



## **BROXIDECSTAB COMPOUND**

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RichardsApex BROXIDECSTAB is a neutral clear, water-white liquid, weighing approximately 8.6 pounds per gallon, formulated for the copper and brass industry. It is used with BROXIDEC, our highly inhibited 50% hydrogen peroxide.

BROXIDECSTAB is a highly effective inhibiting and brightening system formulated to provide effective pickling and etching of copper when used in conjunction with sulfuric acid and hydrogen peroxide.

Use 0.2% to 2% by volume of BROXIDECSTAB in a solution containing 10% by volume of sulfuric acid and 1% to 6% by volume BROXIDEC (inhibited 50% Hydrogen Peroxide). Pickling is accomplished at room temperature to 30°C (86°F) in a matter of minutes.

### **Advantages of BROXIDECSTAB**

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Prevent rapid decomposition of hydrogen peroxide by metals.

Stabilizer is nonphenolic and odorless.

Stabilizer controls the brightening and etch rate while slowing the depletion rate of the peroxide.

Performs well at room temperature.

Effective at low acid concentrations and high metal concentrations.

Environmentally nonhazardous, high quality and purity.

Determination method by gas chromatography available upon request

### **TECHNICAL DATA ON BROXIDECSTAB BROXIDEC (Inhibited 50% Hydrogen Peroxide)**

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#### **Pickling – Bath Composition**

Sulfuric Acid - The sulfuric acid concentration of the cleaning bath is not critical. It can vary from 10 to 20% by volume without changing the cleaning action.

Additions of sulfuric acid are needed to compensate for acid used in forming the soluble cupric sulfate and that lost by mechanical drag out.



**BROXIDEC** - The concentration of hydrogen peroxide in the cleaning bath can vary between 1% and 6%. At concentrations greater than 6%, surface pitting can occur. At concentrations less than 1%, the cleaning action is too slow to be economical.

**Copper Concentration** - The dissolved copper in the cleaning bath should not exceed 20 g/l. Above this level, wasteful decomposition of hydrogen peroxide occurs.

**Temperature** - The decomposition of BROXIDEC peroxygen compound increases to an unacceptable rate above 30°C. Although temperature differences have little effect on the ability of BROXIDEC to clean, at temperatures above 40°C the baths are less efficient due to excessive decomposition of the peroxygen compound.

### **BROXIDECSTAB (For Copper)**

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Stabilizer additions further slow down the decomposition rate of peroxide in baths highly contaminated with copper.

It permits operating the bath higher than room temperature without fuming. Concentration should be maintained at 0.25% to 1.0% by weight. Additions should be 1 gallon or liter with every 5 gallons or liters of BROXIDEC addition.

An economical starting point for an in-line system should contain:

- 15% by volume, Sulfuric Acid
- 2% by volume, BROXIDEC
- 0.4% by volume, BROXIDECSTAB

### **Copper Recovery**

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Copper is recovered from hydrogen peroxide - based cleaning baths through electrolysis. The cathode should be copper, either starter sheets or flattened tube. The anode is lead or lead-antimony 15% alloy.

The cathodic current density is maintained at 5 - 15 amps/ft<sup>2</sup> until the copper in the bath is plated on the copper cathode. Hydrogen peroxide can be added, plus sulfuric acid as needed, and the solution reused.

The pickle solution should be dumped only if the concentration of zinc and other alloying metals inhibit plating of the copper. If continuous electrolysis of a primary hot acid pickle is already practiced, the spent hydrogen peroxide pickle solution can be blended into the larger hot acid pickle system.



## Handling Precautions for Hydrogen Peroxide

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BROXIDEC should be stored in its original vented container, in a dry location out of the sun and away from the heat. The vent hole in the bung cap must be kept open. Pressure must not be used to empty the drums.

Never return unused portions of BROXIDEC to the drum. They should be diluted with a large volume of water and discarded.

Empty drums must be thoroughly rinsed with clean water before discarding.

A spill or leak must be quickly flushed away by flooding with water. Avoid contamination from any source.

Contaminants may cause rapid decomposition and the generating of large quantities of oxygen gas at high pressures.

Keep BROXIDEC away from all combustible material. Drums should not be stored or shipped on wood pallets; plastic is preferred.

## Safety Precautions and First Aid for Hydrogen Peroxide

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Do not get in eyes - wear impact-resistant glasses or plastic goggles.

Avoid contact with skin - wear neoprene, butyl rubber or vinyl rubber gloves and clean Dacron outer clothing. Avoid contact with combustible material.

If contact is made with the skin or eyes, flush with water immediately.

After exposure, even though there is no severe pain, call a physician if contact is made with the eyes.

## Instructions to make 1,000 gallons or 4,00 liters of solution

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1. Put 410 gallons or 1,640 liters of water in tank.
2. Add 100 gallons or 400 liters of  $H_2SO_4$
3. Follow with 442 gallons or 1,768 liters of water.
4. Let cool to room temperature.
5. Add 6 gallons or 24 liters of BROXIDECSTAB.
6. Add 42 gallons or 168 liters of BROXIDEC.



*ADVANTAGES OF BROXIDECSTAB*

Competitive Method	<ol style="list-style-type: none"><li>1. Normal effluent treatment is effective (bichromate is extremely toxic and expensive to treat.</li></ol>
Oxidizing acid pickles bichromates (most common pickling oxidant in USA) Chromic acid	<ol style="list-style-type: none"><li>2. Can be more economical when you cost our actual chemical consumption</li><li>3. Waste treatment is easier, less expensive, peroxide by-products are generally regarded as nonhazardous in the waste treatment process</li><li>4. Solution is regenerable; indefinitely replenishable if copper recovery is practical</li><li>5. Copper is easily recovered</li><li>6. Avoids chromate conversion coating which can accelerate tool wear</li><li>7. Eliminates problems which may occur in handling chrome.</li></ol>
Nitric acid (used primarily for “bright dipping” copper alloys but also used in some descaling operations)	<ol style="list-style-type: none"><li>1. Avoids need for fume scrubbers (nitric acid can produce large quantities of toxic, corrosive fumes)</li><li>2. Can be economical when you consider total overall costs</li><li>3. Copper is more easily recovered</li></ol>
Non-oxidizing acid pickles Standard sulfuric acid pickles	<ol style="list-style-type: none"><li>1. Remove scale left by simple acid pickling.</li><li>2. Eliminates red stains caused by sulfuric acid.</li></ol>
Ordinary peroxide containing competitive stabilizer package	<ol style="list-style-type: none"><li>1. Lower total use costs</li><li>2. More stable under use conditions</li><li>3. Contains all necessary stabilizers needed for sulfuric acid pickling</li><li>4. Less difficulty controlling solution (compared to solution where expensive external stabilizers must be added periodically</li></ol>