

Luster-On Products

Technical Data Sheet

LUSTER-ON CADMIUM SPECIAL

I. GENERAL DESCRIPTION

Luster-On Cadmium Special is a high performance brightener system designed to achieve maximum luster from a cyanide cadmium-plating bath. Cadmium Special performs best in a rack situation but also provides excellent brightness, uniformity and throwing power in a barrel operation. Luster-On Cadmium Special is simple and efficient to use and operates over a wide temperature range and wide current density range.

The high luster of deposits is characteristic of the system and is consistent over the entire range from load to load. While the degree of brightness varies directly with the concentration of addition agent, no sharp drop from peak brightness occurs with either a reasonable excess or deficiency of Cadmium Special.

Luster-On Cadmium Special is easy to control by Hull Cell plating tests, observation of deposit luster or proportioning with sodium cyanide additions. The recommended concentration is optimum, although amounts as much as double that value pose no serious problems. Luster-On Cadmium Special deposits are burn, stain and pit free and readily accept a chromate conversion coating from the line of Luster-On Chromates.

READ MSDS FOR THIS PRODUCT PRIOR TO USING

Luster-on Products Inc., Springfield, MA - 800-888-2541, Fax 413-731-5549
www.luster-on.com E-MAIL sales@luster-on.com

LUSTER-ON CADMIUM SPECIAL (CONTINUED)

II. COMPOSITIONS OF BATHS

BARREL

	Preparation lbs./100 gal.	Analysis oz./gal.
Sodium Cyanide	105.00	15.0 - 17.0
*Cadmium Oxide	15.00	
*Cadmium Metal		1.8 - 2.2
Caustic Soda		2.5 - 3.5
Sodium Carbonate	13.00	2.0
Luster-On Cadmium Special	0.5 gallon	

STILL

	Preparation lbs./100 gal.	Analysis oz./gal.
Sodium Cyanide	105.00	16.0 - 18.0
*Cadmium Oxide	22.00	
*Cadmium Metal		2.7 - 3.5
Caustic Soda		2.0 - 3.0
Sodium Carbonate	13.00	2.0
Luster-On Cadmium Special	0.5 gallon	

*Cadmium oxide is used in preparing a new solution, but once it is dissolved the bath is thereafter analyzed for cadmium metal.

Luster-On Cadmium Special should **always** be diluted with an equal volume of water before adding to the bath. After initial plating, Luster-On Cadmium Special may be added in increments of 0.25% to achieve additional brightness.

Each 1 oz./gal. of cadmium oxide dissolved also results in 0.6 oz./gal. of caustic soda, as determined by analysis, so that no further additions of caustic soda should be made to still or automatic plating solutions except after analysis. Concentrations higher than those listed above appreciably lower the maximum bright current density and narrow the plating range. Barrel plating solutions are improved by the addition of 1.0 to 1.5 oz./gal. caustic as the higher caustic soda concentration permits highest current carrying capacity and hence the highest production rates with no harmful effects at low barrel plating current densities.

LUSTER-ON CADMIUM SPECIAL (continued)

III. CONVERSION TO LUSTER-ON CADMIUM SPECIAL

Luster-On Cadmium Special addition agent is ordinarily compatible with other addition agents commonly employed so that no difficulty is experienced in making a change to it, provided one of the following techniques is used. Sometimes, although the different addition agents do not clash, the total combined effect of the two is deleterious.

The best method to follow for a conversion is to submit a sample to the Luster-On Customer Service Laboratory for our recommendations. If this is not possible, then the bath should be first analyzed and necessary additions made to adjust the chemistry to that recommended under solution composition. After which, performing Hull Cell plating tests will aid in determining the proper initial addition of Luster-On Cadmium Special. If the Hull Cell is not available, an addition of one-fourth the recommended amount, 1 pint Luster-On Cadmium Special per 100 gallons of solution, is suggested. In no case should the first addition exceed 2 pints per 100 gallons. Concentration of brightener can then be raised to the recommended level by making additions of 1 pint per 100 gallons biweekly or weekly. Regular maintenance additions of 1 pint Luster-On Cadmium Special for each 10 pounds of sodium cyanide added should be made after the recommended level is achieved.

IV. OPERATING CONDITIONS

Temperature	-	75° to 105° F.
Current Density		
Rack Plating	-	10 to 70 Amps. /Sq.Ft.
Barrel Plating	-	Highest obtainable
Voltage (a three phase full wave rectifier or generator is desirable)		
Rack Plating	-	3 to 6 volts
Barrel Plating	-	9 to 15 volts
Ratio	-	Total Cyanide to Cadmium Metal
Rack Plating	-	5.3 to 5.8 for average work
Barrel Plating	-	6.5 to 7.5 for average work

The "Ratio" is an important consideration as it directly proportions the concentration of sodium cyanide to that of cadmium in solution.

V. PHYSICAL PROPERTIES

Luster-On Cadmium Special is a slightly viscous liquid with a bluish color and light ammoniacal odor.

VI. HANDLING AND STORAGE

Luster-On Cadmium Special is shipped in 5-gallon non-returnable polyethylene containers. It should be stored in a dry location and tightly closed after partial withdrawal of material.

