BCF Black Zinc Coating

Single-Component Dye-Free Black Coating for Zinc, Zinc-Iron, and Zinc Die-Cast Surfaces

Product Code BCF (Companion Products: BCF Activator, SP-5 Topcoat)

1. PERFORMANCE

OVERVIEW

ACCU-LABS BCF is a single-component liquid black-conversion coating that produces uniform, attractive, dye-free black finishes on zinc-plated, zinc-iron-plated, and zinc die-cast surfaces. BCF is fully compatible with zinc plated from cyanide, alkaline non-cyanide, and acid-chloride processes. The chemistry contains no silver nitrate and no chromate, yet delivers 144 hours of corrosion protection per ASTM B117 in its base condition — and can be further extended with a wax, oil, or trivalent-chromate topcoat. The black finish is UV stable and will not fade when exposed to sunlight.

FEATURES & BENEFITS

SINGLE-COMPONENT, EASY TO USE	Liquid concentrate operates as a single-component bath — no additional brighteners, accelerators, or silver-nitrate dosing required, simplifying inventory and operator workflow.
CHROMATE-FREE, SILVER-FREE CHEMISTRY	Eliminates the cost of silver nitrate and the regulatory burden of hexavalent chromate while still producing an attractive uniform black coating.
PROVEN 144-HOUR SALT-SPRAY PROTECTION	Provides 144 hours of corrosion protection per ASTM B117 in the base condition — extendable with seal, wax, oil, or trivalent-chromate topcoat for higher-protection applications.
UV-STABLE BLACK FINISH	The black coating is UV stable and will not fade when exposed to sunlight, making it suitable for outdoor and architectural applications.
WORKS WITH ALL COMMON ZINC SUBSTRATES	Compatible with zinc plated from cyanide, alkaline non-cyanide, and acid-chloride processes, plus zinc-iron alloy plating and zinc die-cast parts — one black-coating chemistry across a mixed-substrate shop.

WIDE-WINDOW BATH CONTROL Effective across 10–30% concentration, pH 3.0–4.0, and 120–150°F, with optimum production setpoints in the middle of each range — tolerant of routine drift.

OPERATING PARAMETERS

Parameter	Optimum	Range
Accu-Labs BCF Concentration	15–20% by volume	10–30% by volume
pH	3.1–3.7	3.0–4.0
Operating Temperature	130–135° F	120–150° F
Immersion Time	1–2 minutes	1–4 minutes

NOTE: Adjust pH down with very small additions of sulfuric acid and up with liquid caustic soda. Check pH at operating temperature (not at room temperature) and adjust if needed before running production. Salt-spray performance and finish color are most reproducible when pH is held in the optimum 3.1–3.7 band.

2. PROCESS SETUP & OPERATIONS

EQUIPMENT REQUIREMENTS

Tank: Polypropylene, CPVC, fiberglass, or 300-series stainless steel.

Heaters: 304 or 316 stainless steel, Teflon (PTFE), or titanium.

Agitation: Mechanical agitation is recommended — propeller, cathode-rod, work, or pump agitation all work.

Filtration: Optional; when used, 10–20 micron filtration is recommended for improved finish consistency.

MAKE-UP COMPONENTS

Material	Quantity	Notes
Accu-Labs BCF	15–20% by volume	Single-component black-coating concentrate
Water	Balance to working volume	Diluent
Sulfuric Acid	As required	For pH adjustment downward; add in very small amounts
Liquid Caustic Soda	As required	For pH adjustment upward; add in very small amounts

MAKE-UP PROCEDURE

BATH MAKE-UP

1. Fill the cleaned tank to a portion of its working volume with water.
2. Add Accu-Labs BCF to a working concentration of 15–20% by volume, then bring the bath to its final working volume with water and mix thoroughly.
3. Adjust pH to 3.0–3.3 with very small additions of sulfuric acid.
4. Bring the bath to operating temperature (130–150°F).
5. Re-check pH at operating temperature and adjust if needed — sulfuric acid to lower, liquid caustic soda to raise.

OPERATING CYCLE

6. Zinc plate.
7. Rinse.
8. Rinse.
9. Activate in 15–25% by volume Accu-Labs BCF Activator at 90–130°F for 1–5 minutes. NOTE: the activator step is NOT used for zinc die-cast parts.
10. Rinse thoroughly.
11. Rinse thoroughly.

12. Black coat in 20% Accu-Labs BCF at pH 3.1–3.7 and 125–150°F for 45–120 seconds.
13. Rinse.
14. Topcoat with Accu-Labs SP-5.
15. Hot-air dry.

NOTE: The BCF Activator is required to obtain proper black coverage on electroplated zinc and zinc-iron, but should be skipped for zinc die-cast substrates. The SP-5 topcoat in step 9 extends salt-spray performance beyond the 144-hour baseline; wax, oil, or trivalent-chromate post-treatments may be substituted depending on the customer's corrosion-protection target.

BATH MAINTENANCE

When temperature and pH are held in range, Accu-Labs BCF produces uniform production results across a very wide concentration window. Replenish with 1–2% by volume additions of BCF to maintain the desired black-finish quality. Verify pH at operating temperature after each replenishment and adjust if needed. Dump the bath when 1–2% additions no longer produce the desired finish — this indicates accumulated contamination or chemistry drift that cannot be recovered through further additions.

NOTE: Salt-spray performance and finish color are most consistent when the bath is held near the optimum setpoints (15–20% concentration, pH 3.1–3.7, 130–135°F). If finish quality begins to drift, verify pH and temperature before making concentration changes.

ANALYTICAL METHODS

PH MONITORING

Bath pH is the primary analytical control for Accu-Labs BCF. Measure pH at operating temperature using a pH meter calibrated with 2.0 and 4.0 buffers. Adjust pH down with very small additions of sulfuric acid, and up with very small additions of liquid caustic soda. Target the optimum 3.1–3.7 range for most consistent finish.

FINISH-QUALITY VERIFICATION

Process panels should be coated periodically and inspected for uniform black appearance, freedom from blemishes, and acceptable adhesion. If finish quality begins to drift, verify pH and temperature before making concentration changes. Contact your Accu-Labs representative for the recommended bath-concentration titration procedure if quantitative control is required.

3. HANDLING & COMPLIANCE

SAFETY & HANDLING

Accu-Labs BCF black-coating solutions are acidic. Avoid contact with skin and eyes. Wear safety goggles or face shield, chemical-resistant gloves, apron, and acid-resistant footwear when handling or working with this product. Use caution when adding sulfuric acid for pH adjustment — always add acid to water (never the reverse) and add slowly with stirring. Read and review the Safety Data Sheets (SDS) for BCF, BCF Activator, SP-5 Topcoat, and all other chemicals used in the cycle before handling or use. Ensure all applicable health, environmental, and safety regulations and standards (OSHA, NIOSH, ACGIH, NFPA) are met.

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