

Glycolic Acid

In Toilet Bowl Cleaner Formulations

Product Information

Glycolic acid features many excellent characteristics that make it ideal for use in toilet bowl cleaner formulations—either alone or as a blend with other acids. Specifically, its low pKa, low molecular weight, and organic nature make it highly effective for removing mineral scales that typically form in toilet bowls. Glycolic acid also readily complexes with iron, calcium, and magnesium deposits, providing easy removal of rust and hard water stains.

In addition to fast, effective cleaning, the use of glycolic acid in toilet bowl cleaner formulations addresses other consumer concerns. For example:

Environmental acceptability. Glycolic acid is readily biodegradable (90% in seven days) and VOC-exempt in California.

Safety and ease of use. Glycolic acid has no irritating fumes and is readily dilutable at all concentrations. It is non-volatile and nonflammable.

Anti-microbial performance. Chemours has a glycolic acid offering, Glyclean™ AM, that is EPA registered for use as an active ingredient in formulating liquid, hard, non-porous surface disinfectants for household, industrial, institutional, or commercial premises. It provides both bactericidal and viricidal activity.

Value. Glycolic acid is an eco-friendly product that offers outstanding cost-effectiveness and is safe and convenient to use.

With a focus on continuously improving product performance to better meet evolving needs, we developed a formulation for a high-performance blend that offers all the benefits of glycolic acid with enhanced cleaning effectiveness.

Putting the Glycolic Acid Blend to the Test

Laboratory tests compared the cleaning performance of glycolic acid blend versus organic and mineral acids commonly used in toilet bowl cleaner formulations, including citric acid, glycolic acid, phosphoric acid, and sulfamic acid, all at 10% active ingredient. A modified ASTM D5343-06 test method was used.

As shown in **Figure 1**, glycolic acid blend is significantly more effective at removing iron oxide stains than any of the other organic or mineral acids tested that are commonly used in toilet bowl cleaner formulations. Although all of the acids showed some improvement in cleaning effectiveness with the addition of a booster, the greatest benefit was seen with the glycolic acid blend.

Glycolic acid blend provides superior cleaning effectiveness against rust stains compared to citric acid, glycolic acid, sulfamic acid, and phosphoric acid. And, unlike mineral acids, glycolic acid blend will not cause discoloration when it comes in contact with iron.

For calcium carbonate—or hard water—stains, the glycolic acid blend again performed better than the other organic acids tested, but not as well as phosphoric acid, as shown in **Figure 2**. However, many companies are discontinuing phosphoric acid use in toilet bowl cleaners because of environmental considerations—and this is not a concern with eco-friendly glycolic acid. The addition of a booster gave the greatest performance enhancement to the glycolic acid blend and phosphoric acid.



Key Benefits of Glycolic Acid Blend with Booster Technology*

Ideal for use in toilet bowl cleaner formulations, glycolic acid blend with booster technology:

- Provides significantly better cleaning against iron oxide and calcium carbonate stains compared to citric, glycolic, and sulfamic acids.
- Clearly outperforms phosphoric acid against iron oxide stains—one of the predominant issues for toilet bowl cleaning.
- Offers environmental advantages compared to phosphoric acid.
- Highly effective in a fully formulated toilet bowl cleaning product.
- Easily formulated and compatible with other cleaner components, such as solvents, fragrances, surfactants, and colorants.

With outstanding cleaning performance, ease of use, and environmental acceptability, glycolic acid blend with booster technology meets the demand from today's busy consumers who want an effective toilet bowl cleaner that will help save time and effort doing an unpleasant household chore, while addressing their concerns about environmental impact.

The Chemours Difference

For more than 50 years, Chemours has been the leading supplier of glycolic acid to customers and distributors around the world. We earned this distinction by providing a reliable, consistent supply from a dedicated production line at one U.S.-based facility. This plant is the world's largest purpose-built facility with ISO 9001:2000 certification to ensure that we meet your global supply needs.

In addition to high quality and reliable supply, we provide the added advantage of access to a dedicated, professional staff of technical service representatives,

formulating chemists, and analytical chemists for help with technical questions, assistance with new product development, and advice to help ensure the success of products made with glycolic acid.

Figure 1.

It's easy to see the superior cleaning power of Glycolic Acid blend compared to other organic and mineral acids—with or without the same booster—when used against iron oxide stains.

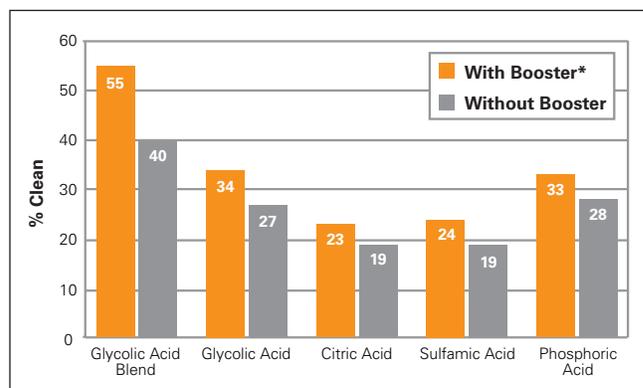
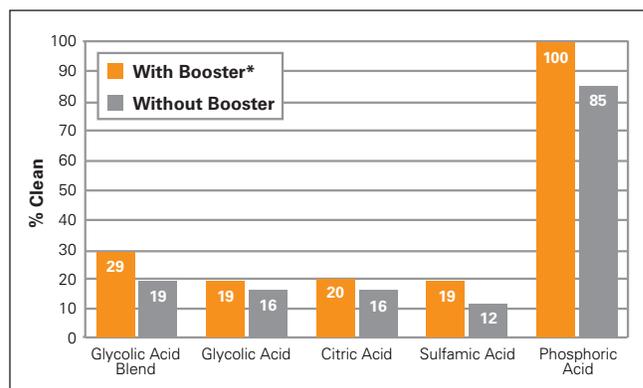


Figure 2.

Glycolic acid blend removes calcium carbonate stains more effectively than other organic acids—with or without the same booster. Although less effective than phosphoric acid against these hard water stains, glycolic acid blend offers important environmental advantages.



*Booster is sodium erythrobate at optimal concentration of 2 wt%.

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