



# COLDIP® NI-Z BLACK DIAMOND 500

TECHNICAL DATA  
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## COLDIP® NI-Z BLACK DIAMOND 500

*TRIVALENT BLACK PASSIVATE FOR ZINC-NICKEL ELECTROPLATE*

COLDIP® NI-Z BLACK DIAMOND 500	is a unique trivalent black conversion coating for electroplated zinc-nickel alloy.
COLDIP® NI-Z BLACK DIAMOND 500	produces a uniform, gloss-black, scratch-resistant finish.
COLDIP® NI-Z BLACK DIAMOND 500	achieves over 400 hours to white corrosion and over 1,000 hours to red rust when sealed with a Columbia Chemical sealer.
COLDIP® NI-Z BLACK DIAMOND 500	works over a very wide nickel alloy content range of 11 - 17%.
COLDIP® NI-Z BLACK DIAMOND 500	is ideal for both rack and barrel installations using alkaline and acid zinc-nickel deposits.

## SOLUTION MAKEUP

### RACK PLATING

	<u>GENERAL APPLICATION</u>	<u>RANGE</u>
COLDIP® NI-Z BLACK DIAMOND 500A:	10% by volume	8.0 - 12% by volume
COLDIP® NI-Z BLACK DIAMOND 500B:	10% by volume	8.0 - 12% by volume
COLDIP® NI-Z BLACK DIAMOND 500C:	5% by volume	4.0 - 6% by volume
Dip time:	Optimum 45 seconds	40 to 60 seconds
Temperature:	77° F (25° C)	60 - 85° F (15 - 30° C)
pH:	Optimum 1.6	1.5 to 2.2

**NOTE:** Use diluted Nitric Acid (50%) to adjust the pH down.  
Use diluted Sodium Hydroxide (20%) to adjust the pH up.

**BARREL PLATING**

	<u>GENERAL APPLICATION</u>	<u>RANGE</u>
COLDIP® Ni-Z Black Diamond 500A:	10% by volume	8.0 - 12% by volume
COLDIP® Ni-Z Black Diamond 500B:	10% by volume	8.0 - 12% by volume
COLDIP® Ni-Z Black Diamond 500C:	5% by volume	4.0 - 6% by volume
Dip time:	Optimum 45 seconds	40 - 60 seconds
Temperature:	77° F (25° C)	60 - 85° F (15 - 30° C)
pH:	Optimum 2.0	1.8 - 2.2
Heating:	Steam or indirect heating, portable heaters not recommended.	

NOTE: Use diluted Nitric Acid (50%) to adjust the pH down.  
Use diluted Sodium Hydroxide (20%) to adjust the pH up.

**MAINTENANCE ADDITIONS****RACK PLATING**

	<u>REPLENISHMENT RATE</u>
COLDIP® Ni-Z Black Diamond 500B:	5.50 mL/ft <sup>2</sup>
COLDIP® Ni-Z Black Diamond 500C:	1.0 mL/ft <sup>2</sup>
COLDIP® Ni-Z Black Diamond 500D:	3.0 mL/ft <sup>2</sup>
Nitric Acid (67%):	1.30 mL/ft <sup>2</sup>
Heating:	Steam or indirect heating, portable heaters not recommended

**BARREL PLATING:**

	<u>REPLENISHMENT RATE</u>
COLDIP® Ni-Z Black Diamond 500A:	2.20 mL/ft <sup>2</sup>
COLDIP® Ni-Z Black Diamond 500B:	2.90 mL/ft <sup>2</sup>
COLDIP® Ni-Z Black Diamond 500C:	1.00 mL/ft <sup>2</sup>
Nitric Acid (67%):	1.30 mL/ft <sup>2</sup>

**TYPICAL CYCLE**

1. PLATE
2. RINSE (3 RINSES RECOMMENDED)
3. COLDIP® NI-Z BLACK DIAMOND 500

4. RINSE (MULTIPLE)\*
5. COLUMBIA CHEMICAL SEALER OR TOPCOAT.
6. DRY

\*NOTE: MAINTAIN GOOD RINSING AFTER CHROMATE TO MINIMIZE DRAG IN TO SEALER TANK.

