Glycolic Acid

General Metal Finishing and Cleaning

Product Information

Glycolic acid is an excellent choice for your copper and aluminum metal finishing processes. It is a good raw material for new or re-formulated surface cleaner applications when looking for less toxic materials. Glycolic acid is 100% biodegradable, reducing the impact your finishing application leaves on the environment. It is a great choice for metal cleaning because it has dual functionality. The molecule contains both a carboxylic acid functional group as well as a hydroxyl group and can act as an acid or an alcohol or both. As a fairly strong acid, it is a good source of protons for acid to neutral cleaner.

Advantages

- Low corrosiveness
- Low toxicity
- Readily biodegradable
- Low odor
- Negligable VOC
- Freely water-soluble

Applications

- Aluminum and copper cleaner and finishing
- Electroless plating premix
- Electropolishing electrolytes
- Anodizing and sealer formulations
- Pickling and mill scale
- Acid cleaning and degreasing
- Wheel cleaner
- Buffing compound cleaner

Physical and Chemical Description

Technical grade glycolic acid is sold as a clear to light amber solution in a 70% concentration. Glycolic acid is the first and simplest member of the family of hydroxycarboxylic acids. Glycolic acid has an acid dissociation constant of $1.47 \times 10^{-4}$, or a pKa of 3.87. Glycolic acid has a 7 day biodegradability value of 89.6%.

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>Molecular Weight</td>
<td>76.04</td>
</tr>
<tr>
<td>Total Acid, %</td>
<td>70.0–72.0</td>
</tr>
<tr>
<td>Sulfates, ppm</td>
<td>800 max.</td>
</tr>
<tr>
<td>Color, Gardner</td>
<td>&lt;3</td>
</tr>
<tr>
<td>Formic Acid, %</td>
<td>&lt;1 max.</td>
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<tr>
<td>Turbidity, NTU</td>
<td>6 max.</td>
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Metal Cleaner

Glycolic acid is useful in a wide variety of metal cleaning applications, including equipment, stainless steel boilers, heat exchangers, and many other industrial metal surfaces.

The properties listed here contribute to its effectiveness and versatility:

- A relatively strong organic acid. The pH of a 4% solution of Glycolic acid in water is below 2.0.
- Low volatility. This means little corrosive fumes evolve on heating. Low acid yield loss is experienced, even when hot solutions are used. Non-VOC due to low vapor pressure.
- Very mild odor versus the strong objectionable odor created by other acids, such as acetic. Does not fume as some mineral acids do.
- Dissolves carbonate, oxide, and most casein scales readily. The resulting salts are water soluble. This gives good rinsing properties.
- As supplied, it is already in complete solution. Easy to handle as a liquid. There are no "incomplete dissolving" problems, and the 70% concentrate can be quickly diluted to any desired strength with water.
- Relatively low corrosion rate on metals. Specific corrosion data are available upon request from Chemours. These low rates of corrosion can be further reduced by addition of a corrosion inhibitor.
- Contains essentially no chlorides. It can be used for cleaning stainless steels without the possible chloride cracking or embrittlement sometimes experienced in acid chloride systems.
- In formulation, it is compatible with many cleaning additives. These can include surfactants, biocidal agents, corrosion inhibitors, scents, colors, other acids, and, of course, water.
- Possesses complexing properties. This characteristic may preclude the need to add a special chelating or complexing agent. Enhances the rinsibility property of the cleaner.
- A relatively safe acid to store and handle. Always be sure to follow safety data sheet (SDS) guidelines for chemical handling.
- Readily biodegradable, but does not support the growth of bacteria in use.

For more information, visit glycolicacid.chemours.com or call (800) 441-9593.

Starting point formulations for metal cleaning are given in the “Glycolic Acid Cleaner Formulary” technical bulletin.