

Key Performance Advantages

- Excellent alternative to n-Butylaminoethanol
- Enhances the performance of many biocides
- Controls corrosion of ferrous metals



Metalworking Fluids

CORRGUARD[®] EXT

Amino Alcohol for Long-Life Metalworking Fluids Performance Comparison with n-Butylaminoethanol

CORRGUARD[®] EXT Amino Alcohol is a commercially new-to-the-world primary amino alcohol (3-amino-4-octanol) and is an excellent alternative to n-butylaminoethanol (BAE¹). It provides the following advantages in a full range of water-miscible metal removal and metal forming fluids; please note that CORRGUARD EXT is not a biocide and is not intended for use as an antimicrobial.

- Primary amine functionality meets applicable government regulations in most countries for formulations (low secondary amine fluids)
- Consistently enhances the performance of a wide range of biocides including the industry-standard triazine
- Exceptional performance with benzisothiazolinone (a non-formaldehyde-based biocide)
- Excellent corrosion control of ferrous metals (cast iron, etc.)

Consistent Enhancement of Biocide Performance

CORRGUARD EXT Amino Alcohol consistently improves the performance of a variety of registered biocides, as demonstrated in Figures 1 & 2 for a low oil semi-synthetic metal removal fluid (Fig. 5). CORRGUARD EXT is present at 3500 ppm (dilution basis) vs. 3000 ppm BAE; since CORRGUARD EXT is 85% active this gives equal weight concentrations of active amine. Triazine biocide was tested at 750 ppm as supplied (~78% active), BIOBAN™ ULTRA BIT 20 Antimicrobial at 900 ppm as supplied, and a combination of 750 ppm triazine plus 1000 ppm BIOBAN™ I-20 Antimicrobial² (all on dilution basis). BIOBAN ULTRA BIT 20 is an approximate 20% solution of benzisothiazolinone (BIT), and BIOBAN I-20 contains approximately 20% iodopropynylbutylcarbamate (IPBC). Bacterial protection is defined as the number of weeks before reaching a total bacterial count of 1x10⁵ CFU/mL or more, and fungal protection is the weeks prior to reaching fungal counts of 1x10³ CFU/mL or above; the accelerated test protocol is ASTM E2275. The fluids with CORRGUARD EXT resist bacterial and fungal growth more consistently (vs. BAE) across the range of biocides.

Fig. 1 – Bacterial Protection Results

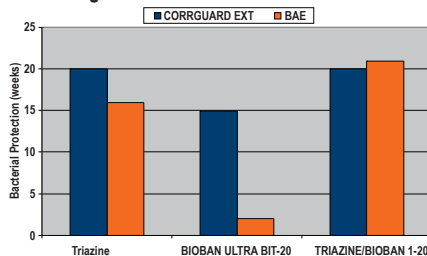
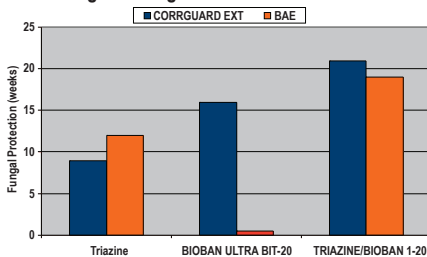


Fig. 2 – Fungal Protection Results



Exceptional Performance with Benzisothiazolinone (non-formaldehyde-based)

Tests demonstrate the exceptional performance of CORRGUARD EXT (vs. BAE) with BIOBAN ULTRA BIT 20, a non-formaldehyde-based antimicrobial. Several of the most effective biocides for metalworking fluids, such as triazine, are reaction products of formaldehyde and are capable of releasing formaldehyde under certain use conditions. Some geographies and end-use customers require or prefer fluid formulations that do not contain formaldehyde-based products. CORRGUARD EXT enables this by helping BIOBAN ULTRA BIT 20 perform similarly to triazine. A formaldehyde-based biocide can therefore be replaced with a non-formaldehyde-based product. Results may vary with the formulation and the use levels of CORRGUARD EXT and BIOBAN ULTRA BIT 20.

Excellent Corrosion Control of Ferrous Metals

CORRGUARD EXT Amino Alcohol provides better corrosion control of cast iron versus BAE. This is demonstrated in the boron-free semi-synthetic fluid containing 1500 ppm triazine or a combination of 750 ppm triazine plus 1000 ppm BIOBAN I-20 (dilution basis). The diluted fluids contained either 3500 ppm CORRGUARD EXT or 3000 ppm BAE. Fluid samples were tested for cast iron chip corrosion control initially (ASTM D4627), and then at 4 week intervals during microbial challenge tests; the results are presented in Figures 3 & 4 (below). The fluid with CORRGUARD EXT provides equal or better corrosion control initially (vs. BAE), but more important, corrosion control with CORRGUARD EXT is maintained throughout the microbial challenge tests. This is a significant improvement over the fluid containing BAE.

Fig. 3 - Cast Iron Corrosion Control (Fluid with Triazine)

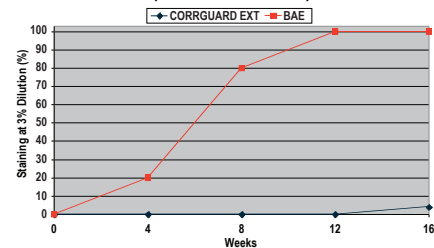
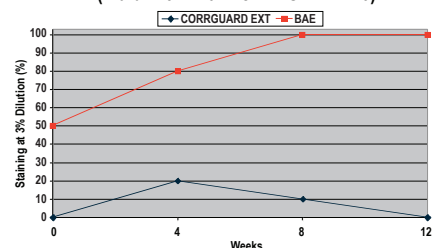


Fig. 4 - Cast Iron Corrosion Control (Fluid with Triazine + BIOBAN I-20)



Formulating Guidance

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

¹ Supplied by TAMINCO under the registered tradename SYNERGEX

² Supplied by Dow Microbial Control, a unit of The Dow Chemical Company

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.

Contact Information	North America +1 (847) 808-3887	Western Europe +33 670654658	Middle East and Africa +33 670654658	Greater China +65 8686 5712	Southeast Asia and New Zealand +65 8686 5712
angus.com	Latin America +55 (11) 94245-5307	Central and Eastern Europe +33 670654658	Indian Subcontinent +33 670654658	Japan and Korea +65 8686 5712	
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