



CREATE THE PAINT OF THE FUTURE
Emulsions for Architectural Paints
Indian Region

A GLOBAL LEADER SUPPLYING WORLD-CLASS EMULSIONS.

Celanese manufactures, markets and sells a broad range of emulsion polymers in all 3 major regions of the world. Our Emulsion plants are located across Europe, North America and in Nanjing, China, the site of our newest facility, to supply coatings products globally. Our quality control teams and measures ensure high-quality products.



Innovation Drives our Business.
Our Shanghai Technology Center
Serves the Asian Region.

LEADING INNOVATION IN COATINGS.

For decades, Celanese has partnered with some of the largest coatings manufacturers across Europe to assist them in formulating environmentally-friendly decorative paints. As the consumer trend toward "green" products has grown internationally, we have translated this knowledge to North America and to Asia through product lines developed especially for their respective regions.

Celanese's research and development center for emulsions is in Frankfurt, Germany. The Frankfurt Technology Center includes analytic, synthesis, process development, application and development departments. These world-class facilities, including an expanded coatings department, enable rapid development of new products as well as customisation of products for the various regions.

To ensure the quickest response and the best expertise, our coatings customers are assisted regionally. The Shanghai Commercial and Technology Center is the home of our application and development laboratory for Asia. Here, scientists and technicians concentrate on emulsion products for China and the rest of Asia. They work with individual customers to determine the products best suited to their needs and then to test them fully using numerous test methods, including ISO and ASTM, where appropriate. Our goal is to help our customers drive value into their products by providing performance-based solutions including world-class emulsion products.

THE CELANESE COMMITMENT TO ASIA.

Heavily Investing in the Region

Celanese has a long-term commitment to the Asian region dating back decades. Growth in the Asian region, and China in particular, has been a key strategy for Celanese.

The Celanese Nanjing (China) chemical complex is Celanese's largest integrated complex in the world. The site houses numerous operating units for three of its businesses in one facility that shares infrastructure and resources, making it a world-class manufacturing base.

Celanese is committed to social responsibility with a strong emphasis on environmental stewardship and sustainable development. In 2013, Celanese was presented with multiple awards from the American Chemistry Council (ACC) including "Employee of the Year" and the ACC Facility Safety Award for 4 of our sites.

World-class Emulsions Facility

The Nanjing site is integrated from acetic acid to vinyl acetate monomer (VAM), a key raw material for emulsion vinyl-based polymers. This integration allows for surety of supply. The emulsions plant includes high-pressure reactors to synthesize state-of-the-art vinyl acetate/ethylene (VAE) emulsions. The facility also includes atmospheric reactors to manufacture high-performance homopolymers, copolymers and pure acrylic emulsions. All emulsion products meet our global, high-quality standards.

In June of 2011, Celanese Emulsions dedicated its VAE expansion in Nanjing, which celebrated the doubling of its VAE capacity to serve the growing demand in the Asian region.

The Celanese Shanghai Commercial and Technology Center officially opened in January 2011. This facility serves as the headquarters for Celanese's Asia business (including emulsions) as well as the region's customer application development labs and research and development center. Hundreds of Celanese scientists, design engineers and technical experts are under one roof in this new state-of-the-art facility.



Celanese Shanghai Commercial and Technology Center.



Celanese Nanjing Integrated Chemical Complex.

LEADING THE ECO-FRIENDLY CHARGE.

Celanese has been at the forefront of emulsion technology that has enabled the coatings industry to create breakthroughs for the environment. We were the first company to develop a totally non-solvent binder technology for low VOC interior consumer paints more than a decade ago. This VAE emulsion dramatically reduced VOC levels in matt paints, achieving eco-friendly labeling and meeting consumer requirements for environmentally-friendly products with good performance.

Our work with low VOC and with other environmental issues continues today. We introduced emulsion technology for low emission, eco-friendly, interior semi-gloss paints. And beyond VOCs, through technology development and creative formulating approaches, we are developing new methods to address many of the environmental issues facing the coatings industry today.



Emission behaviour of optimised interior paints based on VAE-Copolymers



- Detectable emissions after 28 days are far below the limit of 1000 µg/m³ necessary to achieve the A+ qualification according to the French labeling.
- The 3 day limit (< 300 µg/m³) for some non-mandatory labels (like TÜV) can be achieved as well by using VAE as binder for low emission paints.

Around the world, the paint and coating industry is under strong pressure to reduce VOC emissions. Although most interior decorative paints are already waterborne, many formulations based on hard polymer emulsions still contain co-solvents and plasticisers, affecting the indoor air quality of the painted rooms. The use of soft VAE emulsions with MFFT 0°C enables the formulation of paints without any solvents and plasticisers. Many of these paints can meet existing VOC regulations and standards for ecological labels across Europe and the U.S. Finally, our emulsions assist these paints to fulfill the stricter emissions limits regarding the total VOC [TVOC] evaluation in chamber tests according to ISO 16000-9.

