

## BVM Metal-Kote

This write up is intended to provide additional details on the application of BVM's Metal-Kote beyond what is in the instructions, some alternate techniques, and some additional capabilities.

Metal-Kote provides a good quality simulated metal finish. There are many different finishes that can be obtained depending on the surface preparation. While the stated purpose of the product is to obtain an aluminum finish, it is possible to simulate other metallic surfaces. In this article we will explore the techniques that I used in the finishing of my BVM F-100 in a Thunderbird scheme. While this article is specific to the F-100, the techniques can be applied to any natural metal finish.

Some of the advantages of Metal-Kote are that the final product is as durable as any painted finish and requires no maintenance beyond any other painted surface. Markings can be applied on the surface with no additional prep work, and can be sealed under an over all clear coat.



**The completed model showing many of the effects that can be achieved with Metal-Kote**

Prep work; No doubt about it, this is where the majority of the work is in using Metal-Kote. The surface must be prepped to a higher than normal quality. I started out doing the normal surface preparation that accompanies any building project, the seams where sealed with putty and sanded smooth, and all the joints and hatch seams where cleaned up. I added a few extra surface features, such as completing the exit for the avionics cooling on the top of the fuselage; I completed the troughs for the gun wells along with

adding in the blast tubes, and I also added the landing lights to the belly. Once all this work was completed the affected areas were given a coat of PPG K-36 primer, which normally shows a few flaws in the surface. After these areas were cleaned up I was left with a primer gray model that had a good quality surface that was ready for a traditional paint job.

This is the point at which the Metal-Kote process begins. I laid out the full color scheme so that I would know where the natural metal finishes were going, and decided what finish would go where. On the F-100 there are a number of different metals that can be seen on the exterior of the aircraft, which include – aluminum, steel, stainless steel, titanium, and what I think is magnesium. Adding the BVM hot section detail paint to the basic Metal-Kote allows all of these to be obtained. For aluminum a dark primer base is used, for all the rest an aluminum color base is used.

Once I had the color scheme in place the areas that were to be aluminum were sprayed with a dark primer. This primer is obtained by adding PPG DBC black to K-36 primer. The Metal-Kote instructions call out mixing 1 part black to 3 parts primer, I found that going to 1 part black to two parts primer gave me a color that I could more easily match later should I sand through and need to re-coat an area. This primer should be thinned more than normal so that it will flow out. I used 3 parts thinner to 2 parts primer for this, and also adding extra hardener helps flow out the primer, about 25% extra. At this point you could make different panels different shades of gray to give some additional differentiation to the different panels.

The remaining natural metal finish areas were sprayed with an aluminum color. The paint I used is PPG DMC with the formula being DMC 981 – 437.0, 902 – 0.8, 984 – fill. This makes one pint. The DMC works the same as DCC and even uses the same catalyst. This paint is intended to replicate the aluminized lacquer (FS17178) that the Air Force used to seal many parts of their aircraft. For some period of time the inside of door wells and other compartments were painted with this paint, and over time this paint was used to cover the exterior of the “silver” planes for corrosion control. The exterior paint got to the point that by the early 70’s many of the silver planes were actually all painted, even though they might look like natural metal from a distance. So this aluminum paint was also applied to the areas that would have been painted with the aluminized lacquer. I applied this as I would any other single stage paint.

Once you have your base down you will need to sand it smooth. The primer may look as if it went down perfectly, but once you start to wet sand it you will see that there is some small amount of orange peel in even your best effort. I started with 1500 grit wet using the foam block supplied with the Metal-Kote kit and removed about 90% of the orange peel, and then finished up with 2000 grit.

Now it's time to take your first shot at applying the Metal-Kote. This first light coat will be removed, and it makes for a good practice session for applying the real finish. In my case I choose to shoot everything at one time. The fuselage had a PVC pipe running from end to end and sticking a little bit out on each end. This pipe was supported by a PVC frame

such that the model sat level a couple of feet off the ground and could be rotated about the pipe. The remaining parts were on stands or attached to sticks. I used an automotive touchup gun to apply all the final finishes. For the Metal-Kote the fan adjustment was set to supply about a 6" wide pattern and the metering needle was barely backed out, in fact a single pass would barely show that anything had been applied. For the fuselage I found that with a bit of coordinated effort I could make one pass from one end to the other in one motion. After a pass I would rotate the fuselage a little and make the next pass trying to keep about 50% over lap with the previous pass. At this point I saw some silver dots showing up. I initially thought that there was a problem with the paint, but the truth is, these are the spots that I did not sand as well as I thought I had. Why these spots show up as bright spots I do not know, but in the next step it was obvious that this was the cause. For now I only applied enough Metal-Kote to give myself some practice, and so that I could see that there was some Metal-Kote over the surfaces, you are not looking for anything like the final finish, you are just looking for the trouble spots.

