

Eastman **VANTEX™-T**

neutralizing amine additive

Neutralizing amines. Enhancing paint performance.

Eastman is committed to delivering innovation and solutions for coatings applications. For more than 90 years, we have been a leading provider of high quality raw materials for the global paint and coatings industry. Our comprehensive portfolio for the coatings industry includes neutralizing amine products. Paint formulators use neutralizing amine additives to adjust the pH of the paint. In addition, these additives function as beneficial supplementary pigment dispersants that enhance tint strength, grind stability, and overall paint performance.

Eastman Vantex™-T neutralizing amine additive

Eastman Vantex-T is an excellent multifunctional neutralizing amine that enables formulators to create environmentally friendly, lower odor, low-VOC, and low emission paints and coatings.

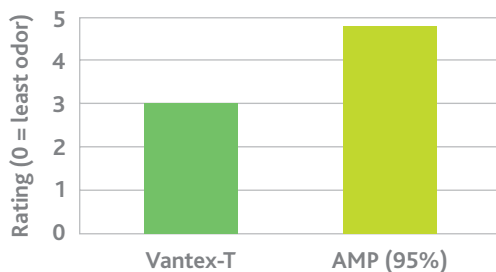
Vantex-T is a tertiary amine additive with virtually no ammonia or amine-type odor. The lack of odor from Vantex-T is a benefit in formulating paints for interior use. Coatings formulated with Vantex-T are suitable for use in contained spaces and in areas that may be occupied after painting. Vantex-T can be used in formulations that meet but not limited to JG/T 481-2015, French Grenelle, AgBB, GS-11, Ecolabel, and Greenguard® Standards. Contact your Eastman representative for more information.

As volatile neutralizing amines have become one of the few odorous components still used in paints, low-VOC paints can achieve improved performance with less odor by using low-odor, neutralizing additives like Vantex-T.

VOC contribution is dependent on region and test method. In China, testing by GB 18582-2008 shows that Vantex-T does not contribute to the VOC content. Vantex-T is not considered a VOC in accordance with ISO 11890-2:2013 (based on VOC definition as described in EU directive 2004/42/EC and ABNT NBR-16388).

Odor testing

An Asia team of paint specialists tested neat odor of Vantex-T compared to one leading competitive amine. Vantex-T shows lower odor.



Zero VOC

Vantex-T is a zero VOC neutralization amine additive that allows paint manufacturers to formulate high quality, low VOC paints.

Test method: Refer to Appendix A of Chinese GB 18582-2008 (Indoor decorating and refurbishing materials—Limit of harmful substances of interior architectural coatings) gas chromatography method, $\leq 250^{\circ}\text{C}$ for VOC. Use GC-FID to conduct the analysis.

Test item	Limit	Unit	MDL	001
Volatile organic compound (VOC)	120	g/L	2	Nondetected
Conclusion	Pass			

Tested by SGS-CSTC Standards Technical Service (Shanghai) Co., Ltd

Zero contribution to TVOC¹

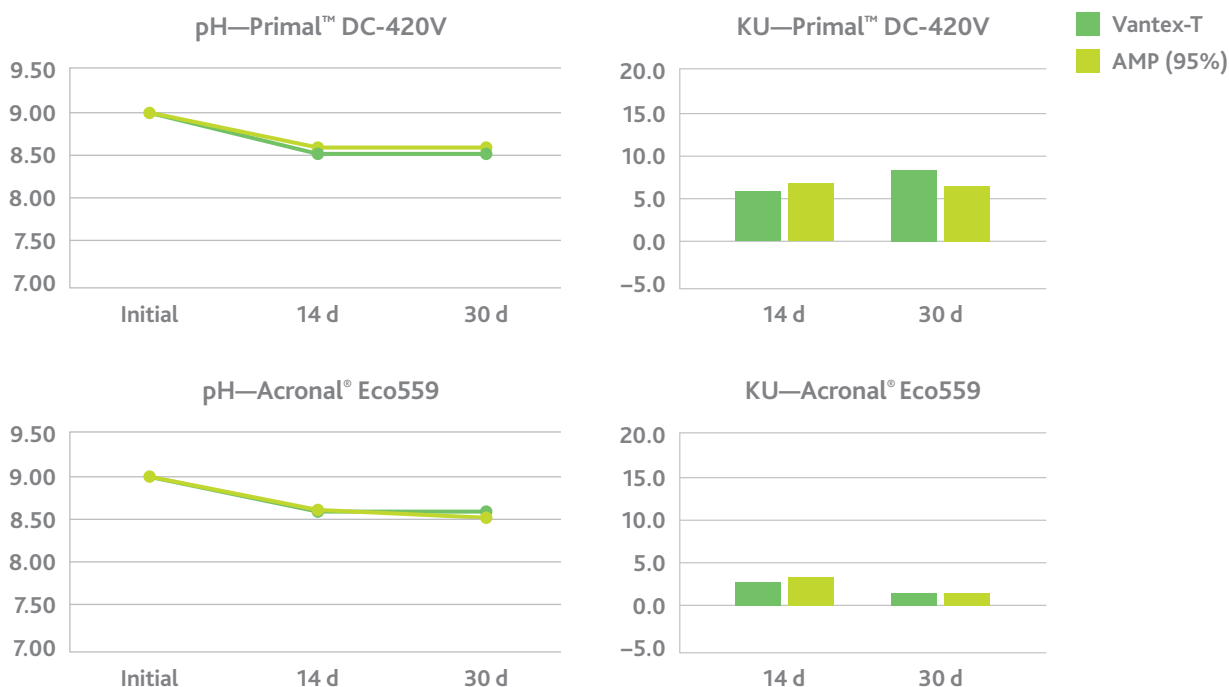
Emitted TVOC can be contributed by many paint components from different raw materials like latex, coalescents, cosolvents, neutralizing aids, and other materials. Vantex T, as the novel neutralizing amine additive, contributes zero to TVOC.

