

XAMA[®]7

Polyfunctional Aziridine

Description

XAMA 7 polyfunctional aziridine is utilized as a cross-linking agent and adhesion promoter and modifier.

Product Specifications

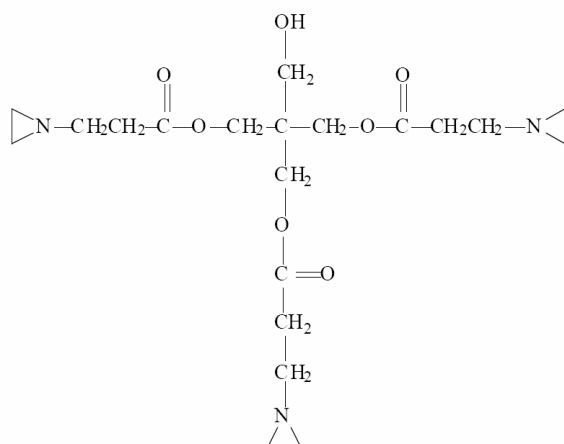
Property	Value
Bruto formula	C ₂₀ H ₃₃ O ₇ N ₃
Mol. weight	427
CAS number	57116-45-7
EINECS number	260-568-2
Monomer	EI
Aziridine content, meq/g	6.35 - 7.00
Viscosity, cp at 25°C	4000 max
Ethyleneimine	<10 ppm
Appearance	Clear, amber liquid

Typical Properties *

Property	Value
Aziridine functionality approx	3.3
Weight per litre, g at 25°C	1184
Density at 25°C g/ml	1.18—1.20
Freezing point (°C)	<-10
Flash point (°C) (TCC)	>100
Vapor pressure (mmHg)	<0.1
Solubility	100% water

Application

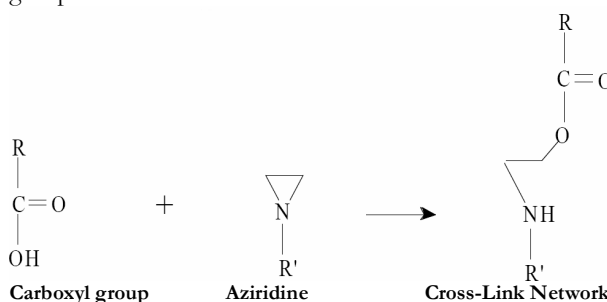
When used as a cross-linker, XAMA 7 aziridine dramatically improves the final properties of many adhesive, coating, and printing applications. It imparts strength and flexibility, improves solvent resistance, alcohol and water resistance, increases hardness, and upgrades adhesion to difficult substrates.



XAMA 7 aziridine contains three aziridine groups in a high molecular weight, low volatile, molecule. Each aziridine group can react with an active H⁺, as found in the carboxyl groups of acrylic emulsions and polyurethane dispersions. This reaction protonates and opens the aziridine ring, which then reacts with the oxygen of the carboxyl groups forming a cross-link network.

Cross-Linking Mechanism

The diagram below shows the reaction of a carboxyl group with the aziridine ring. Since each molecule of XAMA 7 contains three aziridine groups, a crosslinked network is formed when all three groups react with the carboxyl groups.



Typical Application Conditions

Method of Addition: XAMA 7 aziridine is added to finish formulated coating systems just prior to use. Therefore, the polyfunctional aziridine must be used in a two-component system with addition taking place at the time of use.

The aziridine is added, slowly and with good agitation, directly to the formulated coating system. It can be added neat or in solution. If added in solution, a solvent without an active H⁺ should be used.

Addition Levels. The level of aziridine to add to the formulated system will depend on the coating system and the desired properties of the coating film. Most applications find use levels between 1% and 3% based on resin solids. Higher levels, such as 5%, may yield higher solvent resistance and adhesion properties.

pH of the Formulated System. An aqueous system pH of 9.0-9.5, at the time of aziridine addition, most often produces the optimum results. A lower pH may cause the aziridine to react prematurely in the pot.

Pot Life: An aqueous system containing a low boiling (volatile) amine, such as ammonia or triethylamine, has a pot life of about 18-36 hours. If use is extended beyond this time, there will be a loss of aziridine functionality. This loss can be replenished, without a negative effect on film properties, by adding more of the polyfunctional aziridine.

Solubility

XAMA 7 aziridine is miscible in water and many common organic solvents. This allows it to be used in both aqueous and solvent systems.

Compatibility

XAMA 7 aziridine is very reactive with active hydrogen groups, such as those found in carboxyl groups of acrylic emulsions and polyurethane dispersions. Do not expose to acidic materials, high heat, direct sunlight, ultraviolet radiation, strong oxidizers.

Storage

XAMA 7 polyfunctional aziridine must be stored away from acids and oxidizers. Store in a cool, dry, well ventilated storage area and in closed containers. Protect material from freezing. The shelf life is approximately 24 months from date of manufacture when stored in closed original containers at 25 °C.

Note: The information contained in this bulletin is current as of November 2004. Please contact Ichemco to determine whether this publication has been revised.

Health and Safety Information

Appropriate literature has been assembled which provides information pertaining to the health and safety concerns that must be observed when handling XAMA 7 polyfunctional aziridine. For materials mentioned that are not Ichemco products, appropriate industrial hygiene and other safety precautions recommended by their manufacturer should be followed. Before working with any product mentioned in this publication, you must read and become familiar with available information concerning its hazards, proper use, and handling. This cannot be overemphasized. Information is available in several forms such as material safety data sheets and product labels. For further information contact Ichemco.

Market Uses

Application	Benefits
Adhesives	Increases cohesive strength Faster cure time Improves adhesion to difficult substrates, such as polyolefin, marble, stainless steel, and glass
Pressure-Sensitive Adhesives	Increases cohesive strength Adhesion modification Improves adhesion to difficult substrates, such as polyolefin, marble, stainless steel, and glass Faster cure time
Printing Inks	Improves adhesion to varied substrates Increases scuff resistance Increases water and chemical resistance Faster cure time
Over-Print Varnishes	Improves adhesion to varied substrates Increases scuff resistance Increases water and chemical resistance Increases high temperature resistance Faster cure time
Wood Coatings	Improves water and chemical resistance Faster cure time Low VOC formulations Improves black heel resistance Improves abrasion resistance
Leather and Textile Coatings	Improves wear resistance Faster cure time Increases water and chemical resistance
Protective Films	Adhesion modification Faster cure time
Photographic Films	Improved adhesion Increases anti-static properties
Plastic Films	Increases anti-static properties Increases anti-blocking properties Improves adhesion of coating

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