

Key Performance Advantages

- Extends fluid life
- Minimizes leaching of cobalt
- Cost effective



Metalworking Fluids

CORRGUARD[®]-95 AMINO ALCOHOL

High Performance Amino Alcohol for Metalworking Fluids

Whatever your metalworking fluid challenges, ANGUS has the formulation expertise, products, and technology solutions to facilitate a winning formulation. Our cornerstone product, CORRGUARD[®]-95, is an efficient multifunctional neutralizer of acidic ingredients and a leading amine for metalworking fluid formulations where performance matters.

The unique chemical and physical properties of CORRGUARD-95 can offer the metalworking fluid formulator the following advantages:

- Cost efficient alkaline pH development and neutralization of acidic components
- Resistance to microbial degradation
- Stable emulsions at high pH
- Longer fluid life with triazine biocide
- Minimal ammonia release
- Minimal leaching of cobalt
- Registered on all major chemical inventories
- Maximizes fluid life when used with CORRGUARD[®] EXT multifunctional neutralizer

Typical Properties

The following are typical properties of CORRGUARD-95. They are not to be considered product specifications.

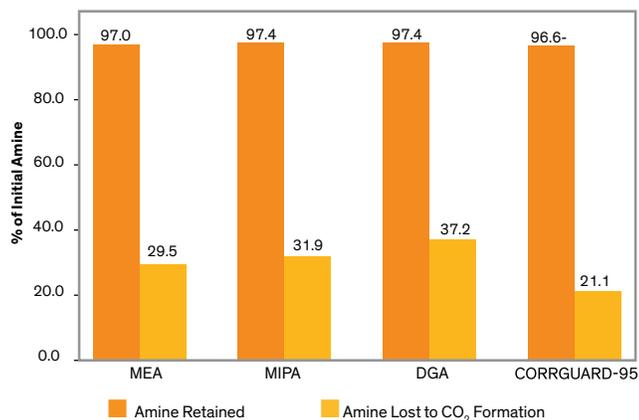
Base strength (pKa @ 25°C)	9.8
Molecular weight (of 2-amino-2-methyl-1-propanol)	89.1
pH (0.1M Aqueous)	11.3
Neutral equivalent	93-97
Vapor pressure @ 20°C mm Hg (anhydrous)	0.34 mm Hg
Specific gravity @ 25°C	0.942
Weight per gallon @ 25°C	7.85 lb
Viscosity @ 25°C (77°F) @ 10°C (50°F)	147 cp 561 cp
Freezing point	-2°C (28°F)
Flash point Tag Open Cup (Tag Closed Cup)	78°C/172°F (83°C/182°F)
Surface Tension as supplied (In 10% aqueous solution)	37 dynes/cm (58 dynes/cm)

Cost Efficient Alkaline pH Development

CORRGUARD-95 corrosion inhibitor is an excellent choice for developing and maintaining alkaline pH because it has high base strength, low molecular weight and is less reactive with atmospheric CO₂ than other common amines. High base strength, along with low molecular weight, means less amine is needed to develop alkaline pH.

Amine retention and reactivity with atmospheric CO₂ in a circulating metalworking fluid system can significantly influence pH stability. Results of a 14-day aquarium study (Figure 1) revealed that CORRGUARD-95 corrosion inhibitor is well retained in a re-circulating aqueous solution. In addition, CORRGUARD-95 is less reactive with atmospheric CO₂ than other strong amines, resulting in better pH stability.

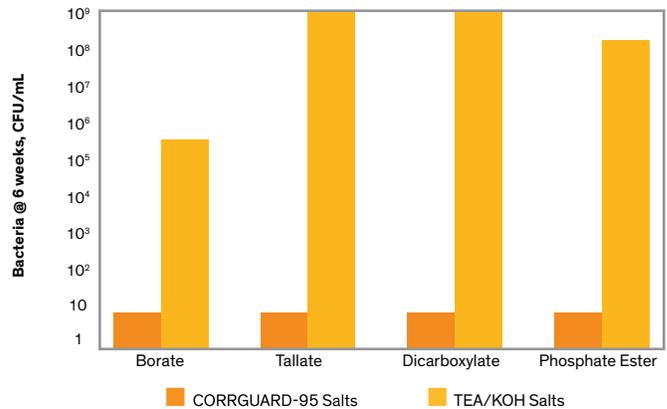
Figure 1. Amine Retention & Carbon Dioxide Reactivity



Enhanced Bioresistance

Several common acidic components were diluted to 5000 ppm in distilled water and neutralized to pH 9.5 with CORRGUARD-95 corrosion inhibitor or a blend of TEA-99 and KOH. These salt solutions were given a mixed inoculum of 10⁶ Colony Forming Units (CFU)/mL bacteria and 10⁴ CFU/mL fungi. The CORRGUARD-95 salts were all resistant to bacterial growth while the TEA salts were biosupportive as shown in Figure 2.

