

## KR-70 Kit Acrylic Restoration

### Required Level of Skill:

- For use on **non-pressurized** aircraft: No specific training is required.
- For use on **pressurized** aircraft: Use should be restricted to licensed mechanics.

### List of Contents:

Micro-Mesh 3" x 6" sheets: 1500, 1800, 2400, 3600, 4000, 6000, foam block, Micro-Gloss® and 2 cotton flannel wipes (sandpaper is not included in this kit).

### Determine Type and Extent of Damage and Starting Point

Crazing - A series of very fine lines, stars, or haze when viewed at an angle in bright light. Crazing is below the surface and usually cannot be felt with the fingernail. Requires aggressive sanding to remove. Begin with 220 grit wet/dry sandpaper.

Deep Scratches - Easily felt with the fingertip Begin with 220 grit wet/dry sandpaper.

Minor Scratches - Readily detected with fingernail. Begin with 1500 Micro-Mesh. If the scratch is not easily removed use 400 wet/dry sandpaper followed by Micro-Mesh 1500.

Hairline Scratches & Light Scuffs - Light scratches and hazing - Begin with 2400 or 3600 Micro-Mesh

Very Fine Scratches - Usually caused by improper cleaning methods. Begin with 4000 or 6000 Micro-Mesh.

Crazing is the most common and objectionable problem with regards to aircraft transparencies. It appears to be scratches, either large or small, which when highlighted by the sun show up as bright lines. In reality they are shallow fractures just under the surface layer. Crazing can be classified in two categories, minor and severe. Minor crazing has the appearance of thousands of tiny scratches on the surface. When viewed at an angle to the sun or a bright light, they look like a network of very fine shiny lines, stars or haze. Severe crazing, on the other hand has fewer scratches, but they are much larger and appear to be deep gouges in the surface. In both cases it is rare that these can be felt with the fingernail - they are UNDER the surface. This will be the hardest type of damage to remove. Deep crazing will require sandpaper, possibly as coarse as 120 grit. Crazing removal will take time. An equal amount of material must be removed from the entire surface to prevent distortion. THIS MUCH STOCK REMOVAL CAN ONLY BE DONE WITH SANDPAPER. DO NOT BE AFRAID TO USE SANDPAPER ON YOUR TRANSPARENCY! After damage removal and completion of the sandpaper sequence, the cloudy appearance will be removed as you continue with the Micro-Mesh procedure.

### Step 1 - Damage Removal

Most of the restoral time is spent actually removing the degraded acrylic material. Take your time and make sure that this first step removes all of the damaged material. THIS IS ESSENTIAL! Time required for this step may take 70% of the total restoral process.

1. Determine the type and extent of damage and determine your starting abrasive grade. Open coat sandpaper must be used dry. Wet/dry sandpaper and Micro-Mesh can be used wet or dry, but best results are obtained if used wet. This will also help keep the surface cool and the abrasive flushed free of abraded particles. Clean fresh water is an excellent lubricant and coolant for Micro-Mesh. Water may be sprayed or misted on the surface with a spray bottle or Micro-Mesh may be dipped in fresh water occasionally during use. A drop of mild dish detergent can be added to water for lubrication if needed.

2. Once the starting abrasive grade has been determined, wrap the abrasive tightly around the foam block. Using firm pressure, sand evenly over the entire area in a vertical motion, until the damaged layer has been totally removed. This damage removal step is CRITICAL! If it is incomplete, the final results will not be satisfactory. After 3-5 minutes check your progress. If it seems the damage is not being removed at an acceptable rate, you may want to proceed to a coarser grade of abrasive. In the case of crazing, the time needed to remove the damage will be longer. Since more material will be removed to eliminate damage, you may want to alternate with vertical and horizontal straight line motion. Once the damage has been removed, end with a vertical sanding pattern. **DO NOT SAND IN A CIRCULAR PATTERN.** Spot sanding in a localized area is not recommended. To remove a single scratch or small scratch area, sand in an area large enough (8" x 8") to prevent waviness or distortion. Work across the damaged area 4 to 5 inches each way from the damage. This may mean sanding the entire surface. Work an area slightly larger (at least 2 inches) with each consecutive step. You may find you are sanding the entire surface before you are finished.
3. Clean the surface by flushing with water, or blowing with air. This will prevent abraded particles from being picked up with the next abrasive step and causing scratches.
4. Proceed to the next step of abrasive. If sandpaper was used, it will be necessary to continue through all of the grades listed to 400 grit sandpaper before beginning with the Micro-Mesh abrasives. Wrap the abrasive around the foam block and sand at a 90° angle from the previous step. Continue sanding until the previous sanding pattern has been completely removed. The approximate time for each step is 3-5 minutes per square foot. If water is being used, it will be necessary to dry the surface completely to determine that the previous pattern has been removed. The use of 100% cotton flannel is recommended. Avoid synthetics and paper towels, as these both tend to cause scratches in plastic.

