

Elvacite® 4331

Acrylic Resin for Pigment Dispersion

Elvacite® 4331 is a solid acrylic bead resin, which can be used for the preparation of universal pigment pastes. The resin is compatible with a wide range of inorganic and organic pigments, as well as different types of resins. Elvacite® 4331 is non-reactive for use in reactive systems.

Performance Features and Key Benefits

- Lower viscosity solutions compared to competitive resins allows for heavier pigment loading
- Solvent Free
- Excellent compatibility with a wide variety of resins
- Water-white clarity

Typical Properties^a

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Appearance	Solid bead
Glass Transition Temp, final	61°C
Molecular Weight (Mw)	4,000
Acid Number (mg KOH/g Resin)	7

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.

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.

Solubility Data (30% in Solvent)											
Toluene	MEK	Acetone	EA	IPA	Aromatic 100	DMC	tBAC	nBAC	MS	PCBTF	Water
S	S	S	S	I	S	S	I	S	I	S	I

S: Soluble, I: Insoluble

MEK: Methyl Ethyl Ketone

EA: Ethyl Acetate

IPA: Isopropyl Alcohol

DMC: Dimethyl Carbonate

tBAC: t-Butyl Acetate

nBAC: n-Butyl Acetate

MS: Mineral Spirits

PCBTF: Parachlorobenzotrifluoride

Pigment Dispersion Evaluation

Each resin was initially dissolved in ethyl acetate @ 60% ^w/_w (except for Elvacite® 2016 @ 40% solids). 2 mm glass beads and pigment were added, and then the mixture was dispersed with a horizontal, flat mixing blade.

<u>Formulation</u>	<u>PIGMENT TYPE</u>		
	<u>Hostaperm</u>	<u>Novoperm Red</u>	<u>Raven Black</u>
	<u>Yellow H4G</u>	<u>F3RK 70</u>	<u>1200</u>
Resin (60%* by weight in ethyl acetate)	23.5	20.8	25.0
Pigment	22.0	35.0	25.0

The table below describes the results for the different resins tested:

	Elvacite® 4331	Competitive Resin A	Competitive Resin B	Elvacite® 2016
60% solids viscosity in ethyl acetate (cps)	226	696	667	>1000
Hostaperm Yellow H4G 30 min dispersion (Hegman)	7+	7	7+	7
Novoperm Red F3RK 70 30 min dispersion (Hegman)	7+	7	7+	3
Raven Black 1200 30 min dispersion (Hegman)	7	4.5	4	3
Raven Black 1200 60 min dispersion (Hegman)	7	6	7	3

Resin Compatibility Evaluation

The compatibility of Elvacite® 4331 with a range of other resins, i.e. typical acrylic, alkyd and epoxy resins, was assessed as follows:

10% w/w Elvacite® 4331 was solution blended with 90% w/w of each test resin. Details of the solvents employed are shown in table 3. The blend solutions were rolled overnight at room temperature and then observed for clarity and color. Coatings of each blend were also made by casting onto PET sheets using a 100 micron Meyer bar and then drying for 24 hours.

Resin Compatibility Study - Solution Blends

Resin / Solvent	Type	Elvacite® 4331
Elvacite® 2021C/Acetone	acrylic, methyl methacrylate	(A) Clear
Elvacite® 2041/Acetone	acrylic, methyl methacrylate	(B) very slight haze
Elvacite® 2014/Acetone	acrylic, methyl methacrylate	(C) cloudy, some insoluble material
Elvacite® 2016/Acetone	acrylic, methyl methacrylate/n-butyl methacrylate co-polymer	(A) clear
Elvacite® 2042/Acetone	acrylic, ethyl methacrylate	(B) very slight haze
Elvacite® 2044/Acetone	acrylic, n-butyl methacrylate	(B) very slight haze
Elvacite® 2045/Acetone	acrylic, isobutyl methacrylate	(A) clear
Epikote 1001/ Acetone	epoxy	(E) very cloudy, yellow

Resin Compatibility Study - Dried Film Blends

Resin	Type	Elvacite® 4331
Elvacite® 2021C	acrylic, methyl methacrylate	(A) clear
Elvacite® 2041	acrylic, methyl methacrylate	(A) clear
Elvacite® 2014	acrylic, methyl methacrylate	(A) clear
Elvacite® 2016	acrylic, methyl methacrylate n-butyl/methacrylate co-polymer	(A) clear
Elvacite® 2042	acrylic, ethyl methacrylate	(A) clear
Elvacite® 2044	acrylic, n-butyl methacrylate	(A) clear
Elvacite® 2045	acrylic, isobutyl methacrylate	(A) clear
Epikote 1001	Epoxy	(B) very slight haze
Wresinol VAS 9160	alkyd, short oil/linseed	(A) clear
Wresinol AS 483	alkyd, medium oil/linoleic	(B) very slight haze
Wresinol AS 621	alkyd, long oil/linoleic	(C) very slight haze
Blagden 930-50	alkyd, short oil/soya & benzoic	(B) very slight haze

Code for Evaluation:

A	=	Clear solutions
B	=	Very slight haze
C	=	Cloudy
D	=	Cloudy, some insoluble material
E	=	Very cloudy

Elvacite® 4331 is not compliant with FDA 21 CFR 175.105, 175.300, 175.320, 176.170, 176.180, or 177.1010.

Pasadena, Texas, USA

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Mitsubishi Chemical America, Inc., Specialty Resins Division hereby certifies that the country chemical inventory status of Elvacite® 4331 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
PE	Y	Y	N	N	N	N	N	N	Y	N	N

PE: Listed as an active Polymer Exemption

Y: Listed

N: Not Listed

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

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