

Elvacite[®] 2669

Water Reducible Acrylic Resin

Elvacite[®] 2669 is a solid acrylic bead copolymer which can be dissolved in slightly alkaline aqueous systems. This distinct capability makes the product particularly suitable for end-uses where solvent emissions must be minimized or where the substrate may be sensitive to organic solvents. Clear, hard, abrasion resistant films and coatings may be obtained due to the polymethyl methacrylate backbone of this specially modified resin. These films show good adhesion to numerous substrates such as metal and plastic.

The water-soluble characteristics of this polymer allow for its use in areas where temporary protection is desirable. Dilute ammonia solutions may be used to remove the film. If a more permanent coating is required, formulations with zinc oxide may be prepared to enhance the durability and improve water resistance. Elvacite[®] 2669 further exhibits good solubility in many ketones and esters as well as glycol ethers. Plasticizers such as trimethyl pentanyl diisobutyrate may be added to enhance flexibility and flow properties.

Mitsubishi Chemical America, Inc., Specialty Resins Division also has the capability to produce other acrylic resins with different balances of water-soluble characteristics and parameters, which meet distinct requirements such as variations in pigment loading for ink applications. Where sufficient opportunities exist, the customer will find Mitsubishi Chemical America, Inc., Specialty Resins Division to be a willing partner in engineering resins that meet the customer's specific requirements.

Performance Features and Key Benefits

- Good adhesion to a variety of plastic substrates
- Exceptional resistance to abrasion and moisture
- Excellent ultraviolet and chemical resistance
- Excellent alcohol resistance
- non-reactive (low residual initiator) for use in reactive systems

Typical Properties^a

Appearance	Solid bead
Specific Gravity, 25° C	1.20
Glass Transition Temp, onset (calculated)	67°C
Molecular Weight (Mw)	35,000
Acid Number (mg KOH/g Resin)	134
<i>a) Typical physical properties listed are approximate values and should not be considered manufacturer's release specifications. Manufacturer's release specifications are subject to change without notice, please contact your Elvacite[®] representative for the latest product specification details.</i>	

Preparing Solutions

Elvacite[®] resins dissolve at room temperature but require constant agitation to prevent solvent-swollen granules of polymer from forming agglomerates and sticking to the walls of the vessel. Important: The polymer beads should be sifted directly into the vortex of the stirred solvent to speed wetting-out and dispersion. Continuous low-shear agitation for periods of 1-12 hours, depending on the grade and concentration of resin, is recommended.

After the solution appears clear in the tank, a sample should be spread out on a Leneta card or glass. After the solvent evaporates and a film forms on the card or glass, there should not be any resin seeds. If there are any seeds, the tank should be agitated further to fully dissolve the resin. Tank agitation should not be stopped (except for sampling) until the film test indicates there are no resin seeds. Any cloudiness or residue may indicate that some polymer remains undissolved. The presence of water in the system can also cause cloudiness.

Solution time can be reduced by heating; most common solvents can be heated to approximately 49°C (120°F) without the need for reflux equipment. High-shear agitation also cuts dissolving time, but requires care to avoid overheating and excessive solvent loss.

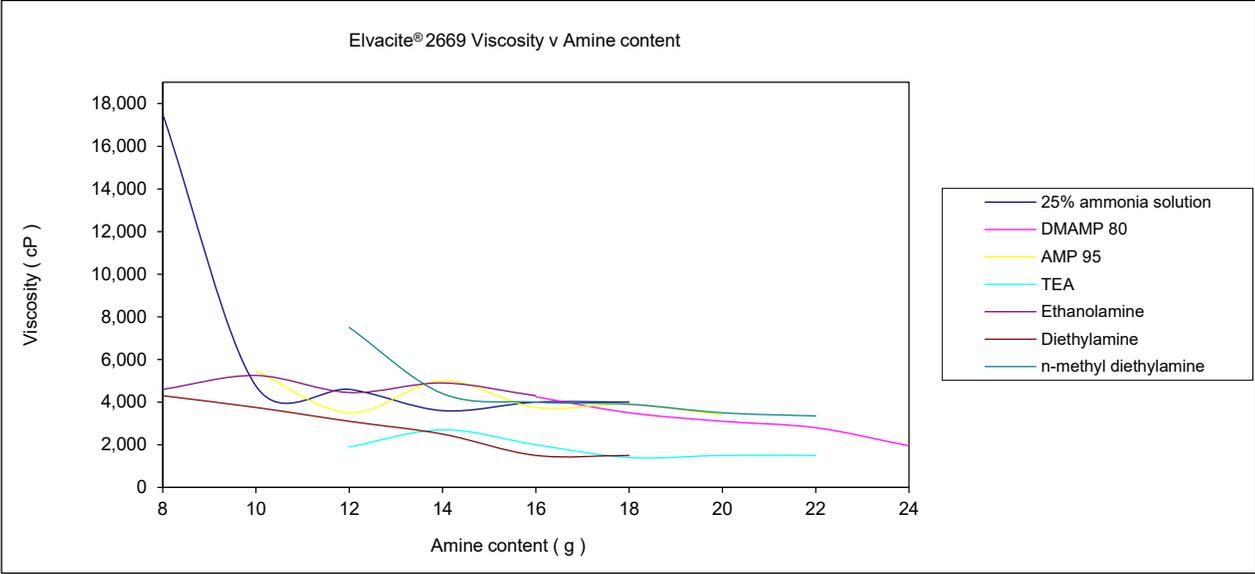
Formulating Guidelines

A neutralized solution of Elvacite® 2669 in water can be prepared by blending various amines plus 220 grams of water, then dissolving 50 grams of polymer into the solution. The actual amounts for each amine can be seen on the following page. Substantial improvement in water resistance may be obtained by the addition of 2-5% of a zinc oxide solution such as "Zinc Oxide Solution #1" from BASF.

