LANITZ-PRENA FOLIEN FACTORY GmbH

MADE IN GERMANY

ORACOVER®

APPLICATION INSTRUCTIONS

CAN BE
IRONED ON AND OFF

The polyester model aircraft covering material

ORACOVER® is patented WORLDWIDE. It is the easy-to-use, high-tech polyester covering with legendary strength and astonishing puncture resistance making it suitable for all model aircraft from trainers right through to huge 1/3 scale models. When attached correctly it will not wrinkle, sag or delaminate. **ORACOVER®** can be painted, too.

Its polymerized colour-bonded layer tolerates higher temperatures for smooth compound-curve coverage and permits film re-positioning without fear of colour layer separation. Its wide application heat range makes for easy, temperature-uncritical covering jobs - with or without the use of a thermometer. **ORACOVER®**'s colours are completely fade-free, and its rich gloss is designed to give your model the last word in professional model covering.

Fig. 1 Recommended tools

1. TOOLS YOU'LL NEED (Fig. 1)

☐ Hobby covering iron
☐ Cutter bar / ruler / scissors
☐ **ORACOLOR®** - filler (ref. no. 0999)
☐ **ORACOVER®** - felt blade (ref. no. 0915)
☐ Soft cloth / kitchen roll
☐ Hobby heat gun or paint-stripping gun
☐ Scalpel (ref. no. 0914) or cutting knife (ref. no. 0916)
☐ **ORACOVER®** - iron-on adhesive (ref. no. 0960)
☐ **ORACOVER®** - special solvent (ref. no. 0980)

Fig. 2 Sand surfaces smooth

2. SURFACE PREPARATION (Fig. 2)

Take time to sand your model completely. Fill gaps and dents with filler. Finish sanding with 320 grade sandpaper, always using a sanding block. Completely vacuum and then wipe the structure free of all dust. If the surface is suitable to take a finish, treatment of the surface is not necessary. If the surface is NOT suitable to take a finish we recommend you apply **ORACOVER®** - iron-on adhesive (ref. no. 0960) first. You can test the suitability by sticking some adhesive tape on the surface. If you can pull the tape off easily and the adhesive tape is covered with fine wood particles, prepare the surface as recommended above.

Fig. 3A Temperature test at approx. 90°C

3. SETTING THE TEMPERATURE OF YOUR SEALING IRON

Correct iron temperature is the key to easy covering with **ORACOVER®**. Use a pocket or oven thermometer to measure temperature. If you don't have a thermometer, use the following simple checks to adjust your iron:

A Low Range (90 °C) - Adhesive (duller) side will begin to stick to balsa (see fig. 3A)

B Medium Range (130 °C) - midway between high and low range

C High Range (150 °C) - at this temperature a scrap of **ORACOVER®** dropped on the iron (dull side up, see fig. 3C) will wrinkle and distort.

D Foam test - An easy and reliable way to find the 90 °C setting on your iron is to test the warm iron on a piece of foam. If the foam "squeaks", but
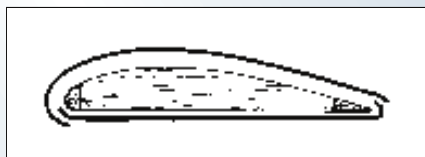

Fig. 3C Temperature test at approx 150°C

Fig. 4 Wing - do bottom first

Fig. 5a

Fig. 5b

Fig. 5c

Pull

Tacked
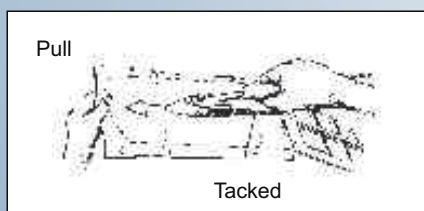
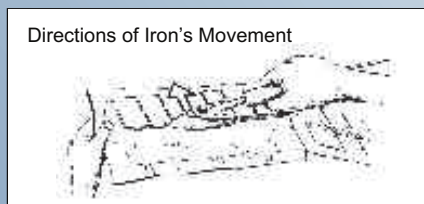**Fig. 6**

Directions of Iron's Movement

Fig. 7

Pull

Fig. 8

does not melt when the iron only slides over it, the iron has a temperature of 90 - 95 °C. Depending on the type of foam the melting point is between 95 °C and 105 °C.

