rags so that when you wipe one spot, you don’t wind up redepositing the wax from the earlier de-waxed spot onto the next spot you clean.

Specialty materials, such as Rymply Cloth -which is like cheesecloth (cheaper) can be used instead of rags. Make a thick pad of many sheets, wipe the area with a single wipe, then fold the soiled layers back to expose a new cloth face and take another pass. Also, you could try mineral spirits, MEK or MPK to get the surface really clean. Try this on a spot, then try to polish off the cloudiness from that spot to see if this is going to work. If G6 or C doesn’t take it, try F7 or even F9 on a little spot to see if that works.

Make sure that the wool pads are not contaminated with oil, some kinds solvent spirits leave a residue or wax. You see how once a contamination issue arises, how hard it is to keep from spreading the problem from one media or process to the other!

What a pain!

## “Specular Surface” or “Sparkles” in Your Final Finish

We have had situations arise where the finished polished job looks great in hangar lighting, but as soon as the polished surface sees sunlight, a “sparkle” effect covers the whole polish job.

Sometimes, a weird, “holographic” effect shows up. The sparkles and the holographic effect usually come from compounding grit or fine dust getting mixed into the final finishing pass in the nap of the cotton flannel. The “holographic effect” is caused by microscopic, coherent (all parallel) lines in the surface.

In any case, something is contaminating the polish media and causing tiny, microscopic scratches as the final finish Grade S is being used. A roll of butcher paper may be used for the area where you wrap the cotton flannel over the orbital buffer face - simply pull out a clean sheet to make a clean surface for the cloth.

Suffice to say—keeping the polish process free from extra contamination is really worth the time and effort!

## Blending Pits and Scratches

Pits & light scratches are usually blended with F7. Serious pitting might need F9, followed by F7, but minor pits and scratches should be able to be blended with F7 using the following procedure.

Put fingerprints of polish about 2" apart over a 4" – 6" square area (about). Use a wool "compounding" pad on a circular buffer and tip it up to 45 to 60 degrees so that you are buffing with just an outer ring of the buffer pad face. Buff the area with the pad running crossways to a back and forth movement, then turn it 90 degrees and move the buffer up and down, then turn it 45 degrees and go up and down again, then turn it to the other 45 degree position and go back and forth (make a "plus" sign, then an "X" sign with the buffer)–blending the polishing action in all directions around the pits or scratches.

Continue until the polished area is clear. Don't just use a gob of polish -should still be no more than a minute or so before it clears. Since F series polish media stays sharp,

you can give the area some more buffing after the polish disappears, -continuing the action, because it is still on the pad.

What you are attempting to do is blend the pit or scratch edges until they shallow out and will no longer reflect light (they disappear!) or trap polish or aluminum oxide corrosion in the depression. You are blending and burnishing the surface. Some of your polish will trap into the pits, and sometimes even in scratches making black spots. Don't worry about it. Reapply polish and give it another pass over the same area. This action may take several passes before the pits or scratches are no longer visible. Understand, that there is no way to manufacture and redeposit metal to replace that which was in the pit hole or scratch. What you must do is blend the sides & edges of the depression so that moisture, salt, polish and dirt cannot trap in the relatively steep walls of the pit or scratch. By blending the edges, you are also blending away the sharp edges that reflect light, making the blemish visible. Follow with a normal buff of the whole

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 Procedure

Compounding Phase:

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

Using Nuvite NuShine II Grade F9, put wet "fingerprints" of polish every 3" over a 2' X 1 ½' area to be compounded. Compound buff using 2000-2500 rpm rotary 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. Do not use standard "loose wool" pads.

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. The surface will get hot as you buff, but will cool quickly as you move over other areas of the buffed areas.

In 30 to 45 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 30- 45 seconds, too much polish is being used, and the desired surface burnishing action is reduced.

Repeat the above over the same area. The more passes, the more the blending action will ease the mill roller "grain" and the smooth the metal surface. We recommend two passes as a minimum. Four passes will give a smoother surface, although even more passes will not harm the metal or its' properties. As a suggestion, areas that will be out of sight –top

clean flannel for final surface cleanup.

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 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).

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### **Polishing Non-Clad Aluminum Sheet Metal**

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, -but not hard work. This is be-

cause, 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.

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 "burnishing" type of polish (does not grind away the rough spots as other kinds of polishes do), the

area with Nuvite grade C and with S to finish. The process is somewhat tedious, but works best because sanding only exacerbates the area corrosion problems that pitting causes by removing the protective aluminum clad coating. Nuvite compounds only burnish and level the remaining clad without removing metal.

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### **Non-Corrosive Storage -and Making your Polish job Last Longer**

Strive for a non corrosive storage climate, - i.e. don't leave it out in the elements for day in-day out storage. Polished surfaces will last a long time if cared for with awareness of the need to dry off the polished surface if wet. Allowing a polished surface to dry after a rain or dew can allow oxidation and white spot corrosion to form. Polished metal and, also, even paint, needs day-to-day storage protection- preferably inside a storage building. Even a storage building beside the salty sea can help if air in the building is kept circulating via a small fan inside.

