

## Key Performance Advantages

- Excellent alternative to ethanolamines
- Extends fluid life
- Minimizes leaching of cobalt and lead



**Metalworking Fluids**

# CORRGUARD<sup>®</sup>-95

## CORRGUARD-95 Amino Alcohol for Metalworking Fluids A Cost Effective Replacement for Ethanolamines

CORRGUARD<sup>®</sup>-95 is an excellent choice for cost-effective replacement of monoethanolamine (MEA)/triethanolamine (TEA) combinations. While CORRGUARD-95 is more expensive on a per-lb/per-kg basis, the lower use level and higher performance allows formulation cost to be managed. The likelihood of longer fluid life also means that maintenance and fluid replacement costs may be reduced.

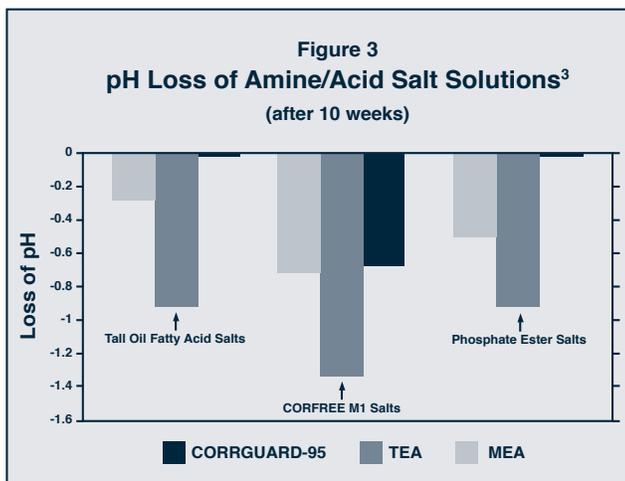
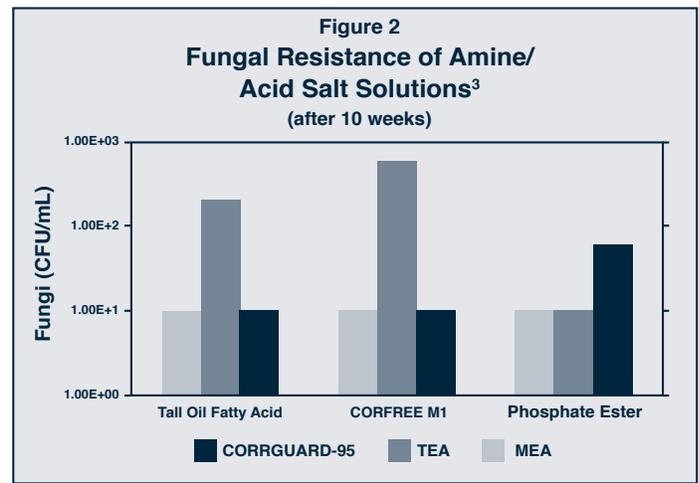
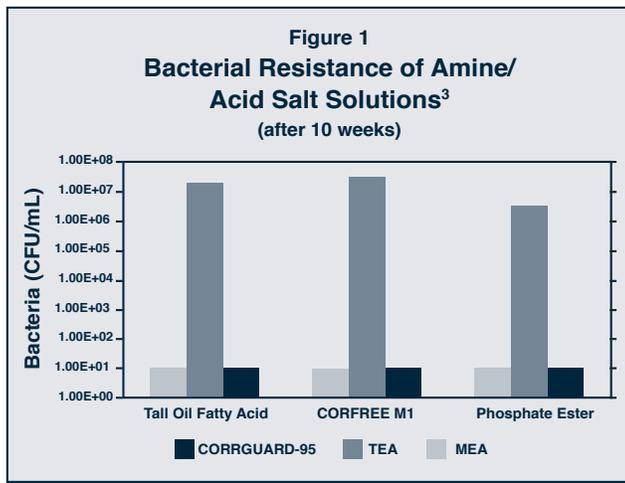
Important advantages over MEA/TEA include:

