



BRITEGUARD™ PITCHBLACK CS™

- ***Outstanding corrosion resistance.***
- ***UV protected, will not fade or discolor.***
- ***Glossy, non-iridescent, non-conductive coating.***
- ***Better adhesion and hardness.***
- ***Excellent base for paint, lacquer & waxes.***
- ***Economical to make-up and maintain.***
- ***Consistent, deep, rich black color.***

BLACK CHROMATE CONVERSION COATING FOR ZINC AND CAD

PITCHBLACK CS is a two part black chromate system that is designed to provide a uniform, consistent black deposit on all types of electroplated zinc, galvanized and die-cast. It has been specifically formulated for high production loads, where ease of use, consistent color and a high degree of corrosion protection are desired. With proper control and when used in conjunction with a ***BRITEGUARD Post Treatment Process***, *PITCHBLACK CS* can provide 72-250 hours of protection. For a higher degree of salt spray protection, ***PITCHBLACK 44*** is recommended.

PITCHBLACK CS provides a coating that is glossy, non-iridescent and non-conductive, with better adhesion and hardness than competitive black chromate coatings. It provides a coating that is an excellent base for paint, lacquer, oils and waxes. The coating meets all U.S. Government Specifications for corrosion resistance and is also specified under ASTM-201.

PITCHBLACK CS is formulated with a UV blocker, thus coating will not fade or discolor. Parts will retain their deep, rich, black color.

PITCHBLACK CS is economical to make-up and maintain, and offers exceptionally long life in production. It does not require discarding as frequently as do many other black chromates.

OPERATING DATA

<u>For Zinc</u>	<u>Range</u>	<u>Typical</u>
PITCHBLACK CS Part C	12-18%/vol.	16%/vol.
PITCHBLACK CS Part S	4-10%/vol.	7%/vol.
 <u>For Cad</u>		
PITCHBLACK CS Part C	6-10%/vol.	8%/vol.
PITCHBLACK CS Part S	6-10%/vol.	8%/vol.
Temperature	60-90° F. (15-32° C)	Same
Time	30-3 min.	45 sec.
pH	1.5-3.0	2.0

- *Deionized water must be used to avoid silver loss due to chlorides, etc. If deionized water is unavailable and tap water is used, increase the PITCHBLACK CS Part C amount until the correct color is obtained.*
- *When using caustic to adjust pH, be sure to use rayon grade or better. Many caustics contain chlorides which can impede the performance of the chromate. When using sulfuric acid, CP or Reagent grade is recommended.*

BATH MAKE-UP

1. Make sure you know the correct volume of the working solution.
2. Fill the tank 1/3 the volume with the pure DI water.
3. Add 16% of **PitchBlack Part C**.
4. Add another 1/3 of the volume of DI water and heat the solution up to between 90-100F.
5. Add **7%** of the **PitchBlack Part S**, make sure that you mix the container well prior to use.
6. Add the final 1/3 of the working volume with DI water.
7. Check the pH, if a little low, adjust up to 1.4-1.5 with ammonium hydroxide.

PROCESS CYCLE

- 1) Zinc Plate, .0002" minimum.
 - 2) Cold water rinse.
 - 3) Activate, 0.1-0.75%/volume nitric, sulfuric acid, or 0.25-0.5% acetic acid 2-15 seconds.
 - 4) Cold water rinse.
 - 5) **PITCHBLACK CS BLACK CHROMATE.**
 - 6) Cold water rinse.
 - 7) **PITCHBLACK PT-9 POST-DIP**, (optional) 0.5-1%/volume, 10-20 seconds, pH 1.8-2.0.
 - 8) Dry.
- *Immersion time should be 45 seconds to a minute, after about 3 days of utilizing the bath hard, add an additional 1% of the PART S. After 3-4 weeks of operations with no additions being made, add about 2% of the PART C to kick the bath, additional Part S, after this run the bath until it produces unacceptable work. Based on experience the PITCHBLACK bath will have contamination, (zinc and iron), that makes it more economical to dump and re-bath.*

SOLUTION CONTROL

The best results are obtained when routinely performing the following; 1) Performance solution maintenance, 2) pH solution maintenance, and 3) Analytical solution maintenance.