## **Step Two - Surface Restoral**

1. After the surface has been sanded with 400 grit sandpaper, begin with the Micro-Mesh abrasives. Wrap the 1500 around the foam block, and sand at a 90° angle from the previous sanding pattern. Continue until the previous pattern is again removed.
2. Proceed as above through all grades of Micro-Mesh included in the kit. Be sure to change the sanding direction 90° with each step and check for total removal of each scratch pattern. If coarser scratches remain at any step, they will probably still be visible at the end leaving an incomplete restoral and a hazy finish.
3. When you have finished with the final step of the Micro-Mesh series, and are satisfied with the surface appearance, clean the surface thoroughly.
4. Once the surface has been sufficiently cleaned, flush with water. Using one of the flannel cloths included in this kit, wipe the window. Rinse the flannel, and wrap around the foam block. Apply a dime size drop of Micro-Gloss to the flannel. Rub briskly over a square foot area. Work in a straight line pattern. Use a firm pressure for 1 to 2 minutes, until Micro-Gloss has almost disappeared. Water may be added to extend working time. Continue in 1 foot areas, overlapping slightly until entire surface has been worked. Flush with water and wipe entire surface clean and dry with the second flannel cloth.

Note: Keep the flannel clean and you can use it many times. Rinsing is needed to remove dirt and abrasive particles that are trapped in the flannel.

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## GUIDELINES FOR ACRYLIC FINISHING BY HAND

To avoid scratching the surface, do not wear watches, rings, or bracelets. Long fingernails should be covered with gloves.

MICRO-MESH® will remove surface discoloration, but not tinting that is throughout the plastic. If unsure, test in a small inconspicuous area.

Keep MICRO-MESH® clean; contamination can cause scratches. When your restoral is complete, rinse MICRO-MESH® pieces, air dry, and return them to their original packaging. MICRO-MESH® is reusable!

Use only 100% cotton flannel for wiping. Keep it clean, wash in warm soapy water, rinse, dry and return to the kit box.

Wrap MICRO-MESH® or conventional sandpaper tightly around foam block and hold in palm of hand. Sanding without a block will produce a rippled or distorted surface.

MICRO-MESH® is numerically graded. The higher the number, the finer the cutting action.

**Do not work in a circular pattern.** Cross your sanding pattern at 90 degree angles from one step to the next to be sure of total removal of the previous sanding pattern. Incomplete removal will result in an incomplete restoral! Damage not removed with the beginning step will most likely remain after the process is complete.

To remove heavy damage from highly curved surfaces, it may be beneficial to sand in an alternating pattern of diagonally, horizontally and vertically, in a straight line motion. This will assist in achieving an even removal of material over the entire surface.

Thin plastic (1/8" or less) may develop surface distortion if sanding the surface creates heat. Work the surface slowly and work wet.

Check your scratch pattern frequently. It is helpful to set a bright light on the side opposite your restoral side. For better viewing on non-transparent surfaces, place the light at an angle.

### **DISTORTION**

It is always easier to prevent distortion than to remove it! There are two types of distortion that can be caused by the use of improper restoral methods, localized and surface. Localized distortion is caused by working one small spot and not blending the damage removal over a large enough area.