Note: For especially difficult curves, you can increase the iron temperature from 150 to 200 °C. At 180 °C you can stretch **ORACOVER**®. Bear in mind that **ORACOVER**® starts to melt at approximately 250 °C!

4. APPLICATION OVER <u>OPEN</u> FRAMEWORKS: WING (Fig. 4, 5, 7)

Cut a piece of **ORACOVER**® at least 2 cm oversize (Fig. 5a) all around for the under surface of the wing, and 15 cm oversize around the wing tip. Discard the backing paper if you are using opaque **ORACOVER**® or the clear protective film if you are using transparent **ORACOVER**®or **ORALIGHT**®. We recommend sticking a strip of adhesive tape to both an upper and lower edge of the covering - let the strips of tape overlap. When you then pull off the overlapping ends of the tape, you can easily separate the covering from the paper backing or the protective film respectively (Fig. 5b). When discarding the film, always put the covering with the upside on a flat surface (table). Always separate the backing from the covering and not the other way to avoid kinks or wrinkles in the covering (Fig. 5c). Lay **ORACOVER**® in position with as few wrinkles as possible (Fig. 4). Note: Place it adhesive side (dull side) down and double-check positioning. Set the sealing iron to a <u>low</u> temperature (90 °C). Using the tip of the iron, tack the **ORACOVER**® to the root-rib and then to the main spar (see Fig. 6). Slightly tension the **ORACOVER**® at the wing tip to make sure it lies flat on the surface. Move the sealing iron along the main spar (or wing high point) applying gentle pressure.

For the next step (see Fig. 7) bond **ORACOVER**® onto the surface of the wing between the main spar and the leading edge. Hold the shoe of the iron parallel to the wing's leading edge. Press the full surface of the iron against the already tacked strip and move the iron in the direction of the leading edge, starting from the wing root and moving in the direction of the wing tip. DO NOT tack the **ORACOVER**® around the leading edge yet.

The tacking method is then applied to the rear two-thirds of the wing. Remember to hold your iron parallel to the main spar and move the iron in the direction of the trailing edge as you did in Fig. 7. Always try to run your iron over 2 ribs at a time for best results.
<u>DO NOT</u> seal the **ORACOVER**® around the trailing edge yet.

5. COVERING SHEETED SURFACES - OPEN FRAMEWORK STRUCTURES (Fig. 9a, 9b)

Repeat the procedure described for wings above but with one exception:
Set your covering iron to <u>low</u> (90 °C) tacking the **ORACOVER**® from centre, as we did in Fig. 5 and 13. Tack the entire surface with <u>low</u> heat, then again repeat the same procedure with <u>middle</u> range (130 °C) as in Step 8. Keep your iron flat to the surface so all of the **ORACOVER**® is tightly bonded to the surface. For the second and final shrinkage you can also use a paint-stripping gun, see step 9. In doing so the covering must be <u>firmly</u> pressed onto the surface with a soft cloth (or kitchen roll), or better still, with the **ORACOVER**®-felt blade (ref. no. 0915), see fig. 9a and 9b.

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Fig. 9 / 9a   Gradually work around curves

Fig. 9a

Fig. 9b   Final shrinking
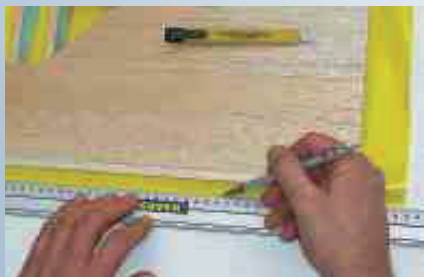
Fig. 10a   Trim off surplus

Fig. 10b   Complete bonding

5a. COVERING SHEETED SURFACES WITH STYRENE FOAM CORES   (Fig. 9a, 9b)

