BLUE RIVER COATINGS
Product Data Sheet

HYDRO-FLEX POLYURETHANE TOP COAT

PRODUCT DESCRIPTION

BLUE RIVER COATINGS HYDRO-FLEX POLYURETHANE TOPCOAT is a water dispersible polyurethane. When the customer receives HYDRO-FLEX, it is already formed in the container, where as the solvent base type, the polyurethane is formed on the substrate. Therefore, once the paint is applied on the substrate, the film properties of HYDRO-FLEX rival that of other two component catalyzed systems. HYDRO-FLEX offers outstanding coverage, excellent durability, and ease of application as well as being a low VOC and EPA compliant coating.

ENVIRONMENTAL ADVANTAGES

BLUE RIVER COATINGS HYDRO-FLEX POLYURETHANE TOPCOAT is considered non-hazardous by EPA definitions and does not contain lead or chromates. The solid and semi-solid sludge produced in spraying and clean up can be flocculated; dried and sent to a "Class B" landfill. Check with local and state regulations for proper handling.

CHARACTERISTICS

- Excellent exterior durability
- Non-photochemically reactive
- Full gloss-80-85% at 60° glossometer
- Available in satin to gloss finish
- Excellent hardness/impact resistance
- Excellent adhesion, mar, and abrasion resistance
- Coating will not flash rust on clean dry metals
- Coatings can be applied in a wide range of temperature and humidity without the use of retarders
- Linear flexibility is excellent on substrates such as Lexan, vinyl, and fiberglass
- Water is used for reduction
- Excellent performance on most plastics
- Water is used for clean-up
- Non-Hazardous
- Air dry or force curing preferred
- Can be baked dry
- No discoloration or loss of flexibility when oven baked (250°F for one hour)
- Wide range of colors
- Shelf life of 1 year
- Unused paint can be returned to container
- Non-Flammable
- Metallics can be formulated

USES

- Steel, Steel Decks
- Aluminum
- Fiberglass
- Wood
- Canvas
- Plastics
- PVC

AIR QUALITY DATA

- VOC (Volatile Organic Compounds) 1.8 lb/gal, 216 gm/ltr
- Free of lead and chromates
- Non-photochemically reactive

PHYSICAL DATA

- Liquid
- Specific Gravity: 1.16
- Vapor Density: Heavier than air
- Evaporation Rate: Slower than ether
- VOC: 1.8 lb/gal, 216 gm/ltr
- Boiling Point: 340°F (171°C)
- % Solid by weight: 43%
- % Solid by volume: 39.2%
- Weight per gallon: 9.3 lbs
- Flash Point: 150°F CC

PERFORMANCE DATA

The tests below were conducted on Bonderite panels at 1-1.5 mil dry film thickness after 14 days cure time at a room temperature of 77°F (25°C). Each test rated excellent or no failure.

1. Salt Spray: 500 hours
2. Solvent Resistance: lacquer thinner, acetone, MEK, gasoline, xylene-50 double rubs with saturated cloth.
3. Pencil hardness test to 4H
4. Flexibility: 1/8" conical mandrel
5. Impact Resistance: Forward-180 inch pound, Reverse-180 inch pounds
6. Cold Check: 16 cycles: 24 hours @100% humidity, 24 hours @ 10°F, 24 hours @ 77°F.
7. 15 minute 180°F oven bake, immersion in boiling water 5 minutes
8. Taber Abrasion: CS17 wheel, 1,000 gm load (100mg loss/1,000 cycles)
9. Theoretical Coverage at 1 mil: 628 ft^2 (1604 x 39.2% solids by volume)
10. Dry Time (Air Dry): Recoat – 10 minutes @ 50% humidity and 75°F
11. Dry Time (Air Dry): Dust free – 20 minutes @ 50% humidity and 75°F
12. Dry Time (Air Dry): Dry to handle – 45 minutes @ 50% humidity and 75°F

SPECIFICATIONS

METALS: Surface must be free of grease, oil, dirt, and other foreign matter. Oxidation material must be removed or converted with Blue River Conversion Coating. Priming with Blue River Coatings Primer Sealer or Hydro-Poxy Primer is recommended. For compatibility with other primers, contact Blue River Coatings.