Surface distortion is almost always a sign of incomplete restoration. This could be the result of:

1. the incomplete removal of one sanding pattern before proceeding to the next step
2. not working a larger area with each new step
3. heat build-up
4. skipping steps
5. not cleaning the surface between steps

### **HINTS FOR POLYCARBONATE RESTORAL (LEXAN, TUFFAK, ETC.)**

Polycarbonates have one very serious and unredeeming feature. They are easily scratched and next to impossible to restore without leaving haziness. Unlike acrylic, which is hard and can be almost rubbery. Some scratches and other damage can be removed, but the final polishing is not truly effective. MICRO-MESH will produce a "better-than-anything else" finish on polycarbonates, but does leave a slight haze.

If restoring polycarbonates, it is important that each step in the process can be an improvement to the quality of the surface. For this reason, sandpaper and coarser abrasives should be avoided.

In most cases it is better to minimize the damage than to attempt to totally remove it. Sandpaper may leave scratches that are more objectionable than original damage. Begin with 2400 or 3600 MICRO-MESH and follow the basic procedure. Extra time and effort may be required to obtain best results. Upon completion of the MICRO-MESH steps the surface will still appear less than optically clear. The use of MICRO-GLOSS (available where MICRO-MESH is sold) will improve the finish, and may be used for an extended period of time to obtain desired results. In many cases the use of MICRO-GLOSS will improve the original damage to the point of acceptability, without the work involved in the sanding procedure.

### **CARE AND MAINTENANCE OF ACRYLIC AND PLASTIC SURFACES**

Use clean fresh water with a drop of detergent and flannel for cleaning. Avoid paper towels, napkins and tissue.

Keeping the surface clean and smooth helps prevent scratching and crazing.

Never use rubbing compound, polishing cleaner or auto waxes on acrylic. These materials contain abrasive and solvents that damage the surface or accelerate crazing.

MICRO-GLOSS is a liquid abrasive. It contains no waxes or silicones. MICRO-GLOSS is used to remove very minor surface scratches. It contains a uniformly graded abrasive grain in suspension.

MICRO-GLOSS may be used to remove superficial damage and maintain polished surfaces. It is used to shorten the final finishing process for plastics and other soft materials. It can be applied by hand with a clean damp flannel cloth, or it can be used with a buffer and a natural wool buffing pad.

Note: Keep the flannel clean and you can use it many times. Rinsing is needed to remove dirt and abrasive particles that are trapped in the flannel.

Please contact our restoral department Monday - Thursday between the hours of 8 a.m. and 4 p.m. CST for an explanation on how to remove distortion.

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04/01/04

Guidelines for Acrylic Finishing By Hand

## HOW TO DETERMINE IF YOU ARE WORKING ON ACRYLIC OR POLYCARBONATE

### REQUIREMENTS:

1. 3-WAY MICRO-MESH BUFFER; GRADES 2400 (PINK); 4000 (WHITE); 12000 (GRAY)
2. SPRAY BOTTLE OF WATER
3. LIGHT SOURCE

### PROCEDURE:

Work on an approx. 2" x 2" inconspicuous area of the window

Set a light behind the window so inspection can be easily done

Spray the area with a mist of water

Using the buffing stick - pink 2400, make 6 back and forth, using **light** strokes. Sand in a horizontal motion.

Now, sanding in a vertical motion, use the 4000 white side of the buffer to cross over and remove the 2400 scratch pattern you put in the window.

Stop and assess your progress. You should notice a white, milky slurry forming from the sanding action. This is a combination of the water and small abraded particles of acrylic. Did you remove the 2400 sanding pattern? If so and you have a slurry forming - the window is acrylic.

If not, the window is most likely polycarbonate. Making sure the repair area is wet, continue sanding, but this time use the 12000 MICRO-MESH side of the buffer and sand in a horizontal pattern to try the 4000 sanding pattern.

Using a soft flannel or cotton cloth only, put a dime's worth of MICRO-GLOSS on the repair area and polish and wipe clean.

If your window is polycarbonate ask about our restoral products for POLYCARBONATE.

There are many different grades of both acrylic and polycarbonate, so testing is imperative. In some cases, with polycarbonate, less is best and optical clarity may not be possible. Polycarbonate is much softer than acrylic and is more difficult to repair. It's like sanding on rubber.