

## IRON-ON COVERING NOTES

Peter Flanagan © March 2019

### Covering Types

**Monocote Available now but future maybe uncertain.** Gloss finish, lighter weight, most colors, including some flat finish, very durable covering. Hardest to apply, stiff, less shrink or stretch range, hard to put one layer over another without bubbles, Plastic backing is hard to draw out patterns on. Metallic colors are a bit heavier and stiffer and harder to work with. Neon colors will fade rapidly in the sun.

**Ultracoat Available** Semi-gloss only, slightly heavier, fewer colors, easier to use, more stretch and shrink, good for covering fiberglass, lower temp iron-fewer bubbles, easy to put one layer over another without bubbles, paper backing is handy for marking patterns. Applies well as trim on top of monocote, Adhesion to itself is weaker, seams may creep-loose. Seams with dark colors may creep in hot weather/sun. More prone to sagging in the sun.

**Oratex Available** Newly available iron-on fabric imported from Germany. Used in full scale applications so likely will be available long term? Multiple colors, Similar to solartex and world tex. Paintable base. Adheres well, flexible, as with all fabrics easier to apply and hides small defects well. Currently the only iron-on fabric available I know of. NOT CHEAP

**Coverite Discontinued** Iron-on shrink fabric, translucent white only, a base for painting. Heaviest covering, excellent shrink and stretch, excellent adhesion to wood and itself. Easy to apply and use. Low iron temp

**21st Century Pre-painted Fabric Discontinued** Very similar to Coverite but pre-painted with a film of color. No additional painting is required. Limited color choices. Easy to handle and apply as coverite. Low iron temp. Painted finish is sensitive to the temp and movement/handling of the iron.

**Solartex-World-tex Discontinued** Another fabric covering. Multiple colors available. Color is in-bedded in the fabric so the fabric texture is prominent. Color is durable but the finish is flat and the fabric texture is open to collecting dirt and some stains.

This covering could be clear coated or painted on top of.

**Sig Coverall Discontinued** Another fabric covering, translucent white. Similar to full scale covering. Contains NO IRON ON ADHESIVE, but shrinks/stretches with heat. This covering must be applied with dope or adhesive to the airplane framework. The weave is open and not sealed, so it is not fuel proof and must be doped/painted similar to full scale use. Hard to use— not a beginner's project.

**Stits Covering System & Planetex fabric Available** Used in full scale aircraft. Heat shrink fabric with **no** adhesive. This fabric must be used with a brush-on adhesive/glue (toxic, especially if used indoors). I have no experience with these.

**Microlite or park flier covering** I have no experience with these.

### Surface preparation

**BALSA WOOD** Sand to 300 grit with a sanding block for a smooth finish. Vacuum and tack rag before covering. Sand corners and edges lightly to remove burrs, sand inside edges of open frame structures as well. Don't sand surfaces excessively with fine paper, the glue lines will be exaggerated all over again when covered.

**Liteply** Sanding method is important, it is harder to remove scratches from coarse sanding. Deburr the edges of die cuts.

**Aircraft or Birch Ply** Adhesion to this ply is harder to do, I will hold the iron on the surface for a longer time to heat the wood enough to adhere the covering. I would consider using a light coat of **BALSA-RITE** or **Cover Grip** to the wood before covering.

**Fiberglass** Sand to 400 grit, do not apply to a slick glossy surface. Ultra coat would be a better choice here. Consider using a light coat of **BALSA-RITE**.

## Note on Adhesive

**Balsarite** is the traditional solvent based adhesive that can be painted on balsa, wood or fiberglass to strengthen the adhesion when applying covering. **Cover Grip** is a new product which is water based and odorless which has the same uses. I have just started trying it out. Full strength it seems too thick- dries quick but the brushed surface is lumpy. I have diluted it 1:1 with rubbing alcohol and it brushes out to a thin uniform coat.