## ***ANALYTICAL PROCEDURE***

### **RACK PLATING**

1. Fill tank with 60% with water.
2. Add the required amount of COLDIP® NI-Z Black Diamond 500A and mix well.
3. Add the required amount of COLDIP® NI-Z Black Diamond 500B and COLDIP® NI-Z Black Diamond 500C and mix well.
4. Allow pH to stabilize.
5. Adjust pH if necessary, using dilute sodium hydroxide or dilute nitric acid.
6. Add water as needed to final volume.

NOTE: Use diluted Nitric Acid (50%) to adjust the pH down.  
Use diluted Sodium Hydroxide (20%) to adjust the pH up.

### **BARREL PLATING**

1. Fill tank with 60% with Water
2. Add the required amount of COLDIP® NI-Z Black Diamond 500A and mix well.
3. Add the required amount of COLDIP® NI-Z Black Diamond 5000B and COLDIP® NI-Z Black Diamond 500C and mix well.
4. Allow solution to set at operating temperature for approximately 2 hours to allow pH to stabilize.
5. Adjust pH if necessary, using dilute sodium hydroxide or dilute nitric acid.
6. Add water as needed to final volume.

### **TITRATION PROCEDURE**

#### **ITEMS NEEDED:**

- DI Water
- 20% Sodium Hydroxide Solution
- 35% Hydrogen Peroxide Solution
- 10% Nickel Chloride Solution
- Conc. Hydrochloric Acid
- Ammonium Bifluoride
- 10% Potassium Iodide Solution
- Starch Indicator Solution
- 0.010N Sodium Thiosulfate Solution

**PROCEDURE:**

1. Pipette a 5 mL sample of working chromate into a 100 mL volumetric flask. Dilute to 100 mL with DI water.
2. Pipette 10 mL of the above diluted solution into a 250 mL Erlenmeyer flask and dilute to approx. 100 mL with DI water.
3. Add 5 mL of 20% Sodium Hydroxide solution and mix.
4. Add 1 mL of 35% Hydrogen Peroxide solution and mix.
5. Place solution on a hot plate and with mixing heat until boiling. Boil for 5 minutes.
6. Add 1 mL of 10% Nickel Chloride solution to the flask and continue boiling for an additional 2 minutes.
7. Remove solution from hot plate and cool to room temperature.
8. With mixing add the following in order; 10 mL of concentrated Hydrochloric Acid, 1 gm Ammonium Bifluoride, 10 mL Potassium Iodide, and 1 mL Starch Indicator.
9. Titrate solution with 0.010N Sodium Thiosulfate to a clear/slight greenish endpoint.

CALCULATION: mL of 0.010N Sodium Thiosulfate x 0.359 = % COLDIP® NI-Z Black Diamond 500A

***HELPFUL HINTS*****AGITATION**

Agitation of passivation solution is required for complete coverage and uniform passivation film formation:

- Barrel applicators can passivate directly in the barrel. For off-line hand baskets, the basket must be agitated vigorously to allow for the passivation solutions to continually flow over the plated work. Washers and flat pieces are best done in a rotating barrel.
- Rack applicators must have good agitation in the passivate solution. A recirculation pump is recommended or air agitation is acceptable.

Product is suitable for use in acid and alkaline non-cyanide zinc-nickel deposits. Slight variations in color may be seen depending upon the deposit of choice.

**OPERATING TIPS**

1. Rinse water prior to the passivate tank must be kept clean. High alkalinity can cause precipitates that will affect the final part appearance.
2. Keep plating thickness above 5 microns.
3. When alloy is low it is sometimes helpful to lower the pH to low end of the operating parameters.
4. Copper and iron contamination can cause appearance issues as well as reduced corrosion protection. Keep iron below 100ppm and Copper below 2 ppm.

## *HANDLING & STORAGE*

Columbia Chemical recommends referring to the specific product Safety Data Sheets for safety, handling, and storage precautions.

## *NON-WARRANTY*

The data contained in this bulletin is believed by Columbia Chemical Corp. to be accurate, true, and complete. Since, however, final methods of use of this product are in the hands of the customer and beyond our control, we cannot guarantee that the customer will obtain the results described in this bulletin, nor can we assume responsibility of the use of this product by the customer in any process which may infringe the patents of third parties.