Superheated steam is used in the production of polystyrene foam cores; so many foam wings often contain relatively high levels of residual moisture. At ordinary room temperature a stable microclimate stabilizes inside the core retaining the moisture. That is the reason why moisture even after long periods hardly evaporates from foam cores. The heat applied during the covering process draws moisture from the cores and can produce bubbles in the film. Sometimes during bubbling, the covering can be ripped from the wooden surface leaving wood fibres attached to the covering. As a result you may get "permanent wrinkles" where it becomes impossible to iron the covering back onto the surface of the wood. To avoid this problem we recommend you apply a thin layer of **ORACOVER**®- iron-on adhesive (ref. no. 0960) as a moisture barrier and let it dry overnight. Note: it is important to apply a **thin** layer so that the solvent in the adhesive does not damage the foam core. Once this barrier has cured, you can cover the model.

Set your covering iron to <u>low</u> (90 °C) tacking the **ORACOVER**® from centre, as we did in Fig. 6 and 13. Tack the entire surface with <u>low</u> heat; then again repeat the same procedure with medium heat (120 -130 °C) as in step 8. Keep your iron flat on the surface so all of the **ORACOVER**® is tightly bonded to the surface. For the second and final shrinkage you can also use a paint-stripping gun, see step 9. In doing so the covering must be <u>firmly</u> pressed onto the surface with a soft cloth (or kitchen roll), or better still, with the **ORACOVER**®-felt blade (ref. no. 0915). Do not use too excessive heat, as you may cause damage to the foam core (fig. 9a, 9b).

6. COVERING THE WING TIP   (Fig. 11a, b, c, d)

Set the iron to <u>high</u> (150 - 200 °C) for difficult curves. Pull and stretch the **ORACOVER**® around the wing tip while heating it with the iron, tacking the material in place. (see Fig. 8). As the **ORACOVER**® cools, maintain the tension to allow the adhesive to grip.
<u>DO NOT</u> attempt to eliminate all wrinkles at this stage. If there are deep folds along the tip, then heat the **ORACOVER**® and release the folds, and re-stretch until reasonably smooth. You can easily do these jobs with a heat gun (fig. 11a, b, c, d).
Note that **ORACOVER**® can be ironed onto the structure and then heated and removed without damage to the material as often as needed.

Fig. 11a-d   Covering of the wing tip

Fig. 12a
For Inside corners, first slit 45°.

Fig. 12b
Fold and bond covering.

Fig. 13

Fig. 14

Fig. 15

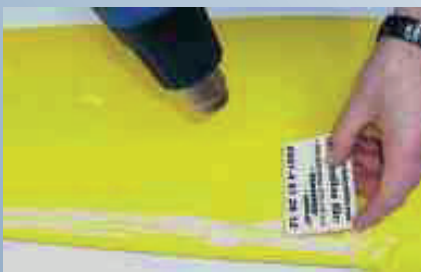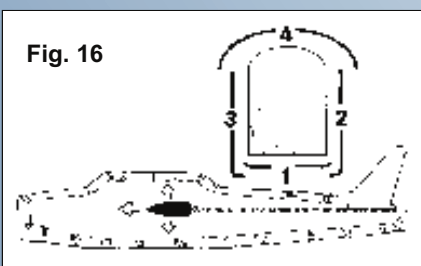**Fig. 16**

7. SEAL THE EDGES (Fig. 10a, 10b)

When you have completed covering the bottom of the wing and sealed the wing tip using a <u>high</u> temperature setting, trim the **ORACOVER**® to about a ½ cm overlap and seal the edges with the iron (fig. 10a, 10b) - <u>DO NOT</u> shrink **ORACOVER**® over the framework yet.

8. WING UPPER SURFACE

To cover the upper surface of the wing use the same procedure as that used for the lower, except you must cut a little more **ORACOVER**® (required at the wing tip for stretching). Note: Be sure to reduce the heat to <u>low</u> (90 °C).