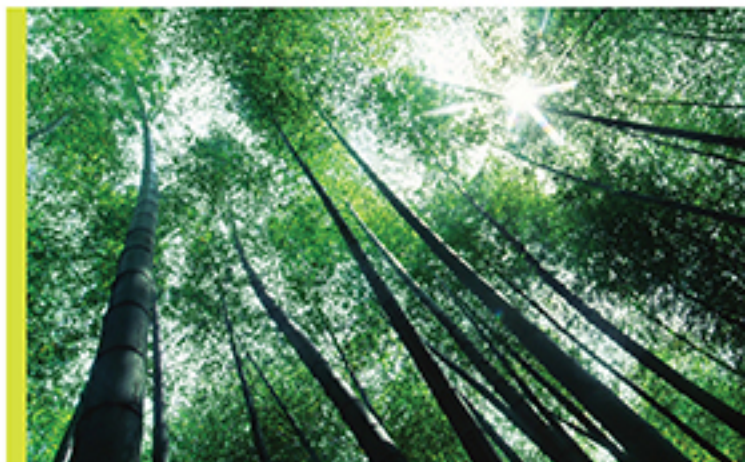
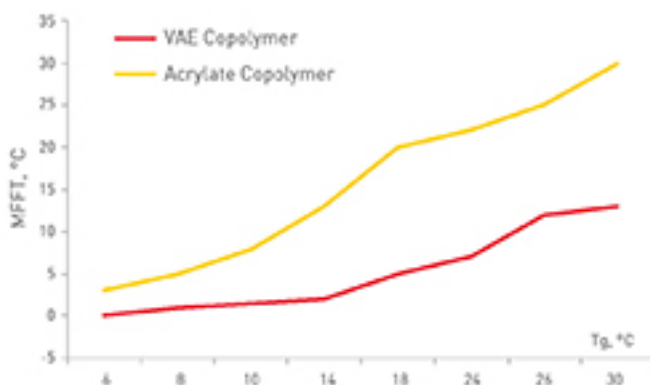
THINK GREEN. THINK VAE.

VAE Technology Behind 'People-Friendly' Paints

The first action paint formulators take in order to create environmentally-friendly paints is to reduce the VOC (volatile organic compound) content. It is not as easy as simply removing the solvent or coalescing agents as the formulator needs to compensate for the loss of its main film former and the source of many performance properties such as washability.

Celanese introduced vinyl acetate/ethylene (VAE) emulsions for low emission paints more than a decade ago. Through hydroplastification, the water in the paint actually becomes the solvent required for the film formation process.

Hydroplastification Effect with VAE Copolymers



"It is possible to make a solvent-free, very low VOC interior paint that meets the needs of the paint formulator, the painter and the homeowner: start with VAE emulsions from Celanese."

This is possible because the VAE copolymers have a wide delta between their MFFT and the Tg. This allows good film formation without the addition of solvents and plasticisers because of the inherently low MFFT.

Tg of VAE and Acrylate Copolymer with MFFT 0°C

	VAE Copolymer	Acrylate Copolymer
MFFT	0°C	0°C
Tg	12-17°C	2-8°C

It also offers improved performance characteristics of the paint film, such as high wet scrub resistance, because of the higher Tg.

We encourage you to talk with your Celanese Emulsions technical expert for the full story on VAE and low emission paints.

FORMULATING THE BEST DECORATIVE PAINTS.

Spotlight on EcoVAE® Emulsions

EcoVAE emulsions are formulated to be inherently low odour by limiting the amount of residual monomer in the product. Utilising the unique properties of vinyl acetate/ethylene (EVA) emulsions, no coalescing solvents are required, thereby removing a major source of odour in paint. Environmentally-conscious consumers prefer low odour, low emission paints and EcoVAE allows the coatings manufacturers to capitalise on this marketing trend. Use the chart below to choose the high-performance polymer technology that is right for your formulation goals.



Formulate Low Odour, Low Voc, Interior Decorative Paints.