### **How Long Will Your NuShine II Polish Job Last?**

Other than extreme atmospheres, where the aircraft is exposed to acid rain, smoke and other non-normal conditions, the shine should last longer and longer every time it is repolished. With every subsequent polishing, the metal surface is "healed" more and more from an "open" condition to oxidation, to a "closed", tight surface, so that the oxidation process takes longer and longer to get started. If some effort is made to protect the surface from everyday sunlight, rain, acid rain and fog attacks when in use, and properly hangared - where air is allowed to circulate to mitigate humidity effects, you may get extraordinary results.

NuShine II polish users usually polish the surface frequently at first to keep up the appearance, This helps to "close" the surface to a tight, smooth, "ZERO oxidation left in, -or, on the surface", condition. So if the first polish job lasts 6 months, the next, maybe 9, and then, polishings might be only yearly -depending on use and care.

## Protective Coatings

As far as a coating to protect the image with a protective agent of some sort: the biggest problem is that anything put on the surface between you and the reflection you see, will dull the reflection. Refraction and lack of reflectivity -as well as not 100% transparency in the coating are the culprits.

Secondly, and more importantly, any coating put on the surface must be removed before you can repolish the surface. Whatever type of coating you might use will get involved in the media and the pads, and there will usually be dirt trapped in the weathered coating, which will foul the polishing pads, the polish itself, and so on. If you do any process to remove the coating, you about have to strip the surface, which etches the aluminum surface, and you are then back to "square one" in the polishing process.

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## How About Waxing Your Polished Metal?

We can understand the quest for trying to keep your shine protected as long as possible. However, WE DO NOT rec-

ommend coating the polished surface with wax! Here's why: When you have a polished image (reflection) - anything you put between you and the reflection must first filter the light from the original image as it goes thru the first time, and then again as the light is reflected back. Just about anything you put on the surface degrades the reflection - and the shine you put manhours into getting in the first place. Also, wax will build up in nooks and crannies, then yellow and get really hard to remove.

BUT! Secondly -and probably most importantly - when you do get ready to repolish (and yes, you will have to someday!), you will have to remove whatever is left on the surface - otherwise it will foul the polishing pads and cause your polish to react uncertainly, —with all kinds of bizarre happenings. Your best option is to strip the surface (with an etchant), and then you will have to begin to "heal" the surface (get it ready to take a shine) all over again!

Surface contamination can create an series of really unholy problems. Oil on the surface is a problem, and

3" over a 2' X 1 ½' area to be compounded. Compound buff using 2000-2500 rpm rotary 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. Do not use standard "loose wool" pads.

Move the buffer back and forth over the area with sweeping passes. Do not slowly "grind" across the surface. The black polish residue should come off the surface, leaving a clean, clear surface after about 30 – 45 seconds. If the black residue remains on the surface longer than 30- 45 seconds, too much polish is being used, and the desired surface bur-nishing action is reduced. Depending on the amount and diligence of the surface preparation sanding, the use of NuShine II Grade F9 may be advisable in place of Grade F7 if the resulting finish is not as expected.

Thoroughly clean the surface of any compounding polish residue around fasteners/ seams/joints, etc. Microfiber cloth is very effective when polish is still fresh, and

seems to have an affinity for the accumulated polish.

Follow the above with a second compound buff, using identical procedures, with Nuvite NuShine II Grade G6. Use fresh buffing pads (-not impregnated with a more aggressive 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).

## Final Finish:

Using an orbital buffer with a 100% cotton flannel sheet wrapped over the buffing pad (s), final buff with Nuvite NuShine II Grade S. 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 30-45 seconds. Buff until surface is clear and clean of polish.

"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

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 comes in contact with surfaces that are clean and free from any earlier polishing residue.

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### **Polishing Stainless Steel and Titanium**

Because of the relative surface hardness of stainless steel and titanium versus aluminum, a more aggressive surface preparation is required prior to the use of Nuvite NuShine II metal polishes. The greatest determining factor in what process is needed is the beginning metal surface condition. In the case of formed titanium and some stainless steel, radial machine marks that are left from a turning forming mandrel, leaving a slightly wavy surface, will likely preclude the metal from ever becoming a smooth, mirror surface finish like normal polished aluminum. The surface may be polished to a very high image, but the waviness will remain.

The following procedures address polishing the surface

of stainless and titanium sheet, which, although curved into a shape, have a basically smooth, even surface.

### **Surface Preparation**

Mill marks and rolling marks are the usual surface concerns when dealing with polishing stainless and titanium sheet. To remove these surface characteristics, DA sanding with suitable grit wet or dry sandpaper is necessary. In spite of the fact that the requirement to move the progress along might drive the use of 400 grit wet or dry, this is discouraged, as all the sanding marks may never be able to be removed when the final finish is achieved. The preferred starting grit for first sanding is Micro-Surface Corporation Micro-Mesh #800AO, transitioning through #1000AO, #1500AO and #1800AO disks. Always use adequate water along with sanding procedure to keep the media from clogging.