9. COMPLETING THE COVERING (Fig. 13, 14)

After the top and bottom have been tacked down, it is time to uniformly shrink the material to the surface. Set the iron to <u>high</u> range (150 °C). Use the same method you applied during tacking (Step 4). This reheats the adhesive to a higher temperature, providing a superior bond to the wood (see fig. 13, 14). Experience shows that once you shrink the covering, some areas may not be securely attached. We therefore recommend you repeat this procedure. If you use a heat gun instead of a covering iron make sure you press the covering firmly onto the airframe surface. This allows the adhesive to set permanently. You can use a soft cloth (or kitchen roll) to do this or better still: use the **ORACOVER**®- felt blade (ref. no. 0915), see fig. 9a, 14, 15. If the **ORACOVER**® is not bonded to the surface properly, wrinkles could appear.

10. COVERING THE FUSELAGE (Fig. 16)

Cut the **ORACOVER**® to the outline of the surface to be covered with about 1 cm of overlap (see Fig. 16). Lay the **ORACOVER**® on the surface. Using <u>low</u> range (90 °C) tack a centre strip down the length of the fuselage. Using the entire surface of the iron, work with gentle pressure from the centre strip outward as shown in Step 4 and 5 (see Fig. 16). Trim the excess overlap to approximately ½ cm. Increase the iron heat to <u>high</u> range (150 °C). Seal all edges at this time. Pass the iron over the entire fuselage as you did in Step 8 to eliminate all wrinkles.

Fig. 16
Fuselage - first do bottom then sides, finally top

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11. HELPFUL HINTS

CAMBERED PROFILES (S-SHAPED SECTION)

When covering wings with a concave lower surface, tack the **ORACOVER**® effectively onto all wooden parts at 90 °C - without shrinking. Then shrink the open bay without heating the sealed parts. It may be useful to make a simple cardboard template, to protect the sealed parts of the structure, when using a heat gun.

VENTILATION HOLES (PRESSURISATION)

When covering open frame structures, tail planes and fins, etc. make sure you have made a few internal ventilation holes. If not, drill holes of 1 - 2 mm through all ribs and webs. This allows hot air to exhaust out of the entire airframe during the covering process. If hot air is prevented from escaping from a wing bay, it may expand the covering locally, and prevent shrinking causing wrinkles/slack areas after cooling.

FIRE WALL

Bond all edges around engine area with a hot iron to prevent oil seepage under the **ORACOVER**®. Also coat the inside of the engine area with the two-component paint **ORACOLOR**®, overlapping this proofer on to the **ORACOVER**®.

FOAM

At <u>low</u> range (90 °C) **ORACOVER**® can be applied to foam. Use a test piece of foam to get the feel of the material. Instead of **ORACOVER**® you can also use **ORASTICK**® on foam surfaces sticking it directly onto the foam. If reworking with the iron is necessary make sure the iron temperature does not exceed 95 °C as more heat may cause damage to the foam surface.

EPP

(Expanded PolyPropylene) To achieve a better bonding on rough and uneven surfaces we recommend the application of a thin layer of **ORACOVER**® EPP Adhesive (ref. no. 0982). Let it dry over night. You can apply the **ORACOVER**® or **ORASTICK**® covering the next day. As the surface keeps a certain tack it is important to apply the covering as plain as possible. When ironing and shrinking the covering make sure the temperature affecting the surface does not exceed 160 °C as the heat may damage the surface of the EPP.

PAINTING

ORACOVER® can easily be painted. You will achieve best results using the **ORACOLOR**® paint system. **ORACOLOR**® is available in the full range of **ORACOVER**® colours. **ORACOLOR**® is a true two-component paint, after polymerisation it is fuel-proof and iron-proof. For adequate paint adhesion dull the surface with 000 grade steel wool and clean it with **ORACOVER**® special solvent for iron-on adhesive (ref. no. 0980).

CLEAN UP

Any colour or adhesive left on your iron or smeared on your covering iron can be removed with a clean rag while the iron is hot. Any residue on the covering can be removed with **ORACOVER**® special solvent for iron-on adhesive (ref. no. 0980) or **ORATEX**® special solvent for iron-on adhesive (ref. no. 0969 - 0972). Use these special solvents on your iron only when the iron is **SWITCHED OFF AND COLD**!
Do not switch the iron on with special solvent still on its surface! When working with special solvent make sure the room is aired properly as the special solvent can release potentially explosive gases.