PLASTICS: Good adhesion on most plastics. For good primer adhesion on plastics, use Blue River Primer Sealer.

WOOD: Surface must be dry, sanded and dust free. Oil stains may not be used. For information on approved water base stains and sanding sealers, contact Blue River Coatings.

APPLICATION

1. Spraying: reduce with distilled water to 20-25 seconds Zahn #2.
2. Brushing or rolling: reduce with distilled water to 30-38 seconds Zahn #2.
3. Stir contents before use. Never shake or stir under high agitation.
4. Shelf life: 1 year.
5. Apply with standard equipment-pressure or suction feed, air assisted airless, HVLP, LVLP or electrostatic. Atomization pressure depends on viscosity.

CLEAN-UP WITH WATER

If the paint dries, solvents may have to be used for clean up. If the spray equipment is not stainless steel, the equipment may have to be taken apart and air-dried.

WEATHEROMETER

QUV testing was run using the following cycles: 4 hours UV @131°F/55°C, followed by 4 hours of condensation @ 104°F/40°C with 30-minute cooling/dry off cycle. When HYDRO-FLEX is compared to two-component catalyzed polyurethane, the initial gloss is about 28% less than the two component systems. However, the gloss can be improved by 20% with a clear coat. After a 1003.1-hour weatherometer test, the gloss exceeded other two component systems by 10-15%.

TEST PERFORMANCE DATA

PRODUCT DESCRIPTION

BLUE RIVER COATINGS HYDRO-FLEX POLYURETHANE TOPCOAT is a high quality water dispersible polyurethane. HYDRO-FLEX offers outstanding coverage, excellent durability, and ease of application as well as being a low VOC and EPA compliant coating. HYDRO-FLEX also offers superior adhesion and has film properties that are very similar, and in many cases superior, to two component catalyzed systems.

TESTING

BLUE RIVER HYDRO-FLEX POLYURETHANE TOPCOAT has passed the following tests:

1.	ANSI Standard 255, 1-1973	
2.	ASTM Standard G23-1969	Amended 1975
3.	ASTM Standard D523-1969	Amended 1972
4.	ASTM Standard D2794-1969	Amended 1974
5.	CGSB Standard 1-GP-71	Amended 1975
6.	CGSB Standard 31-GP-0	Amended September 1974
7.	CSA Standard CO5-176	
8.	MIL-C-85285B (AS)	American National Standard Institute American Society of Testing and Materials Canadian Government Specification Board Canadian Standards Association

HYDRO-FLEX was applied as part of a "finishing system" which included metal treatment and Blue River Coatings Hydro-Poxy Primer. The product was applied on metallic surfaces of electrical apparatus intended for outdoor use. Also tested were standard panels of SAE 1020 cold rolled steel of 3.5mm and 1.5mm in thickness finished in the same manner described above. Testing was conducted after air dry and 7-day cure.

PERFORMANCE

- **HARDNESS** – (500gm method 116.2 of CGSB standard 1-GP-71) no exposure of metal through the scratch in the film.
- **IMPACT RESISTANCE** – ASTM Standard D2749 with Gardener Variable Impact Tester with 16mm diameter ball. Exceeds 1.8J and 180 inch pounds reverse and direct.

- **FLEXIBILITY** – Bend through 180° around 6mm-diameter mandrel bare side of specimen in contact with the mandrel. Temperature was 23° (+/- 2°) C. Bending time not to exceed 1 second. No cracking or peeling when examined with unaided eye.
- **ADHESION** – CGSB Standard 31-GP-0 Method 7.3. No removal of paint.