**Glue Joints** **AVOID** CA glue lines— THIS IS THE SINGLE MOST IMPORTANT HINT TO A GOOD FINISH. Sand away glue lines with 100 or 120 grit to start. Sand across the glue line to remove it, not parallel to it, in-spite of the wood grain direction. Consider using aliphatic (white or yellow) for sheeting or external seams that will be covered. If CA must be used, use the thickest stuff or CA gel, wipe away the excess and clamp the joint to make the narrowest glue line possible. Don't use thin CA and have it wick into the wood over a wider area, or use CA as a gap filler. The softer/lighter the wood the more important this becomes. This difficulty shows up over sheeted open bays or on softer shaped balsa block areas.

**Dents and Voids** Use “model magic”, lite-spackle or lite-wood filler to fill small voids and pinholes that are non-structural. I often use **Plastic Wood** water base wood filler. It has a density and firmness close to that of balsa. For more structural voids use epoxy with microballoons (glass or phenolic) Medium CA on a Q-tip may be wiped on the surface of filler to harden and strengthen the surface. Thin CA with saturate the filler and make it strong but sometimes too hard to sand well.

**Venting** Covering parts with potential sealed “air” chambers like an aileron can present a problem as when the structure becomes sealed the heated air from the iron will expand and stretch the covering, only to be less than tight when it cools. Be sure to provide even just a small 1/16<sup>th</sup> inch hole between ribs and the leading edge for air venting. The same ballooning can happen with the plane just out in the sun if not vented.

## Color and Pattern Thoughts

Colors of an individual covering may vary from lot to lot. This is critical for light colors, especially white. Buy enough covering for the whole project at once, if you go back later to get more it may be a different lot and the color won't exactly match.

Light colors won't cover over darker colors without showing through. Yellow and white won't cover over almost anything. Light colors must be applied first.

Color patterns with straight lines are easier to do than patterns with curves.

Color patterns that cross control surface hinge lines or junctions between parts like the wing and fuse are harder to do.

Mark out pattern lines on the airplane with a very soft drafting pencil (6-B) - don't dent the balsa wood, the dent lines will show through the covering. Ink from a marker are likely to show through as well. Marking lines on the covering can be done with a fine sharpie— but don't dent the surface. Isopropyl alcohol will remove the sharpie ink if it is fresh. Acetone will remove sharpie ink and won't hurt the covering, but keep it away from the covering adhesive. The newer “wet erase” markers work well too. I like to use a “**wet-erase**” marker, it sticks well but wipes off with water.

Monocote is a “2” layer material. Clear plastic on top with a combo glue-color layer underneath. When covering you can get some colored smears of glue on the covering next to a seam- it will clean away with acetone.

Ultracoat is a “3” layer material. Clear on top, color in the middle, semi-clear glue on the bottom. Smears from seams will be clear, and can be wiped off with acetone.

With both coverings the clear top layer can be scratched with the covering tool. Be sure the tool is smooth and avoid excess rubbing the surface.

## Basic Tools

Covering Iron Several brands—personal choice Basic must have tool

**Trim Iron** Very **USEFULL** Almost a must have tool. Especially for covering beyond the basic. The foot must be “polished first. These irons are not as durable as the basic iron.

**Heat Gun** Useful for heat shrink over wire soldered connections and the like— otherwise ***use with care!*** I sometimes will use a heat gun as a last step in covering over OPEN BAYS, especially with pre-painted 21st Century or Coverite in which the surface texture is sensitive to contact or rubbing with the iron. It is very difficult to control the temperature and location of the heat with a heat gun. You can burn through the covering easily.

**Scissors** Basic scissors must be easily sharpened, covering dulls tools quickly. Trimming scissors are useful— a variety of types, look for fine sharp points. (I use a variety of surgical scissors- cast-offs from work)

**Edge Trimming Tools** Several type are available, they can be useful at times but many only work in certain places and won't work well on rounded edges or tight places. I often will make my own for a particular use.