Next it was time to remove all the Metal-Kote that I just applied, except for that which is in the panel lines. This sanding process is done in a very controlled manner. Each panel is masked off and the Metal Coat is removed by stroking the panel with sand paper, wet. Stoking means, always keep the paper moving in the same direction, do not go back and forth or in circular path. The masking tape will have to be applied about 1/8" – 1/4" outside the panel being sanded, I suspect that you will need to experiment to find the distance that is right for you. The grit of the paper determines how much differentiation there is between panels and how shiny the surface will appear. Since I was doing a show plane I used 1500 grit, which provided a fairly shiny surface with a modest amount of differentiation. 1200 grit would work best for most clean aircraft that might be encountered on a flight line. When sanding the panel one must remove all traces of Metal-Kote, you can not allow your self to think that a little bit left behind is ok, it all has to go. This is where I found out how much orange peel I left behind the first time I sanded. Once I finished a panel, I masked the next one and stroked it at a different angle. What is going to happen is that the scratches left behind will cause the sun light to reflect differently off each panel, which will make the panels each look a bit different.

Now that the surfaces were nearly ready for the finishing coat of Metal-Kote, I applied the color to large areas that did not have natural metal finish. I used the single stage PPG DCC paints for this. These colors were sanded smooth and made ready for clear coat. Care had to be taken when sanding adjacent to the areas that were prepped for Metal-Kote so as to not scratch that area. Once this painting was done, I polished up the Metal-Kote area with the 6000 micro-mesh paper that came with the paint kit.



**The model is now ready for the final coat of Metal-Kote. The gray areas will be aluminum, the silver areas on the fuselage will be either titanium or stainless steel, and most of the silver on the wing will remain as is, since it was painted that way on the full scale.**

At this point if you are going to apply rivets you need to decide when you want to do them. You can apply rivets on the primer or burn them in at this stage, and then spray the Metal-Kote over the rivets, or you can do the rivets after the Metal-Kote is on. You should make some test panels and try it each way to see what you think looks best, and this will also give you some practice working with the materials. After you have decided on the rivet approach and done what might need to be done, it is time to apply the final Metal-Kote finish. At this point I diverged from the instructions and did the entire fuselage at one time, along with all the other parts. The fuselage was returned to the PVC pipe support, and I applied the Metal-Kote in the same manner as I did the first time. All of the other parts were narrow enough that they could be coated with one pass, so they each got two passes for each pass on the fuselage since the 50% overlap on the fuselage was equivalent to two passes. My goal was for all the parts to have the same amount of Metal-Kote on them. At this point you may be wondering why the width of the wing would not require overlapping passes, well, for the Thunder Birds, at least, the majority of the silver finish on the wings was that aluminized lacquer that I described earlier, there were only a few narrow panels that were left natural metal. After each coat I warmed the surfaces slightly with a heat gun to make sure that the coat had dried completely (Metal-Kote dries very rapidly), and then wiped it down with a soft cotton cloth. Metal-Kote is comprised of microscopic aluminum plates that lay down flat when applied to a surface, normally. If the plates do not lie down correctly, wiping the surface will help

remove the uncooperative ones. It is this nature of Metal-Kote that governed my decision to apply it in such thin coats. My thinking being that a very thin coat would be more likely to promote the plates lying down. Also a large number of thin coats will remove the possibility of striping due to inconsistent over lap. In the end I applied about a dozen coats to the model. As you build up the coats, what you will see is that in the beginning the finish will be very reflective and bright, but over the dark primer it will be dark. As you apply more coats the finish will turn more silver, but less reflective. My theory is that the plates get more disorganized as you build up the layer. Take the parts out and look at them under the sun and you can see how the finish develops. As the coats build up you will see it get more silvery and brighter, but you do not want to go too far or the reflectivity will go down.