DECALS

Follow manufacturer's instructions on decal applications.

TRIMMING, DESIGNS, MARKINGS, ETC.

Since **ORACOVER**®'s special adhesive will not generate its own bubbles when applied over itself, it can be used for trim and markings. However, good workmanship is still required because if you are not careful you can entrap air. Applied at low heat, **ORACOVER**® will bond tightly to itself. For optimum coverage, a darker colour should go over a lighter one. Smaller designs should be positioned and tacked in place at one end: Pull design up at the opposite end and iron down starting from the tacked

end without trapping air. Larger designs (such as sunbursts) should be positioned and the narrowest end tacked in place. Then, working towards the wide end, iron the design down. Pin striping, etc., can be made by cutting thin strips of **ORACOVER**®. To apply multicoloured patterns onto a fuselage in open frame structure or a wing (open framework structure), iron the single patterns on the backing paper on a flat table together. The iron should have a temperature of approx. 80 °C. Allow for a 1,5 cm overlap at the seams. Darker colours should always go over lighter colours, so that the edges of the dark colour do not show through the lighter one. Pay attention to accurate positioning when ironing on. When ironing the pattern on do not heat the seams of the pattern too much - the heat could melt the adhesive and shrink the seam. If you use a heat gun protect the seams from overheating using a cardboard template, if applicable.

PATCHING and REPAIRS

So that the patch bonds well, be sure to remove all traces of engine oil and exhaust. For a simple tear or puncture, cut patch 0.8 to 2 cm larger than the area to be repaired. With the iron set at low heat, apply the patch directly to the clean surface. Or for a neater repair, carefully cut out the entire bay and apply a new patch with a minimum of ½ cm overlap.

HEAT GUN

ORACOVER® will shrink to the surface with the use of a heat gun and will appear to have covered it well, but it will not have bonded to the surface. If you are using a heat gun for final bonding, follow Steps 4, 5, 10 and 10a for proper tacking. Use the heat gun to shrink the **ORACOVER**® over open framework as in step 8. Over sheeted areas, heat the **ORACOVER**® and using a 100 % cotton rag, quickly rub the heated area of **ORACOVER**®. This rubs the adhesive into the wood for a solid bond. Be sure to do small areas at a time. The finished effort is well worth the extra time.

SCALE and CHROME COLOURS

ORACOVER® SCALE and CHROME have an aluminium layer of only nanometres' thickness on the backside of the covering film. This layer is designed to maximize colour density and quality. To minimize the RF shielding effect of the covering on a fuselage covered with **ORACOVER**® SCALE or CHROME we strongly recommend leading the Rx aerial out of the fuselage by the shortest route and running it out to the leading edge of the fin, or use a whip aerial. The same applies to wings covered with **ORACOVER**® SCALE or CHROME: Do not run the Rx aerial along the wing as this too may cause a loss of signal. Always make sure that the Rx aerial has an open destination field. We recommend you follow the same procedure with models constructed from carbon fibre.

WOOD and MOISTURE

Please be aware that wooden model structures absorb moisture and swell in warm, humid conditions and contract under cool dry conditions. If you build and cover your model in humid conditions and then later the weather changes to cool and dry; the covering film tension will decrease as the wood releases moisture and shrinks. In this case you will need to re-iron the covering in order to remove sags or wrinkles.

We would appreciate your comments and suggestions regarding ORACOVER® and its applications.

PLEASE NOTE: Recently, more and more model aircraft with styrene foam wings have appeared on the market. To reduce production costs in many of these models pre-dried foam is no longer used; instead foam containing a relatively high residual moisture content is used. To ensure this moisture stays inside the foam we recommend you create a moisture barrier by applying a thin coat of **ORACOVER**® -iron-on adhesive (ref. no. 0960). Allow to dry overnight.