The following data shows the amount of amine recommended, together with viscosity measurements, for the Elvacite® 2669 resin to go into solution. The viscosities were carried out using a Brookfield LVT viscometer, spindle 4 @ 12 rpm and 20° C.

A recommended minimum pH for each amine is described below. The amounts quoted are a starting point.

<u>Amine</u>	<u>Amount</u>	<u>pH</u>	<u>Viscosity (cP)</u>
Diethylamine	8g	7.60	4,300
Ethanolamine	8g	9.46	4,600
25% Ammonia solution	10g	9.05	4,750
AMP 95	10g	7.82	5,450
Triethylamine (TEA)	12g	10.05	1,900
N-methyl diethylamine	14g	8.34	4,400
DMAMP 80	16g	7.69	4,250



Below is a stepwise example with AMP-95 and the preceding guidelines to make a solution of Elvacite® 2669 at ~18% solids in alkaline water.

1. Add 10 grams of AMP-95 to 220 grams of water.
2. Stir to create a vortex.
3. Check the pH, it should be >7.5. If not, adjust the pH by adding more amine.
4. In a separate container, weigh 50 grams of Elvacite® 2669
5. Stir the AMP-95 and water solution to create a vortex. Continue stirring with a vortex through the next step.
6. Slowly start pouring Elvacite® 2669 into the vortex at around 10 grams per minute. This speed can be increased as more experience is gained.

If you start seeing tiny clumps of polymer on the bottom, stop adding the Elvacite® 2669. Wait for the balls to be dispersed before resuming the Elvacite® 2669 addition.

If the balls of polymer get too big, they will take a very long time to disperse, and it is best to start with a fresh batch.

7. Continue stirring for at least an hour to a clear solution.
8. Check the pH. If it is less than 7.5, adjust it by adding more amine with stirring.
9. Spread out a portion of the solution on a piece of glass (drawdown) and view over a black background to check for seeds or undissolved polymer.
10. If there are seeds, continue stirring until the drawdown shows no seeds.

COMPLIANCE WITH FDA REGULATIONS

Pasadena, Texas, USA Grade: ELVACITE® 2669

Issue date: December 2019

We, MITSUBISHI CHEMICAL AMERICA, INC., Specialty Resins Division, confirm that Elvacite® 2669 complies with the compositional requirements of the following United States of America's Food and Drug Administration (FDA) regulations.

Elvacite® 2669 is cleared for use under the FDA 21 CFR 175.105 for adhesives used as components of articles intended for use in the packaging, transporting, or holding food.

Elvacite® 2669 is cleared for use under FDA 21 CFR 175.300 in resinous and polymeric coatings used as the food contact surface of articles intended for use in producing, packing, processing, preparing, treating, packaging, transporting, or holding food. The coating in its finished form in which it is to contact food is subject to a restriction on its chloroform soluble extractives.

Compliance with the limitation on extractives can only be demonstrated by tests carried out in the final article.

Elvacite® 2669 is cleared for use under FDA 21 CFR 175.320 in resinous and polymeric coatings for polyolefin films, provided it is intended for repeated food contact use as specified in FDA 21 CFR 175.300(a).

The coating in its finished form in which it is to contact food is subject to a restriction on its chloroform soluble extractives.

Compliance with the limitation on extractives can only be demonstrated by tests carried out in the final article.

Elvacite® 2669 is cleared for use under FDA CFR 176.170 as a component of the uncoated or coated food contact surface of paper and paperboard intended for use in producing, manufacturing, packing, processing, preparing, treating, packaging, transporting or holding aqueous and fatty foods.

Compliance with the limitation on extractives can only be demonstrated by tests carried out in the final article.

Elvacite® 2669 is cleared for use under FDA 21 CFR 176.180 as a component of the uncoated or coated food contact surface of paper and paperboard intended for use in producing, manufacturing, packing, processing, preparing, treating, packaging, transporting, or holding dry food.

Elvacite® 2669 is not cleared under FDA 21 CFR 177.1010 as semirigid and rigid acrylic plastics articles intended for use in contact with food. The semirigid and rigid acrylic plastics in the finished form in which they are to contact food are subject to limitation on extractives

Compliance with the limitation on extractives can only be demonstrated by tests carried out on the final article.

This statement of compliance is correct at the date of issue.

As food contact regulations and product formulations are subject to change, it is the user's responsibility to ensure that they are in possession of a current statement of compliance.

Pasadena, Texas, USA

Issue date: January 2022

Mitsubishi Chemical America, Inc., Specialty Resins Division hereby certifies that the country chemical inventory status of Elvacite® 2669 is as follows.

US	CA	AU	CN	KR	NZ	PH	TW	JP	Russian Federation	TH	Vietnam
TSCA	DSL	AIIC	IECSC	KECI	NZIoC	PICCS	TCSI	ENCS	Unified list of chemicals	DIW	NCI
Listed as Active	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Y: Listed

N: Not Listed

For further information or samples, please contact your local distributor, or:

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