Performance Solution Maintenance

Performance maintenance is accomplished on the production line by the operator, whenever production is run. It consists of keeping track of the time required to complete the coating. The optimal dip time is 5-10 seconds past the time when no observable color change takes place when viewed under a strong light. The best coatings are produced when this occurs in 45-120 seconds. As the dip time increases (over 2 minutes) additions of 1%/volume **PITCHBLACK CS Part C and Part S** will increase the deposit speed of the coating.

pH Solution Maintenance

pH should be checked every two hours with a properly calibrated pH meter. pH should be maintained by 1% additions of **PITCHBLACK CS Part C & S** (or in some cases with nitric or acetic acid). Corrective adjustments can be made with 1% additions of **PITCHBLACK CS Part C** only, when the silver content has been analyzed and corrected with additions of **PITCHBLACK CS Part S**.

Analytical Control

Analysis consists of checking hexavalent chrome, zinc, and silver. Adds are made to keep the hex chrome concentration about 50% higher than the zinc concentration and the silver ions between 250 and 500 ppm. Zinc should be maintained below 20,000 ppm by decanting or dumping. Higher levels of zinc will inhibit the chromating reaction, and by 30,000 ppm it is difficult to produce a good chromate film.

PITCHBLACK CS PART C

- 1) 2 ml sample into flask.
- 2) Add 100 mls of D.I. water.
- 3) Add 5 ml concentrated HCL.
- 4) Cool and add 10 ml of 10% potassium iodide solution.
- 5) Titrate w/0.1N sodium thiosulfate to blue then colorless endpoint.
- 6) Add 5 drops starch indicator solution. Continue titration to a clear endpoint.

Calculation: Mls of thiosulfate x = % by volume **PITCHBLACK CS PART C**.

Zinc and Silver

Prepare samples with dilution factors of 100, 1000, and 10,000 for testing on an atomic absorption instrument. Determine the concentration of the zinc by testing the 1000 or 10,000 dilution factor solution. Determine the concentration of the silver by testing the 100 dilution factor solution. Use accurate standard solutions for instrument calibration.

$$\text{Dilution Factor} = \frac{\text{Sample volume + water added}}{\text{Sample volume}}$$

Zinc can also be checked in the following manner:

- 1) 2 ml sample & 100 ml D.I. water.
- 2) 20 mls Ammonium Hydroxide-chloride buffer.
- 3) Add 0.2 gram Eriochrome Black T indicator.
- 4) Titrate with 0.0575 EDTA until red-amber to green yellow endpoint. Use the first sharp color change which holds for 10-15 seconds.

Calculation: Mls of EDTA x 1.88 = grams/liter of zinc. Grams/liter x 1000 = ppm zinc.

PROCESS TIPS

- Immersion time should be 45 seconds to a minute, after about 3 days of utilizing the bath hard, add an additional 1% of the **PART S**. After 3-4 weeks of operations with no additions being made, add about 2% of the **PART C** to kick the bath, additional Part S, after this run the bath until it produces unacceptable work. Based on experience the **PITCHBLACK** bath will have contamination, (zinc and iron), that makes it more economical to dump and re-bath.