EcoVAE 1603, 1608 and 1630 Offer:

- Low odour
- Low VOC
- Excellent wet scrub resistance
- Superior hiding power/opacity
- Compatibility with pigment and fillers
- APEO-free

Celvolit® 7675 pure acrylic emulsion – for low odour, easy-to-clean paints

- Formulate low odour, low VOC paints
- Excellent stain removal performance
- Balanced hardness and flexibility resulting in good block resistance and elasticity
- Good wet adhesion
- Self-crosslinking emulsion
- Good for gloss paints
- Washable and scrubbable
- APEO-free
- Ammonia-free

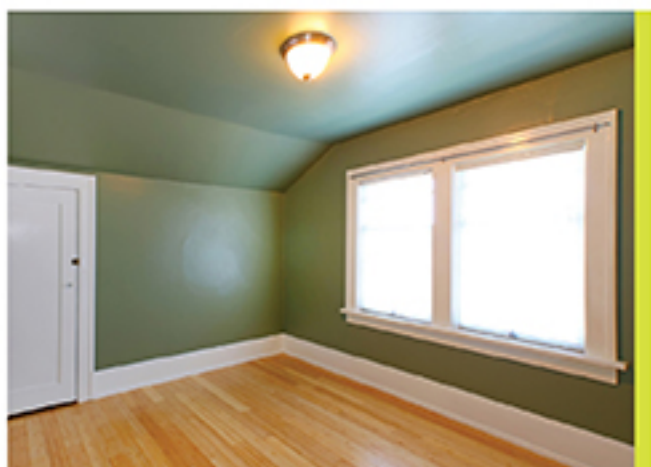
HIGH PERFORMANCE EMULSIONS FOR INTERIOR LOW VOC, LOW ODOUR PAINTS

Product	Polymer Type	T _g °C	MFFT °C	Solids %	Brookfield Viscosity mPa.s	S spindle RPM	pH	Stabilisation	APEO-Free	Application Areas
Celvolit® 1602	Vinyl Acetate/Ethylene	12	0	55	100-700	2/60	4.5	E/C	Yes	Middle/High PVC
Celvolit 7675	Acrylic Copolymer	-7/+45	1	46	10-200	2/60	8.5	E	Yes	Middle/Low PVC
EcoVAE® 1603	Vinyl Acetate/Ethylene	11	0	55	500-2000	3/20	4.5	E/C	Yes	Middle/Low PVC
EcoVAE 1608	Vinyl Acetate/Ethylene	10	0	55	500-3000	3/20	4.5	E/C	Yes	Middle/Low PVC
EcoVAE 1630	Vinyl Acetate/Ethylene	21	4	50	500-1900	2/20	4.5	E/C	Yes	Silk gloss paint

E=Emulsifier
C=Protective Colloids

HIGH-PERFORMANCE EMULSIONS FOR GLOSS PAINTS, LACQUERS AND VARNISHES.

Recently, there has been increasing interest in ecologically-friendly, low VOC gloss paints, lacquers and varnishes (GLV). Because of increasingly stringent VOC regulations and standards for eco-labels, there has been a concentrated effort to reformulate these coatings without alkyd resins, which had been used for decades. Water-based Celvolit acrylic emulsions are a good alternative to alkyd binders to reduce the VOC content while retaining the performance properties required in these products.



HIGH PERFORMANCE EMULSIONS FOR GLOSS PAINTS, LACQUERS AND VARNISHES

Product	Polymer Type	Tg °C	MFFT °C	Solids %	Brookfield Viscosity mPa.s	pH	Stabilisation	APEO-Free
Celvolit 1665	VAE Inclusion/Acrylic	13	2	53	500-2500	5.0	E/PVCH	Yes
Celvolit 7605	Acrylic	-10/50	1	50	1000-4000	8.5	E	Yes
Celvolit 7620	Acrylic	28/100	24	46	500-2500	7.5	E	Yes
Celvolit 7615	Acrylic	13/65	8	47	2500-6500	8.5	E	Yes
Celvolit 7610	Pure Acrylic	21	15	50	500-3500	8.5	E	Yes
Celvolit 7600	Pure Acrylic	23	18	46	200-600	8.5	E	Yes

Product	Features/Benefits	Gloss paints	Weather protection wood paints	Weather protection wood stains	Corrosion protection
Celvolit 1665	High quality interior and exterior trim and masonry paints.		••		
Celvolit 7605	Improved block resistance.	••		••	••
Celvolit 7620	Optimised chemical resistance and hardness for use in parquet and furniture varnishes.	•	•		•
Celvolit 7615	Good block and chemical resistance; particularly suited for gloss paints.	••		•	•
Celvolit 7610	Improved wet adhesion.	•	••	••	
Celvolit 7600	Standard emulsion for universal use.	•	•	•	

- Recommended
- Highly Recommended

E = emulsifier C = cellulose derivatives PVCH = polyvinyl alcohol P = polymer



EMULSION POLYMERS

celanese.com/emulsion-polymers

CELANESE CHEMICALS INDIA PVT. LTD.,

"Commerz" Office 2A
International Business Park,
Oberoi Garden City
Off Western Express Highway
Goregaon (East), Mumbai 400063, India.
Tel: +91 22 66112000
Fax: +91 22 67989589

CELANESE (CHINA) HOLDING CO., LTD.

4560 Jinke Road
Shanghai 201210
Tel: +86 21 38619288
Fax: +86 21 38619588
E-Mail: Info.Emulsions.CN@celanese.com

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