Laser EX

Product Code: 2342002
Revised Date: 04/26/2006

Laser EX
The **Laser Ex** Chemical Polish Process

Laser EX is a peroxide-based chemical polishing system that will provide a high luster on brass and most copper alloys.

Parts processed in the laser system can subsequently be plated, oxidized, soldered, or lacquered. The high luster produced by **Laser EX** is superior to that obtained in the conventional chromic or nitric acid based bright-dips. It is not a direct replacement for these solutions, longer immersion times and extra process tanks are required.

ADVANTAGES OF LASER EX

NON-FUMING... It operates without the hazard of toxic nitric oxide fumes. A built-in surfactant eliminates any mist so that minimal ventilation is required.

BRILLIANT LEVELED FINISH... Its controlled polishing action eliminates the danger of over etching, a major problem in nitric acid based bright-dips. Bright work of consistent quality is the result.

NO NITRIC ACID, CHROMIC ACID OR CYANIDES... It eliminates the handling of these hazardous and toxic chemicals making for a safer operation.

CLEAN ACTIVE SURFACE... It produces a surface that will accept subsequent finishing operations such as plating, oxidizing, soldering and lacquering.

RESISTS TARNISHING... Surfaces remain bright under normal conditions for extended periods of time.

WORKS ON WIDE RANGE OF COPPER ALLOYS... It can be used with good results on a variety of copper alloys.

RACK OR BARREL... It can be used in a manual operation or in an automatic machine. Parts may be racked (with rod agitation) or done in bulk (barrel).

OPERATING PARAMETERS

Solution make-up: The operating solution is easily made up by adding 30% by volume of **Laser EX** to water (30 gal of **Laser EX** per 100 gal of total

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volume) and 0.6% by volume of 66° Be sulfuric acid (5 pints per 100 gallon).

Provision for both heating and cooling of the **Laser EX** solution is recommended.

Operating range: 25 - 35% by volume **Laser EX**
0.5 - 0.7% by volume of 66° Be sulfuric acid

Note: It is important that the sulfuric acid concentration be maintained in the above range at all times. If the pH of the solution rises above 5.0, there may be an explosive release of the **Laser EX** solution. Recommended practice requires titration of the solution both prior to and following use of the bath. See "Analysis of sulfuric acid" on page 3 for the proper method of adjusting the solution.

Temperature: 100° - 115°F Do not exceed 120°F

Cooling of the bath will be required when continuous production is being run. For best results, a bath loading of 0.5 ft^2/gallon should not be exceeded.

Time: 1 - 5 minutes

Brightness is dependent upon immersion time in the solution and alloy composition. A normal treatment of 2 minutes at 110°F will produce an excellent luster on brass. Although leveling will continue to increase with longer treatment time, chemical consumption will be excessive for the slight increase in leveling. The finish on copper is bright but to a lesser degree than 70/30 brass.

Agitation: work rod agitation

Equipment:

Tanks	pvc, polypropylene, polyethylene, 304 or 316 stainless steel
Heaters	quartz, teflon or 316 stainless steel
Cooling coils	304 or 316 stainless steel
Ventilation	required
Fixtures, racks, & baskets	polypropylene, pvc, nylon, or stainless steel

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PROCESS CYCLE

Parts must be free of oil and other soils to insure uniform brightening.

Cycle 1 - (scale free surface)

1) Alkaline soak clean in Cleaner S-139, 10 oz/gal, 160°F, 3 minutes.
2) Cold water rinse.
3) Activate in 5-10% by volume sulfuric acid, room temperature, 1 - 2 minutes.
4) Cold water rinse.
5) Chemical polish in **Laser EX**, 110°F, 1-5 minutes.
6) Cold water rinse.
7) Brilliant dip in 10% by volume of Laser Brilliant Dip, room temperature, 30-60 seconds.
8) Cold water rinse.
9) Dry.

For heavily leaded brass alloys we recommend Laser Brilliant Dip instead of sulfuric acid as a brilliant dip, to aid in the removal of the lead sulfate residue sometimes found on leaded brass. Laser Brilliant Dip also serves to eliminate the copperish hue found on some brass if it becomes dezincified in the bright dip process.

ANALYTICAL PROCEDURES

Maintenance of bath - the **Laser EX** and sulfuric acid concentrations can be easily analyzed and accurately replenished using the following analytical procedures.

ANALYSIS OF LASER EX

1) Pipette a 2 ml sample into a 100 ml volumetric flask and dilute to the mark with DI water.
2) Pipette a 10 ml sample of the diluted solution into a 250 ml erlenmeyer flask and add 75 mls of DI water.
3) Add 5 mls of concentrated sulfuric acid.
4) Titrate with 0.1N potassium permanganate solution until a pink color remains for 10-20 seconds.
5) Record the mls of titrant used.

% by volume of Laser EX = 2.5 X MLS OF 0.1N Potassium Permanganate used

For every 1% low in **Laser EX** concentration, add 1.3 fluid ounces of **Laser EX** per gallon of operating solution (10 mls of **Laser EX** per liter of operating solution).