**Blades** Single edge razor blades, box cutter blades and # 11 Exacto or #11 surgical blades are all useful and should be on hand.

## **General Thoughts on Covering**

Patience is a key factor in a good covering job. If well done to start with covering can last for years without sags, bubbles and loose edges or seams.

I generally start with smaller pieces such as the rudder or elevator, it is a little easier to handle the smaller parts and seeing them all done gives extra motivation to move on to the harder areas. I save the wing(s) for last because they generally cover quickly.

For nitro and gas models think fuel proof. Generally cover from bottom to top and rear to front so seams don't lift up in the airstream and exhaust doesn't gain an edge at getting under seams.

Use pieces of covering that are large enough to provide good edges to grab onto to pull and stretch when it is needed.

Allow enough overlap to insure a seal at your seams. This is especially true for

nitro models and if using Ultracoat. If exhaust gets under the edge of the covering you can try cleaning it with methanol, but covering may not stick down well ever again.

In critical areas which might be hard to seal tight consider something else to seal with. As an example I don't use covering on a firewall to seal around bolt holes or fuel line holes.

Dope, epoxy and CA stick well to covering and may be used to seal an edge where covering comes up to holes or complex corners which are hard to cover.

A small amount of thin CA may be wicked into a small crevasse in the covering.

**IRON TEMPERATURE** is the single most important factor in application technique. A common error is an iron that is too hot. If you have trouble with covering bubbling up your iron is too hot.

Remember the covering stretches with heat and tension better than it shrinks. This is the key to covering compound curves and other tricky areas. Don't rely on the covering shrinking to take up wrinkles. If you have used high heat to shrink to the max to get rid of a wrinkle—the material will relax in a short time And the wrinkle will reappear. This is a common problem with fixing the covering on ARF's.

Most coverings stick to wood with a lower temp and start to shrink with a higher temp. Use a lower temp to attach material and a high temp to shrink it. Actually the goal in applying covering is to apply it tight so you almost don't need any shrinkage to make it tight. If you do this the covering can go years without wrinkles.

The temperature the covering actually "sees" depends on several factors; the iron temp, the type of wood or material under the covering, the presence of a sock on the iron or not, the speed and pressure you use with the iron.

Don't use too much down pressure especially with the trim iron as you can easily dent the wood underneath.

Use a sock over the iron to even out the heat transfer and avoid scratches and dents.

Consider polishing the foot of a trim tool down to 1200 grit or metal polish to

avoid covering scratches.

When applying the covering– (tacking it in place around the edges first) most coverings can be loosened and lifted free to reposition again by warming the spot with a trim iron. One exception- the coverings stick like iron to themselves.

In difficult areas, remember complex shapes may be divided up into smaller simpler shapes. So don't be afraid to cover a spot with multiple small pieces pieced together on the surface instead of trying to fit and attach it all in one piece. The extra seams generally won't show (particularly with dark colors) and look better than wrinkles and creases anyway.

Covering “bubbles “ can be removed by venting the bubble with a very small puncture made by an insulin syringe needle, not a pin. The needle cuts a teeny slice which disappears with heat, but the pin doesn't cut but dents into the covering and underlying wood which leaves covering marks.

### **Trimming and Lettering**

Covering may be cut with razor blades, exacto blades etc. with a straight edge or curve template on a sheet of glass or plastic cutting mat. The glass makes the cleanest cuts, but dulls blades

Stripes may be cut on the glass sheet or using a strip cutting tool. The tool is handy for multiple narrow stripes of the same color, but is not essential. Color wedges and stars are best cut on the glass or mat. For multiple copies of the same shape make a template.

### **Multicolors Over Open Bays**

Multi-color “skins”. Useful for making light color stripes, wedges, or a pattern on dark surfaces OVER OPEN BAYS. Basically the various pieces are attached together on a glass sheet, then the whole sheet is applied to a wing etc. Generally a fairly tedious and high risk of failure technique, but the results can be worth it.