LUSTER-ON CADMIUM SPECIAL (CONTINUED)

VII. WASTE TREATMENT

Luster-On Cadmium Special contains nickel and should be treated for the removal of metal prior to discharge. It is necessary that the solutions in which they are used be treated for the removal of cadmium metal and cyanide prior to disposal.

VIII. SAFETY AND FIRST AID

All of the safety precautions below apply to the product as received. This product is used in highly corrosive plating solutions containing cadmium and cyanide. **All safety precautions associated with those solutions should be observed.**

Mildly Acidic Industrial Product.

CAUTION! May cause irritation of eyes and skin.
May be harmful if swallowed.

Do not get in eyes.
Avoid prolonged skin contact.
Wash thoroughly after handling.
Do not take internally.

Keep container closed when not in use.
Store at moderate temperatures.

FIRST AID IN CASE OF CONTACT

FOR EYES: Immediately flush eyes with plenty of water for at least 15 minutes. Hold eyelids apart while flushing to insure contact of water with all surfaces of eyes and lids. **Get immediate medical attention!**

FOR SKIN: Immediately flush area with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes and wash before reuse. **Get immediate medical attention!**

IF SWALLOWED: Wash out mouth thoroughly with water. Give several glasses of water to drink followed by soapy water, salty water (1 tablespoon per glass), or milk. **Get immediate medical attention!**

IF INHALED: Remove from exposure. In case of severe overexposure, **get immediate medical attention!**

KEEP OUT OF REACH OF CHILDREN

FOR INDUSTRIAL USE ONLY

This product is sold for industrial use only. Our suggestions for its use are based upon tests and procedures, which from experience we believe to be reliable. Since the use is beyond our control, neither we nor our distributors can assume responsibility, either expressed or implied for the results and/or for violation of any patents or any claims resulting from such use.

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CADMIUM PLATING SOLUTION ANALYSIS

SOLUTIONS:

Silver Nitrate	26 g/l AgNO_3 C.P. - 12.5 ml HNO_3 C.P.
Indicator	Dry mixture 95% NaHCO_3 5% $\text{K}_2\text{Cr}_2\text{O}_7$
Potassium Iodide	100 g/l KI C.P.
Barium Chloride	100 g/l $\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$ C.P.
Hydrochloric Acid	1.0 N HCl or 83 ml/l
Sodium Cyanide	5M NaCN C.P. or 245 g/l
Sulfuric Acid	0.94 N H_2SO_4 or 26.2 ml/l
Disodium Salt of E.D.T.A.	0.060 M or 22.34 g/l $\text{Na}_2\text{H}_2\text{EDTA} \cdot 2\text{H}_2\text{O}$
Buffer Solution	Dissolve 54 grams ammonium chloride (NH_4Cl) in water. Add 350 ml concentrated ammonium hydroxide (NH_4OH) make up to 1 liter.
Eriochrome Black T. Powder	2 parts to 400 parts sodium chloride or 0.5grams in 99.5 grams.
Formaldehyde	1 part to 8 parts water

CADMIUM PLATING SOLUTION ANALYSIS (CONT.)

METHODS

I. Sodium Cyanide

1. Pipette a 1-ml sample into a 250-ml Erlenmeyer flask.
2. Dilute with 150 ml of water.
3. Add 5 grams of Indicator powder.
4. Titrate with Silver Nitrate solution ($\text{AgNO}_3 - \text{HNO}_3$) to permanent red brick color.

ml titration = oz./gal. Sodium Cyanide (NaCN)

II. Caustic (NaOH) - Run a blank.

1. Pipette a 5ml sample into a 250 Erlenmeyer flask.
2. Add 100 ml distilled water, 5 ml of 5 molar NaCN solution, 8 drops Parazo Orange Indicator.
3. Titrate with 0.94 N Sulfuric Acid (H_2SO_4)

ml H_2SO_4 = oz./gal. Caustic (NaOH)

III. Carbonates

1. Dilute a 10-ml sample with 100 ml of hot distilled water in a 500 ml Erlenmeyer flask.
2. Add 25 ml 10% Barium Chloride solution, heat to a boil and allow to settle on a steam bath.
3. Filter through #40 Whatman paper and wash with hot distilled water.
4. Return filter paper to original flask, add 100 ml of hot distilled water and Methyl Orange Indicator.
5. Titrate with 1N HCl to first permanent orange color.

ml of Hydrochloric Acid x 0.71 = oz./gal. Sodium carbonate

IV. Metallic Cadmium

1. Pipette a 2-ml sample into a 250-ml Erlenmeyer flask.
2. Dilute with 100 ml distilled water.
3. Add 3 drops of Thymolphthalein Indicator, neutralize to clear with 1-1 Sulfuric Acid or Hydrochloric Acid.
4. Add 20 ml of Buffer solution ($\text{NH}_4\text{Cl}-\text{NH}_4\text{OH}$). From this point on, this must be in quick succession.
5. Add a pinch of eriochrome Black T. dry indicator.
6. Add 10 ml of 1-8 Formaldehyde.
7. Add a pinch of Eriochrome Black T. dry indicator.
8. Titrate quickly with 0.060 molar E.D.T.A. until purple changes to blue.
9. Add more Formaldehyde, notice any change, if so, titrate more.

ml of E.D.T.A. x 0.45 = oz./gal. Cadmium Metal