- Lower use level
- Greater resistance to microbial degradation
- Better pH stability
- Less leaching of cobalt and lead
- Less aluminum staining
- Reduced chance of ammonia release

# Key Benefits

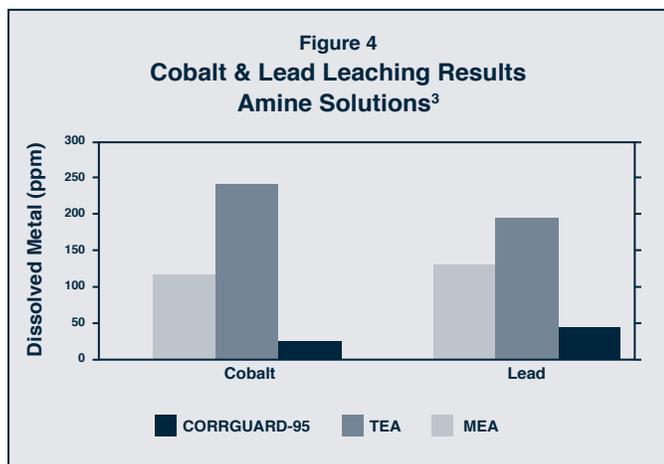
## Greater Resistance to Microbial Degradation and Better pH Stability

A series of typical amine-acid salts (0.5% acid neutralized to pH 9.5) was prepared to evaluate microbial resistance and pH stability. These systems were inoculated with mixed bacterial/fungal inoculum isolated from spoiled fluids. Microbial resistance (Figs. 1,2) and pH stability (Fig. 3) are excellent with CORRGUARD-95 overall, supporting the idea that fluids with CORRGUARD-95 do not require the level of buffering needed with ethanolamines.



## Significantly Less Cobalt and Lead Leaching than Ethanolamines

Cobalt leaching during the production of carbide tools is a health and safety concern. CORRGUARD-95 Amino Alcohol leaches much less cobalt than MEA and TEA and is an excellent choice for low cobalt leaching fluids as its use leads to greater safety and possibly reduced use of expensive leaching inhibitors. The same is true for leaded-brass alloys where CORRGUARD-95 leaches significantly less lead. Test results are shown in Fig. 4. Here, 1% active amine solutions neutralized to pH 9.0 (acetic acid) were mixed with carbide or leaded-brass swarf for 5 days; the filtrates were analyzed for dissolved metal.



## Less Staining of Aluminum Alloys

Aluminum alloys are prone to staining in contact with water-dilutable metalworking fluids, especially when amine levels and pH are high. Since less CORRGUARD-95 is required vs. MEA/TEA, aluminum staining is normally reduced. Work conducted by Huntsman concluded that "Solutions of TEA showed much more significant staining/corrosion than any of the other amines tested."<sup>1</sup> These "amines" included MEA and 2-amino-2-methyl-1-propanol, the active ingredient in CORRGUARD-95.

## Reduced Ammonia Release

Biodegradation of ethanolamines accompanied by pH drop results in the accumulation of dissolved ammonia in metalworking fluids; subsequent upward pH adjustment results in a sudden release of ammonia which is a potential safety hazard. This problem is virtually eliminated when CORRGUARD-95 Amino Alcohol is used in place of MEA/TEA, as demonstrated in work conducted by the former Olin Chemicals.<sup>2</sup>

## Formulating Guidance

ANGUS can help you formulate fluids with CORRGUARD-95 Amino Alcohol and appropriate biocides to meet your cost and performance requirements. Please contact your local ANGUS representative for technical assistance.

## 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.

<sup>1</sup>Koch J., Amine Selection Criteria for Metalworking Fluids, STLE Annual Meeting, Commercial Marketing Forum IV (2002)

<sup>2</sup>Delaney K. et al, Ammonia Gassing in Metalworking Fluids: Amine Effect, STLE Annual Meeting, Metalworking Fluids Technical Session (2003)

<sup>3</sup>Tests performed at ANGUS Chemical Company.

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