

## Key Performance Advantages

- Useful as a corrosion inhibitor, emulsifier and dispersant in a variety of applications
- Excellent aid in pigment dispersion

Paints and Coatings

Metalworking Fluids

Life Sciences

Personal Care

# ALKATERGE®-T

ALKATERGE®-T Nonvolatile Surface Active Agent  
CAS Reg. No. 28984-69-2

ALKATERGE-T, one of a series of oxazoline-type nonvolatile surface active agents, is only slightly soluble in water. At ordinary room temperature, ALKATERGE-T is a waxy solid which is highly soluble in aromatic hydrocarbons and lower alcohols or ketones, moderately soluble in aliphatic hydrocarbons, and miscible with most vegetable oils. In its liquid state, ALKATERGE-T is miscible with almost all organic liquids. ALKATERGE-T is useful as a surface active agent which is indicated by the fact that 0.1% in mineral oil reduces the interfacial surface tension against water approximately 95%, or to less than 2 dynes/cm.

## Typical Properties

The following are typical properties of ALKATERGE-T. They are not to be considered product specifications.

<b>Appearance</b>	Buff to brown firm, waxy solid
<b>Neutral equivalent*</b>	618
<b>Oxazoline content*</b>	60% by wt
<b>Free fatty acid</b>	4% by wt
<b>Free amino alcohol</b>	4% by wt
<b>Color</b>	12 Gardner
<b>Solidification point</b>	59°C
<b>Interfacial tension against water of 0.1% solution in mineral oil</b>	1.8 dynes/cm
<b>Surface tension of saturated aqueous solution</b>	30.4 dynes/cm
<b>Flash point, Tag closed cup</b>	>200°F
<b>Solubility in water</b>	0.01mL/100mL

\*Analytical method supplied on request.

# Solubility in Organic Solvents

ALKATERGE-T is a technical-grade product containing 60% oxazoline as a minimum. Therefore, solubility data should not be considered absolute as some variability will be encountered. However, data below do indicate general trends.

Solubility of ALKATERGE-T		
Solvent	Percent by Weight	
	at 22°C	at 0°C
Low odor mineral spirits	<10	<10
Toluene	40-50	<10
Xylene	17-23	<10
Ethanol	75-80	17-23
n-Butanol	50-75	33-40
Methyl ethyl ketone	17-23	<10
Methyl isobutyl ketone	17-23	<10
2-Nitropropane	<10	<10
Ethylene glycol monoethyl ether	40-50	28-33
Ethyl acetate	10-17	<10
n-Butyl acetate	33-40	17-23

## Uses

ALKATERGE-T has been used as a corrosion inhibitor, an emulsifier, and as a dispersant in a variety of applications. When properly incorporated into a formulation, it can often perform all these functions simultaneously as well as other specific to particular systems.

### Corrosion Inhibition

Using the Langmuir balance, it has been found that ALKATERGE-T adheres to hydrophilic surfaces such as metals or pigments with a force of as much as 10,500 psi.<sup>1</sup> This property, as well as the ability to function as an acid acceptor, undoubtedly are major factors in the corrosion inhibition displayed by ALKATERGE-T.

The ability of ALKATERGE-T to inhibit corrosion has been demonstrated by a static water drop test.<sup>2</sup> In this screening test a depression formed in a cold-rolled steel plate is polished to a mirror finish. The plate is immersed in oil to which the corrosion inhibitor has been added. Distilled water is placed in the depression, and the plate is stored at an elevated temperature. A good corrosion inhibitor at a concentration of 0.2% in the oil will protect the metal for 168 hours at 140°F. ALKATERGE-T, at a concentration of only 0.1% in the oil, provided complete protection to the metal for over 600 hours at 160°F. Uninhibited oil failed in 15 hours under these conditions.

A humidity cabinet test was performed to compare ALKATERGE-T with several well-known inhibitors. Sample panels of steel coated with oil containing equal quantities of various inhibitors were

placed in an environment of 100°F and 100% relative humidity. A control panel treated with uninhibited oil failed in about 24 hours, and panels protected with well-known inhibitors showed failure in 72-250 hours. The panel treated with oil containing ALKATERGE-T resisted corrosion for more than 300 hours.

This excellent corrosion-inhibiting property of ALKATERGE-T has led to its use in a number of applications, such as cutting oils. ALKATERGE-T provides extra protection because it can neutralize traces of acids which often result from the breakdown of other ingredients, and because it is able to emulsify traces of water which otherwise lead to the formation of sludge.

Thin coats of ALKATERGE-T can be used to prevent corrosion of metals during shipment or storage. Such films can be applied by conventional methods utilizing either solutions in solvent or emulsions in water. A formulation for the emulsification of ALKATERGE-T in water is given below.

ALKATERGE-T Emulsion	
	Parts by Weight
ALKATERGE-T	8
Tall oil fatty acid	2
Igepal CO-630 [A]	1
DMAMP-80 [B]	2
Water	87

Key to suppliers:  
[A] Rhodia [B] ANGUS Chemical Company

Melt together the first three ingredients and heat to 90-100°C. Carefully stir in DMAMP-80™ and immediately add the mixture with agitation to the water which has been preheated to 95-99°C. Continue agitation until cool.

### Emulsifying Agent

ALKATERGE-T functions well as a primary emulsifier in forming water-in-oil emulsions. Fluid, stable, invert emulsions of water in an aliphatic hydrocarbon can be produced using as little as 1% ALKATERGE-T.

For oil-in-water emulsions, ALKATERGE-T is most useful as a secondary emulsifier. A small percentage of ALKATERGE-T used in combination with other emulsifiers will often sufficiently upgrade the properties of the resulting emulsion. This allows the formulator to reduce the total amount of emulsifier required in the system.

The use of ALKATERGE-T in an emulsion may greatly enhance stability or even make the difference between an unstable system and a satisfactory emulsion. ALKATERGE-T is particularly useful in products such as metal polishes and waxes, where long-term stability is a requirement.

Additional benefit from the use of ALKATERGE-T as an emulsifier is derived from its corrosion-inhibiting properties. ALKATERGE-T is also useful as an additive for wax polishes to prevent the crystallization of the waxes. Emulsifier systems for oil-slick dispersants can be improved by incorporation of ALKATERGE-T.

### Pigment Dispersion

ALKATERGE-T is an excellent aid for the dispersion of pigments. It may be used either as an additive to improve the wetting of pigments by poorly wetting resins, or as the sole dispersing agent for the production of pigment slurries in nonaqueous solvents.

## 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 local 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> - J.S. Long, C. Whitmarsh, and W.Yuan. Am. Paint J., pp. 112-130 (Nov. 5, 1956).

<sup>2</sup> - H.R. Baker, D.T. Jones, and W.A. Zisman, Ind. Eng. Chem. 41, 137-144 (1949)

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