- Parts basket should be shaken or mechanically agitated initially, then not at all for the last 10-15 seconds.
- Different part configurations may require different process cycles. The **A BRITE TECHNICAL SERVICE LABORATORY** can assist in determining the proper process cycle for each specific operation.
- pH is important! Too low results in a brownish color, while too high will be more iridescence.
- **Always** use deionized water to reduce the possibility of chlorides precipitating the silver.
- To make up a new solution, the correct amount of **PART C** should be added to the D.I. water first. Check for the proper pH. If the pH is too low, add small amounts of caustic soda (Rayon grade only) until you have maintained the proper pH of 1.5-2.5. Add the proper amount of **PITCHBLACK CS PART S**. Stir with plastic paddle until properly mixed. The temperature should be 75 to 90°F.
- During normal operation the **PART C & S** are consumed and the dissolved zinc and pH rises making the reaction time longer and longer. If the reaction time exceeds 120 seconds, 1% additions of **PART C & S** will reduce the process time back to less than 60 seconds. The same thing holds true for the pH. When the pH approaches or exceeds the upper limits, reduce the pH with 1% additions of **PART C & S**.
- Analysis of hexavalent chromium, zinc, silver and pH is recommended. Maintain a chromium concentration approximately 50% higher than the zinc content. Maintain the silver between 300 & 500 p.p.m. provides a good black.
- Increasing time gives a thicker coating, increasing wear resistance but decreasing corrosion resistance. Minimizing the dip time to achieve proper color will maximize salt spray performance. For a higher degree of salt spray performance **PITCHBLACK 44** is recommended.
- If the zinc content approaches 30,000 p.p.m. it is difficult to obtain a good chromate film. The condition can cause very poor corrosion resistance, roughness, spotting and the lack of blackening.
- The corrosion resistance will drop as the level of zinc rises. Keep the zinc content below 15,000 to 20,000 p.p.m. This is accomplished by decanting of the solution and replenishment with D.I. water and **PITCHBLACK CS PART C & S**.
- Chlorides introduced to a **PITCHBLACK CS** solution have a negative effect. The reaction creates a yellow insoluble sludge of silver chloride that settles in the bottom of tank. If the sludge is agitated it could settle on the work and is difficult to rinse off. This silver chloride will oxidize quickly on the surface of the finished part, creating a white to greenish bloom of oxide. As little as 1 p.p.m. of chloride will remove 3 p.p.m of silver from solution and necessitate the use of more **PART S**, raising the cost of operation. Good rinsing and the elimination of chloride will improve the quality of your work and reduce operating costs.
- Hot water rinsing should not be used as it will tend to dull the finish and decrease corrosion resistance of the chromate.
- Rinsing several times and drying prior to blackening helps eliminate some of the problems of chlorides, cyanide, zinc and pH contamination. This is an added step to the operation, but, could be worth it. Drying right out of the processing tank, followed by rinsing the dried blackened parts in fresh water and drying again improves the corrosion resistance.
- Rinse, rinse, rinse, rinse, both before and after chromating, this is a key to success.
- Acid activation before blackening helps the removal of organic films, chlorides and cyanide. Dip also removes passive films that form on baked zinc prior to blackening. A dip of **BriteGuard ZD-270** or 0.25-05%, acetic or sulfuric acid pre-dip is recommended.
- Always allow chromate to “age” for at least 24 hours in order for corrosion or abrasion tests to be meaningful.
- To minimize staining, keep the pH of final rinse between 3.0-6.0 with chromic acid. Chrome in the rinse will react with the black chromate to passivate the silver and form an additional protective coating.

EQUIPMENT

PVC, Koroseal or cross-linked polyethylene tanks are satisfactory. Teflon coils are recommended. Ventilation is normally not required. Dipping baskets should be polyethylene. *Do not use stainless steel.* Metal contact can hinder blackening process.

STORAGE/HANDLING

PITCHBLACK CS is a strong oxidizer. Keep containers closed when not in use and away from combustible materials. Avoid contact with skin and eyes. Wear proper protective clothing, rubber boots, gloves apron and face shield. In the event of contact, flush area with water and contact a physician. **Refer to the Material Safety Data Sheet for more complete information before using this product.**

WARRANTY

The information presented herein, while not guaranteed, is to the best of our knowledge true and accurate. No warranty or guarantee expressed or implied is made regarding the performance of any products, since the manner of use is beyond our control. No suggestion for product use nor anything contained herein, shall be construed as a recommendation for its use in infringement of any existing patent, and we assume no responsibility or liability for operations which do infringe any such patents. The above includes confidential and proprietary information of **A BRITE** and is furnished to you for your use solely on products or processes supplied to you by us.

TROUBLESHOOTING

<u>PROBLEM</u>	<u>POSSIBLE CAUSE</u>
Loosely adherent coating.	Lower temperature to below 85° F.
Stripping of zinc deposit.	Decrease concentration of bath.
Chromating too fast.	Raise bath pH above 1.5 with "Rayon Grade" caustic soda only.
	Check concentration of " PART C "
Film forming slowly.	Lower pH to 1.7-2.3 with equal adds of PITCHBLACK CS PART C & S.
Dusty/filmy coatings	(or dilute sulfuric acid.)
Brown or iridescent color.	Increase temperature above 70 deg.
	Increase dip time.
	Insufficient silver content. Add Part S to increase silver content. When more than 4% is required, decant or dump bath.
	Check pH.
	Check zinc thickness.
	Iron, copper, cad contamination.
	Zinc level high. If over 20,000 discard portion or all of the bath.
Black, smutty color	Too high Part S , increase Part C or dilute.