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The **Laser EX** should be maintained between 25-30% by volume.

ANALYSIS OF SULFURIC ACID

1) Pipette 5 ml sample into a 250 ml erlenmeyer flask.
2) Add 75 mls of DI water.
3) Add 5 drops of methyl orange indicator.
4) Titrate with 0.1N sodium hydroxide to a yellow endpoint.
5) Record the mls of titrant used.

% by volume Sulfuric Acid = 0.05 X MLS OF 0.1N Sodium Hydroxide used

For every 0.1% low in sulfuric acid, add 0.13 fluid ounces of concentrated sulfuric acid per gallon of operating solution. (1 ml of concentrated sulfuric acid per liter of operating solution).

The sulfuric acid concentration *must* be maintained between 0.5 - 0.7% by volume for optimum polishing.

Analysis of copper

Chemicals required

- Pan indicator, makeup:
  Dissolve 0.1 gram of pan indicator (1-(2-pyridylazo)-1-napthol) in 100 ml of methanol.

- 0.0575 M EDTA disodium salt solution, makeup:
  Dissolve 21.4 grams of EDTA disodium salt in 10 ml of concentrated ammonium hydroxide and 100 ml of distilled water, dilute up to 1 liter with distilled water.

1) Pipette 1.0 ml of **Laser EX** solution into a 500 ml erlenmeyer flask.
2) Add 2 ml of concentrated ammonium hydroxide. The solution will gas vigorously. The color should be a blue violet.
3) Add 100 ml of distilled water and about 4 drops of pan indicator.
4) Titrate with 0.0575 M EDTA disodium salt solution until an endpoint color changes from blue violet to green.

CALCULATIONS

(ML OF 0.0575 M EDTA TITRANT) (0.48) = OZ/GAL COPPER (METAL)

(ML OF 0.0575 M EDTA TITRANT) (3.6) = GRAM/LITER COPPER (METAL)

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SAFETY REGULATIONS

Laser EX contains hydrogen peroxide. Hydrogen peroxide is strongly oxidative and acts caustically on the eyes and skin. Self ignition is possible if the liquid is soaked up by an inflammable material. Protect eyes and skin.

EYE CONTACT: Wash thoroughly with water. Contact a doctor.
SKIN CONTACT: Wash with water.

STORAGE AND HANDLING

Laser EX is a hydrogen peroxide mixture and should be stored in original vented container in a dry location, out of sun and away from heat. Empty containers should be diluted with large quantities of water and discarded. A spill or leak should be quickly flushed away by flooding with water.

Avoid contamination from any source, including metals, dust and especially organic materials. Avoid contact with combustible materials. Do not get in eyes - wear goggles. Avoid contact with skin - wear neoprene, butyl rubber or vinyl gloves. Wash thoroughly after handling. Do not breathe mists or vapors; adequate ventilation should be provided.

In the event the **Laser EX** drum begins to vent, immediately apply a cold water spray to cool the drum. Do not physically handle the drum. Also, contact HUBBARD-HALL INC. for further assistance.

WASTE DISPOSAL

Spent solutions contain hydrogen peroxide and sulfuric acid (although to varying degrees). They will contain dissolved metals - copper, zinc, lead, etc. They do not contain chelators.

Laser solutions can be treated with other waste streams or they can be segregated and batch treated independently. If a clarifier is used in the separation of solids and liquids, the batch method is preferred. Small gas bubbles produced by peroxide destruction can lift previously precipitated sludge and cause "floaters". If membrane filters, cartridge filters, sand filters, filter presses, etc., are used, then everything can be mixed.

Hydrogen peroxide is generally unstable on the alkaline side. Since laser solutions are acidic, they require adjustment with caustic, caustic potash, lime, soda ash, etc. When the pH rises above 8.0, an effervescence will occur. This will vary with the concentration of peroxide. Certain dissolved metals like iron, lead, copper - will accelerate this.

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This breakdown should be allowed to run to completion - as evidenced by the absence of gassing. If the dwell time is very short, sodium bisulfite can be used to expedite the process.

When the pH was raised, the various metals will precipitate in their hydroxide forms. If the laser solution is mixed with chelate-containing wastes, some can remain in solution. Care should be taken to prevent this.

After metal precipitation and peroxide breakdown are complete, the waste stream can be handled in the normal fashion. The addition of coagulants and flocculants can proceed as normal.

WARRANTY

THE QUALITY OF THIS PRODUCT IS GUARANTEED ON SHIPMENT FROM OUR PLANT. IF THE USE RECOMMENDATIONS ARE FOLLOWED, DESIRED RESULTS WILL BE OBTAINED. SINCE THE USE OF OUR PRODUCTS IS BEYOND OUR CONTROL, NO GUARANTEE EXPRESSED OR IMPLIED IS MADE AS TO THE EFFECTS OF SUCH USE, OR THE RESULTS TO BE OBTAINED.

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