

Avian Black-S

Instruction and Information Packet Preparation and Application Notes:



**Avian Technologies LLC.
116 Newport Road, Carriage House
New London NH 03257
PO Box 716, Sunapee NH 03782
603-526-2420 (P); 603-526-2729 (F)
www.avianttechnologies.com**

Avian Black-S coating is a spray on, two-part water-based urethane coating that exhibits low reflectance over a wide wavelength range. The water-based coating exhibits very low gloss and is quite durable compared to most low reflectance coatings. It is easily mixed and may be applied with standard spraying equipment. Detailed directions for the application of the coating are given below.

The coating was made to meet or exceed the physical performance requirements of Mil-DTL-64159 (available for download at http://everyspec.com/MIL-SPECS/MIL-SPECS-MIL-DTL/MIL-DTL-64159B_29853/) except for the specification's Infrared Reflectance requirements. It is a low VOC coating (>1.8 lbs/gallon) and is non-flammable as applied. The reflectance is <3.5% over most of the UV-VIS-NIR and approximately 3% over most of the range. Spectral data is available at www.aviantechologies.com.

Physical Properties

Gloss: <1% @60°, <3.5% @85° Viscosity: 70-75 KU
Flexibility: Pass 1/8" mandrel 180° bend
Pot Life: Approximately 10 hours
Coverage: 640 sq. ft./gallon at 1 mil thickness
Air Quality: <1.8 lbs/gallon V.O.C.
Weathering: QUV>1000 hrs. Xenon Weatherometer > 2000 hrs.
Chemical Resistance: Water> 168 hours immersion
Hydrocarbon TT-S-735 Type III: <168 hours immersion
10% Acetic Acid: 1-hour spot
Address questions to: Info@aviantechologies.com

Preparation and Application Notes for Avian Black-S Coating

Avian Black-S is sold as a two-part coating. The two components should only be mixed when the coating is to be used. While the two components have extended shelf life (at least a year for part A and 4-6 months for part B if kept cool and out of light), the mixed coating has a shelf life of approximately 10 hours.

USE ONLY GLASS OR STAINLESS-STEEL VESSELS FOR MIXING. DO NOT USE ALUMINUM VESSELS FOR MIXING – THEY WILL DEGRADE THE PERFORMANCE OF THE COATING.

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Parts Preparation

Avian Black-S can be applied to a large number of substrates. In general, metals with a surface treatment that renders the surface non-stick cannot be coated. Parts made from anodized aluminum can be coated if sanding or bead-blasting is used to completely remove the anodizing prior to coating.

- Remove dust, dirt, oils, etc. from all surfaces: Use soap and water; alcohol can be used to remove grease. Dry the parts thoroughly before continuing.
- Mask off areas that are not to be coated using masking tape or liquid mask for small areas, and masking paper taped in place for large areas.
- If one has many small parts, it may be helpful to mount multiple parts on a sheet of corrugated cardboard using double-stick tape.
- Surface preparation with primers: We have found that primers are usually not necessary for the Black S coating. When they are necessary, we use BIN Primer. The primer is NOT used when coating glass and a thin layer only is applied to aluminum parts. **DO NOT USE KILZ.**

Coating Preparation Materials

After preparation of the material to be coated, gather the following materials for the coating process. The appendix to this document gives recommendations for specific brands based on Avian Technologies coating experiences.

- Avian Black-S coating kit (Components A and B)

- Distilled or deionized water (we used distilled)
- A propeller type stirrer or a paint shaker for mixing the coating. Do not use a blender or any device with aluminum parts that might come in contact with the coating. Do not use squirrel cage mixers.
- Syringes or graduated cylinders for measuring volume. We suggest the use of graduated syringes to measure the component quantities – a 140cc syringe works well for measuring Component A; a 6 or 12 cc syringe works well for measuring Component B. (Note, if you are using a luer-lock type syringe, using a plastic infusion cannula keeps the syringe out of the coating and makes clean-up easier.)
- A Viscosity Cup for checking for proper spraying consistency of the mixed coating.

Procedure

- Determine quantity of coating needed – make only what will be consumed/sprayed that day.
- Thoroughly mix Part A prior to combining with Part B. See *Note below.
- The coating mixture is prepared with two parts of Part A for one part of Part B. Mix the components by stirring vigorously with a propeller stirrer or in a paint shaker. Once mixed, the coating may be diluted slightly with distilled water to a viscosity that allows easy spraying. Do NOT agitate greatly or introduce large amounts of air into the mixture, as this will increase viscosity and make application difficult.
- Transfer mixed coating to spray gun cup, stainless steel pressure pot, or polypropylene bottle for temporary storage.

***Note: If the coating has a glossy appearance when dried, it means that (Part A) was not thoroughly mixed before the coating was prepared. When properly mixed and applied, the coating is extremely matte.**

Application of Coating / Spraying Materials

Once mixed, the coating may be applied using any commercial spraying equipment. We have had success spraying at approximately 35-lbs/sq. in. air pressure using a commercial paint-spraying gun and at lower pressure (approx. 20 lbs/sq. in) using an airbrush. A total of 3-4 coats, to a dry film thickness of 2-3 mils, is usually sufficient for opacity. The coating should be applied as a fine spray to give the most diffuse surface.

- High-volume / low-pressure (HVLP) spray gun or air brush for small parts
- Air compressor capable of delivering 35 PSI to the spray gun
- Air hose
- Line filter (to remove moisture and oils from compressed air)

Note: Any metals that come into contact with coating (e.g., pressure pot and stirrer) must be stainless steel.

Spray Techniques

- The following techniques will ensure that coating at the edges of parts is equivalent in thickness and appearance to the coating at the center of the part and that coating gives the appropriate surface. Place or hold parts approximately 12-18 inches (30-45 centimeters) from spray gun.
- Start spraying before gun is aimed at part; continue spraying after gun passes the end of the part.
- Spray in a steady and even pattern.
- Between coats, allow parts to dry under low heat (approximately 250-watt heat or halogen lamps) for ≤ 5 minutes. Heat source should be at least 18 inches (45 cm) away from the coated surface.
- Continue the cycle of spraying and drying until the coating is approximately 2-3mils thick – this is roughly 3-4 coats.
- When proper thickness is achieved, allow the Coated parts to sit at room temperature for 24-48 hours, the use of heat lamps or drying oven will reduce drying time.

Coating Clean-Up

Cleanup should be performed with hot, soapy water before the coating thoroughly dries or by using ethyl alcohol. Organic solvents such as acetone should readily remove any overspray. We have also had success removing the coating using Mötsenböcker's Lift Off #4 Spray Paint/graffiti remover.

De-Masking

Remove tape carefully to avoid chipping edges of coating. If coating does chip, it may be touched up using leftover coating ≤ 24 hours old and a small paintbrush.

APPENDIX: Materials and Sources

Sources are identified as those suppliers that have worked well for Avian Technologies LLC. They are provided to give a clearer idea of what equipment we use; they may not be available internationally. Other suppliers and equipment may work equally well.

<p style="text-align: center;">Liquid Mask</p> 	<p style="text-align: center;">BIN Primer</p> 	<p style="text-align: center;">Luer Lock Syringes</p> 
<p style="text-align: center;">Infusion cannulas</p> 	<p style="text-align: center;">Wagner Viscosity Cup</p> 	<p style="text-align: center;">Zahn Viscosity cup</p> 
<p style="text-align: center;">Spraying equipment (HVLV) Spray Gun</p> 	<p style="text-align: center;">Airbrush</p> 	<p style="text-align: center;">Line Filter</p> 