### **Polishing: Compounding Phase**

Using Nuvite NuShine II Grade F7, put wet “fingerprints” of polish every

with wax we've seen random black spots, haze, spot haze, discoloration, shaded areas and the list goes on—and nobody will be able tell you why you are getting these problems... Wax will embed into the aluminum surface as well, and using a dewax wipe doesn't seem to get it all. We have had experience where a person was trying to use somebody's homebrew polish that had wax in it. It didn't work very well. We couldn't clear the surface haze, but we kept getting a little better after each pass with dewaxer, then repolishing the area.

We let it slide after SEVEN F7 compounding passes. It still was not really right yet, - but it probably would eventually come out! Maybe it was wax fouling the pad, maybe just imbedded... By the way, if you get real wax (carnuba type) on your wool compounding pads, you'll just save time if you pitch them.

Also, as far as protection goes –we recently read that natural wax is slightly porous to moisture! It does not appear that it would be a good thing to try to use natural wax to seal your polish job, as the porosity would seem to carry the alkaline and salts

from dust in the air right to the aluminum surface.

Try a coating of Nuvite's NuImage polished metal cleaner. (-wipe on til gone, let dry and hand buff) as it puts a bit more of the protective coating left on the surface after polishing with NuShine II. It is slight, but NuImage also works for debugging and cleaning oil on polished surfaces without hazing.

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### **Keeping Off Oxidation Equals Longer Lasting Polish Jobs**

In general, those who go ahead and do a compounding buff to remove oxidation when it first appears find that the intervals get longer and longer between buffings being required.

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### **Cutting Down on the Repolishing**

The best methodology is to polish to as clear an image as possible with compounding grade(s) as necessary, and protect the surface from just being left out in the elements when in storage. Don't let water dry on the surface when out of the hangar. If

you allow water to dry on the surface of your polished airplane, it is almost certain to get hard-to-remove white spots in the image. This comes from the dust from the air that contains salts and alkalines that dissolve in the water spots. As the spot dries, the water goes away, leaving a stronger and stronger “brine” of chemicals that will etch into your surface.

It does the same thing on paint.

Use of a synthetic chamois seems to work well to remove drying dew/water without scratching. The Swift Museum Foundation recommends a synthetic chamois like “The Absorber”. We have seen scratching when a soft squeegee-type of removal is used.

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## **Polishing Cast Aluminum and Machined Parts**

Cast and machined small parts may be polished with Nuvite NuShine II metal polishes. Depending upon the size and shape complexity, it may be advisable to use stand-mounted buffing wheels and polish by hand feeding. Alternatively, parts may be mounted by means of a fixture and vise, and the parts buffed on the fixture.

**Surface Preparation:** -All casting marks and machine tool marks should be removed either by sanding or automated burnishing processes. The following procedures refer to preparing for final finish and finishing, only.

### **Polishing: – Compounding Phase**

Hand feeding part to stand mounted buffer: Using bias cloth or “Airway” buff wheel (metal center with “pleated” cloth), either put Nuvite NuShine II Grade F9 polish on the part and hand rotate the wheel to spread the polish on the wheel, or lightly load the outer face of the buffing wheel with polish with your

finger. Using too much polish will cause it to “throw” when buffer is switched on. Move part across the spinning buffing wheel, adding small amounts of polish from time to time.

- Follow with Nuvite NuShine II Grade G6 with the same procedure as above.

**Fixture and Vise:** Use felt cones and rotary tool for buffing. It is advisable to either use a slow speed tool (10,000 rpm or less) or use a variable speed tool (high speed) at slower settings during this procedure. Place a small amount of NuShine II F9 on the polishing cone, rub it into the surface with your finger. Do not use too much polish, as it will “throw” excess when turned on.

Either use speed trigger or quickly turn the tool on-and-off when first starting to contact the part on the fixture. The purpose is to start as slow as possible and build up the buffing speed as you buff. The polish area should at first turn black, but fairly quickly clear as the tool moves over the surface. Continue the buffing over the whole part until you feel that the surface

is not progressing before adding more polish. Always use polish very sparingly.

After the surface is sufficiently smoothed and even, change to Nuvite NuShine II Grade G6. Change to new felt cone for polishing with Grade G6.

If surface buff marks continue to show up when using bias buff wheel or cone with Grade G6, change to new bias buff wheel or cone. When complete, major buffing marks should be blended away, and only extremely small, barely surface visible marks should remain.

**Final Finishing:** - Using a 100% cotton flannel cloth, hand buff with Nuvite NuShine II Grade S. Put one or two wet “fingerprints” of polish on the part, and rub until black residue disappears and the bright final finish is achieved. Adjust the amount of polish to use so that the area polished clears of residue in about 30 to 45 seconds. Buff until surface is clear and clean of polish.

- Follow with a “dry” pass (no polish), using a clean flannel for final surface cleanup.

- It is very important to keep