Once the Metal-Kote is on I once again diverge from the instructions. At this point the instructions call out working the painted surface with 12,000 grit micro mesh. I tried this several times on test panels, but I could never get happy with the results. Some times I would go through the Metal-Kote and reveal the under lying base, and other times I would see streaks left in the final finish, so I choose to skip this step.

Once the Metal-Kote is applied it was time to apply the bonding clear. Some people feel that this is optional, I do not think so. While the bonding clear is supposed to improve the bonding of the finish, the biggest impact that I saw was in the appearance of the finish. With out the bonding clear the finish has a little bit of a metal flake look to it, in other words you see small sparkles in the finish. The bonding clear diffuses the light a bit and smoothes the look of the finish out. I made one test panel where I applied the bonding clear to half of a finished area and didn't to the rest. While the area that did not receive the bonding clear looked good, the area that did receive it looked better. I applied the bonding clear just as soon as I could clean the paint gun from the Metal-Kote application. Two light coats where applied as per the instructions.

About 60 minutes after applying the bonding clear I stripped off the masking over the rest of the paint, made sure it was all clean and applied a coat of clear to the entire model. This coat was comprised of 1 part PPG 2021 clear to 3 parts PPG DT885 reducer using the PPG recommended hardener to paint ratio. One very light mist coat followed by two just wet coats where applied. After the clear had cured the model was sanded smooth with 1500 grit paper wet.

It was at this point that I added all the graphics. All the insignias where painted on using vinyl masks from Pro-Mark. All the rivets and screw heads where Pro-Mark rub on graphics that where a medium gray. The medium gray keeps the rivets from jumping out at you, but still makes them visible on inspection. If you do use Pro-Mark rub on graphics clean up afterwards with alcohol, this will remove the residue that gets left behind but will not loosen the graphics. Products like PPG Aquaclean, which I normally use to clean a part before painting, will remove Pro-Mark rivets. I actually used Aquaclean to pull up rows of rivets or screw heads if I decided they where on wrong. The last detail that was added is the hot section paint. You do not want to mask over the

hot section paint, as it does not seem to adhere as well as the rest of the paint. I found that I could peel the clear off the hot section paints a bit easier than I would have liked.



**The Metal-Kote has been applied, and the graphics are going on. The different appearance of the panels on the hot section are only due to the angle that the panel was sanded. The final hot section paint has not yet been applied.**

Once all the graphics were finished a final coat of clear was applied, this was done in the same manner as the first coat. This coat was wet sanded with 2,000 then 2,500 grit, and then 6,000 grit micro mesh was used to polish the surface. Then finally, I polished the entire model with 3M Finesse-It. For most clean aircraft you might find on the flight line the final use of a polishing compound probably is not needed, but for a model of a show plane I felt it was appropriate.

There were a couple of other places I used Metal-Kote. For the tail cone I wanted to duplicate the alternating polished steel and sooty steel that was on the full scale aircraft. The polished steel was done as described above using an aluminum base under Metal-Kote. For the sooty finish that was on the eye lids of the tail cone, I first made some new eye lids out of G-10 sheet. The original tail cone was reworked so that the new eye lids would fit flat over the old molded eye lids. The eye lids were painted with a black paint with a small amount of red and aluminum added in to make it look a bit dirty. These were then cleared and the finish polished. Then a couple of light mist coats of Metal-Kote were applied to give it a metallic look. The center rib was given an extra coat to better match the full scale look. The other thing I used Metal-Kote for was on the landing lights. I machined the lights from a piece of acrylic rod. The back side of the light, which is a cone, was polished to a very high gloss by working with progressively finer

paper until I got to 12,000 micro mesh. The back side was then sprayed with Metal-Kote, bonding clear and a heavy coat of the aluminum paint mentioned earlier. This produces a reflective surface on the inside of the light that mimics the reflector on a landing light.

If you do go down the Metal-Kote path, I strongly recommend that you shoot some test panels. Empty gallon metal cans work great for this. It takes little effort to prep an area, and they have a very nice handle to hold on to. Try different ideas, different coat thickness, different base colors, and different rivet techniques; see if you think if the bonding clear should be applied for the look you are going for. After some experimentation, you should be able to develop a plan for your model.

I hope you enjoyed this.