- **OIL RESISTANCE** – Half immerse test panel in transformer oil conforming to CSA Standards C50 at 100°C(212°F)(+/- 1°) for 120 hours. Remove and wipe with a clean lint free cloth. Allow panel to cool for 2 hours. No softening, surface disintegration, wrinkling, blistering, or loss of adhesion.
- **WATER RESISTANCE** – Half immerse test panel in distilled water at 20-25°C (68-77°F) for 18 hours. Removed and wipe with clean lint free cloth. Allow product to dry for 7 hours (less than 50% humidity). No wrinkling or blistering.
- **SALT FOG OR CORROSION RESISTANCE** – CSGB Standard 1-GP-71 Method 129.1 for 150 hours – As per CGSB Standard 1-GP-71 Method 95.1 with maximum corrosion creepage of 1.5mm from edge of the scored line.
- **ACCELERATED WEATHERING** – 1,500 hours in arc weatherometer per ASTM Standard C23. No film degradation except loss of gloss and/or slight color change.
- **PERFORMANCE AFTER ACCELERATED WEATHERING** – Repeat tests on impact resistance and adhesion on panels subjected to accelerated weathering.

  Impact Resistance – 70% of original value
  Adhesion – No removal of paint

TEST PERFORMANCE DATA-HUGHES AIRCRAFT

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TEST OBJECTIVES

9. Identify and evaluate coatings with lower VOC content than currently required by rules for the aerospace industry.
10. Determine feasibility and make recommendations for implementation of lower VOC coatings meeting critical performance requirements of Southern California Air quality Management District Rule 1124.
11. Hughes Process Requirement Specification.

PERFORMANCE

- **IMPACT RESISTANCE** – No degradation after exposure.
  No pre-conditioning – 148 in. lb.
  Exposure to 300°F – 4 hours – 84 in. lb.
  Exposure to lube oil 250°F – 148 in. lb.
- **FLEXIBILITY** – ¼" mandrel tape test over bend area – **PASS** – no flaking, peeling, or cracking.

- **ADHESION** – Dry Tape Test – **PASS** – no delamination
  Wet Tape Test – **PASS** – no delamination
- **FLUID IMMERSION** – Distilled water (100°F – 4 days). Slight blister less than 1.6 by S3S. No softening or wrinkling. Skydrol 500 B (7days r.t.). No delamination or softening.
- **FLUID IMMERSION** – Hydraulic Fluid (7 days r.t.). **PASS** – Excellent adhesion and no softening. Lube Oil (250°F, 24 hours). **PASS** – Excellent adhesion and no softening.
- **SOLVENT RESISTANCE** – Rub 50 times with MEK soaked wipe. PASS – No coating removal to primer.
- **HEAT RESISTANCE** – Gloss was measured before and after tests.
  2 coupons 300°F/4-hours 1% decrease.
  2 coupons 250°F/1-hour 1% decrease.
- **SALT FOG OR CORROSION RESISTANCE** – 300 hours per ASTM B117. No blisters or other defects.
- **LPA TEST** – Method 24 – 340 gm/ltr.
- **FEDERAL-STD-141** – Method 6101 – 60° – Gloss – 82%.

- **ASTM E595** – Spacecraft Coatings – Aero-Kote finish on water reducible epoxy primer.

Color:		Gloss Black
Flexibility:		PASS
50 MEK Wipes:	PASS	
Outgassing1/: % TML =	Total Mass Loss 4.63	
	% VCM =	Volatile condensable Materials .08
	% WVR =	Water Vapor Recovered .67

VCM Visual (Volatile Condensable Materials – Oil Droplets)

COLOR

1. Color compliance with Munsell reading (visual matching to production color in daylight and incandescent light).
2. Gloss specular – Gloss range 70 – 100 at 60° Head, determined in accordance with ASTM standard D523.

Note: Performance was achieved with overall thickness dried, exclusive of metal treatment, of less than .075mm.