AMP™
2-AMINO-2-METHYL-1-PROpanol Solution
CAS Registry No. 124-68-5
Multifunctional Additive for Latex Paints

AMP™ Dispersant is widely recognized as a multifunctional additive for all types of latex emulsion paints. In a formulation, AMP can be used as a powerful co-dispersant to prevent re-agglomeration of pigments. At the same time, AMP will contribute significant benefits to the overall performance of the coating.

The benefits and performance improvements made possible by AMP in different stages of paint manufacture are:

**AMP In the Grind**
- Reduces dispersant demand when used in conjunction with conventional dispersants
- Optimizes pigment dispersion
- Reduces foam (through dispersant reduction)
- Provides effective pH control

**AMP In the Letdown**
- Improves thickener performance
- Eliminates need for ammonia, resulting in a lower odor paint
- Improves color acceptance of shading pastes

**AMP and Coating Performance**
- Improves scrub, water, and block resistance through formula optimization
- Reduces in-can corrosion
- Effective in low odor systems

When formulating a latex paint, it is important to consider all the effects of dispersants and surfactants on the paint and on its final performance. AMP can be used to reduce the levels of some commonly used paint additives through paint formulation optimization, potentially lowering raw material costs while improving paint performance.

Key Performance Advantages
- Powerful co-dispersant
- Improves overall paint performance
- Excellent for low- and ultra low-VOC formulations
- AMP is exempt from registration as a VOC by U.S. EPA and Environment Canada

Paints and Coatings
Typical Properties

The following are selected properties of AMP. They are not to be considered product specifications.

**Recommended Use Levels**

**In the Grind**
To take full advantage of AMP as a co-dispersant, up to 30% of the existing dispersant solids can be replaced by an equal weight of AMP. This generally amounts to 0.05 to 0.1 percent of AMP on the total weight of the formulation.

**In the Letdown**
Typical formulations require 0.1 to 0.3 percent (on total formulation weight) of AMP for optimum pH stability, for associative thickener neutralization, and to eliminate in-can corrosion. For control of flash rusting, an additional 0.1 to 0.2 percent (on total formulation weight) of AMP may be required.

**Efficient Pigment Dispersion**
AMP improves pigment dispersion in the production of latex paints. Combining AMP with a conventional anionic dispersant in a grind paste is more effective than using any dispersant alone.

AMP enhances the performance of anionic dispersants so that dispersant demand is reduced. Six commonly-used dispersants were tested in a typical dispersion. As shown in the table at the top of the next column, small quantities of AMP in a TiO₂, calcined clay and calcium carbonate blend significantly reduced dispersant demand. Specific dispersant requirements vary with the pigment grade type and lot.

Using AMP in the grind produces a paint with maximum hiding power, color acceptance and stability at considerably lower anionic dispersant levels than are normally required to achieve similar results. AMP also stabilizes the grind at a mildly alkaline pH. This reduces the tendency for pigment re-agglomeration or “shock” when the grind is added to a moderately alkaline letdown.

**Reactive Pigment Stabilization**
AMP helps to stabilize some paint systems containing reactive pigments such as zinc oxide. Typical improvements are demonstrated in the following photo; the addition of AMP inhibited gelling even for paint subjected to heat aging.

**Dispersant Demand for 70% NVM TiO₂, Calcined Clay and Calcium Carbonate Blend**

<table>
<thead>
<tr>
<th>Dispersant</th>
<th>Without AMP</th>
<th>With AMP*</th>
<th>% Dispersant Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tamol 731 [A]</td>
<td>0.118</td>
<td>0.085</td>
<td>28</td>
</tr>
<tr>
<td>Nopco 44 [B]</td>
<td>0.113</td>
<td>0.087</td>
<td>23</td>
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<tr>
<td>Tamol 963 [A]</td>
<td>0.100</td>
<td>0.075</td>
<td>25</td>
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<tr>
<td>KTPP [D]</td>
<td>0.165</td>
<td>0.123</td>
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<tr>
<td>Rhodoline 226 [C]</td>
<td>0.142</td>
<td>0.100</td>
<td>29</td>
</tr>
<tr>
<td>Tamol 1124 [A]</td>
<td>0.133</td>
<td>0.100</td>
<td>25</td>
</tr>
</tbody>
</table>

*AMP added at 0.05% by wt. of pigment

Key to suppliers:

**Gloss Enhancement**
AMP functions as a powerful co-dispersant and can partially evaporate from the paint film upon drying. In gloss systems, the gloss is improved by the more efficient dispersion of the pigment through the use of AMP. Therefore, gloss can be enhanced as demonstrated in the following graph.