Figure 2. Biostability of Amine-Based Metalworking Fluid Additives*

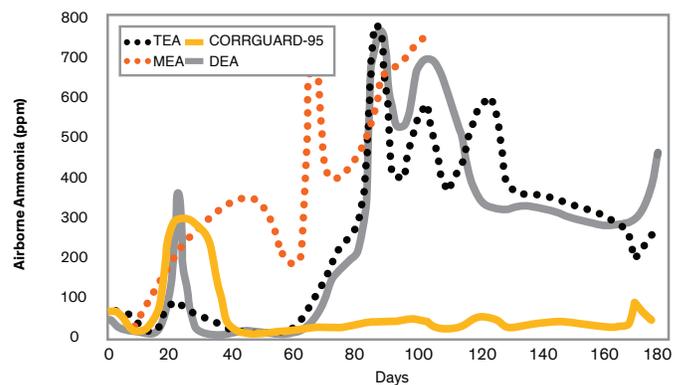


*0.5% acid solutions neutralized to pH 9.5 and inoculated at start with mixed bacterial/fungal inoculum

Ammonia Release

A study by Olin Chemicals (now Lonza) revealed that microbially challenged fluids containing CORRGUARD-95 corrosion inhibitor released significantly less NH₃ than fluids containing ethanolamines (Figure 3). Olin concluded that MEA, DEA and TEA contribute to ammonia accumulation, while CORRGUARD-95 does not.

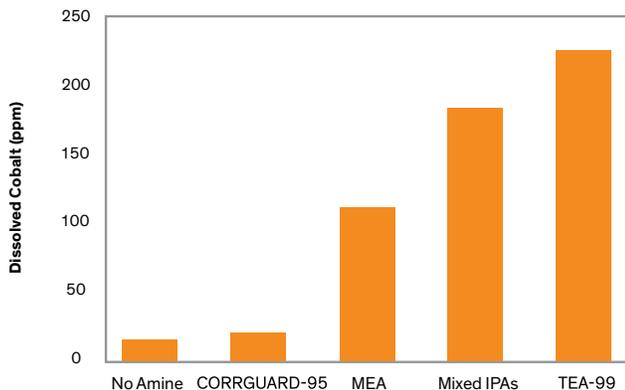
Figure 3. Ammonia Release Study



Cobalt Leaching

To evaluate cobalt leaching potential, amine solutions were vigorously mixed for five days with carbide swarf, filtered and analyzed by atomic absorption for dissolved cobalt. The solution with CORRGUARD-95 had the least dissolved cobalt of all the amine solutions tested (see Figure 4).

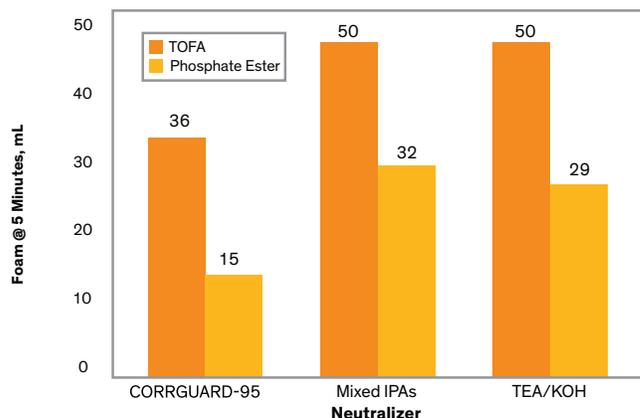
Figure 4. Cobalt Leaching Study



Low Foam Generation

Several types of fluid components (fatty acid soaps, non-ionic surfactants, etc.) can contribute to foaming. Studies have shown that the amine portion of various salts can significantly affect foaming potential. Test results with 0.5% solutions of amine salts at pH 9.5 in Figure 5 show that amine salt solutions containing CORRGUARD-95 generated less foam than comparable salts with mixed isopropanolamines or TEA/KOH.

Figure 5. Cylinder Shake Test on Amine Salt Solutions



Product Stewardship

ANGUS encourages its customers to review their applications of ANGUS products from the standpoint of human health and environmental quality. To help ensure that ANGUS products are not used in ways for which they are not intended, ANGUS personnel will assist customers in dealing with environmental and product safety considerations. For assistance, product Safety Data Sheets, or other information, please contact your ANGUS representative at the numbers provided in this document.

When considering the use of any ANGUS product in a particular application, review the latest Safety Data Sheet to ensure that the intended use is within the scope of approved uses and can be accomplished safely. Before handling any of the products, obtain available product safety information including the Safety Data Sheet(s) and take the necessary steps to ensure safety of use.

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