**Gloss Enhancement Graph**

Exterior Semi-Gloss Paint
With and Without AMP

With AMP** Dispensant
Without AMP

0
5
10
15
20
25
30
35
40
45

60 Degree Gloss Units

With AMP Dispensant
Without AMP

With AMP
Without AMP
Film Performance

Most dispersants and surfactants contain 25 to 50% non-volatile, hygroscopic components, which remain in the dried paint film and contribute to poor scrub resistance and water spotting. Therefore, it is important to keep these additives to a minimum. AMP used in conjunction with reduced levels of conventional dispersants accomplishes this objective. The results are improved scrub resistance, water resistance, and reduced water spotting of the paint film as illustrated below.

AMP is an outstanding replacement for ammonia when neutralizing alkali swellable associative thickeners. Not only does AMP eliminate the problems associated with the handling of ammonia, but pH control and subsequent stability of the associative thickener are often enhanced.

Thickeners are often added at the dispersion stage to provide the required milling viscosity. As shown in the graph below, AMP provides greater pH stability than ammonia during the dispersion, thus contributing to improved performance of the associative thickener.

Improves Thickener Performance

AMP exhibits its superior scrub resistance properties in this interior flat formulation.

In associative thickener-containing systems, effective neutralization and pH control are important to the long-term stability of the coating. Accelerated aging studies demonstrate that AMP provides optimum pH stability in these finished coatings. In one comparison study, semi-gloss paints containing associative thickener and AMP or ammonia were aged 14 days at 130°F (54.5°C). The AMP system exhibited improved pH stability in comparison to the ammonia-based system as shown below.
**pH Stabilization**

AMP imparts excellent pH stability to latex paints. Ammonia is a weaker base and is more fugitive than AMP; therefore, ammonia-based paint has poorer pH stability and a stronger odor than does paint based on AMP. Controlling pH is very important because most paint formulations require a stable alkaline pH to control:

- Pigment dispersion
- Vehicle stability
- Package corrosion
- Viscosity stability

The control of pH with AMP also provides coatings with virtually no yellowing compared to many other commonly-used amines and amino alcohols, which is important for many types of quality paints being produced for the marketplace.

A comparison of the pH control performance of AMP and ammonia in a vinyl-acrylic semi-gloss paint (below) shows AMP is clearly superior to ammonia. After aging one month at an elevated temperature, and then two months at ambient temperature, the pH of the ammonia formulation had dropped from 9.2 to 7.4 while the pH of the paint with AMP did not go below 8.5.

**Effective in Low Odor/ Low VOC Systems**

With the ever-tightening VOC regulations and the consumer preference for low-odor products, AMP is an excellent alternative to ammonia. On June 25, 2014, AMP was exempted from regulation as a VOC by the U.S. EPA. Environment Canada followed suit by exempting AMP in the summer of 2016.

At a typical use level of 0.2% on total formulation weight, AMP makes a minimal contribution to total formulation VOC, in regions where AMP is included in VOC calculations. In addition, the use of AMP allows for the optimization of other additives, which may further reduce VOC and provide significant improvements to low odor systems. The use of AMP in low-VOC paint formulations allows for the manufacture of paints well within current and proposed VOC-regulatory targets.

**Reduced Corrosion**

AMP reduces corrosion problems because AMP reduces pH drift in latex paints. It effectively stops in-can rusting in areas such as seams and edges.

**Contact Information**

ANGUS Chemical Company

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**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, 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.

At a typical use level of 0.2% on total formulation weight, AMP makes a minimal contribution to total formulation VOC, in regions where AMP is included in VOC calculations. In addition, the use of AMP allows for the optimization of other additives, which may further reduce VOC and provide significant improvements to low odor systems. The use of AMP in low-VOC paint formulations allows for the manufacture of paints well within current and proposed VOC-regulatory targets.