Independent emissions testing conducted at an external, accredited laboratory² confirms that Vantex T has zero contribution to emitted TVOC. See Appendix II for test method.

Formulation	Neutralizing agent	Emission VOC ($\mu\text{g}/\text{m}^3$)		Emission label
		Neutralizing aid's contribution	TVOC	
50% PVC Primal™ DC-420V	Vantex-T	0	405.7	A+
50% PVC Acronal® Eco559	Vantex-T	0	250.1	A+

Paint stability—pH and viscosity

Vantex-T showed equal performance with a leading competitive amine when used as a neutralizing agent in a paint system containing Acronal® Eco599. When compared to a competitive amine, both the viscosity, measured in KU, and pH, drifting less than 0.5 unit, performed equally during the test duration.



¹Total volatile organic compounds with retention time between C_6 and C_{16} as defined in JG/T 481-2015

²Eurofins testing laboratory, Shenzhen, P.R. China

Appendix I. Typical physical properties of Eastman Vantex-T

Properties	Typical value, units
Appearance	A colorless to light yellow liquid
Odor	Super low odor
Boiling point	283°C
Vapor pressure @ 20°C	< 0.01 hPa
Density @ 20°C	0.963–0.980 g/cm ³
Water solubility	Completely soluble
Molecular weight	161.3 g/mol
Dissociation constant, pKa	8.91
Octanol-water partition coefficient, log Pow	0.48

Appendix II. Test Method

Eurofins' emission test apparatus

In this study, emission was determined by Eurofins China according to JG/T 481-2015 methodology. A 119L cubic-shaped stainless steel chamber is used for emission testing in Eurofins China lab. The chamber is capable of precision control of air temperature, relative humidity, air velocity, and exchange rate. Emission air was collected after 3 days using Tenax[®] TA thermal sorbent tubes. Prior to each sampling use, conditioning the precleaned sorbent tubes is required to remove trace organic volatiles possibly trapped on the tube. A thoroughly cleaned chamber is also required to ensure blank VOC is lower than 2µg/m³. Analysis of the thermal desorption tube is by thermal desorption and gas chromatography-mass spectrometry (GC-MS) using HP-5 chromatography column. Detailed GC-MS parameters were not shared by Eurofins' lab, with the exception of its detection limit (5µg/m³). Data variation between ± 35% were valid.

Sample preparation and test parameters

A 30-g specimen of each formula was brushed evenly on a glass panel with a surface area of 0.12 m². The freshly coated panel was then loaded into the chamber immediately. The time when the tested panel entered into the chamber was set as 0, and the emission time length was 72 h ± 1 h before chamber air sampling. Air temperature in the test chamber was controlled at 23° ± 1°C. Relative humidity was 50% ± 5%. Air velocity was 0.1 m/s ~ 0.3 m/s. Air was exchanged at the rate of 0.5 h⁻¹ ± 0.01 h⁻¹. Parallel air sampling was conducted to check test reproducibility and get the average data.

Sample preparation				
Method	Principle	Parameter	Detection limit	Uncertainty
Water-based interior wall coating with low-emission TVOC	TDS GC /MS	TVOCs	5 µg/m ³	17.5% (RSD) U = 2 X RSD = 35%

Test chamber parameter	
Chamber volume (L)	119
Air change rate (per hour)	0.5
Temperature (°C)	23
Loading ratio (m ² /m ³)	1
Relative humidity (%)	50

Test condition: sample stayed in test chamber during the whole 3-day testing period.

Sample preparation: The application is 30 g per test specimen.

Appendix III. Starting formulations

Formulation-I: Primal™ DC-420V (50% PVC)			
Material	Type	Supplier	Grams
Grind			
DI-Water	Water	—	150.00
Natrosol™ 250 HBR	Thickener	Ashland	2.50
Propylene glycol	Solvent	Local	0.00
Orotan™ 731A	Dispersant	Dow	9.00
Kathon™ LXE	Biocide	Dow	2.00
Triton™ EF-106	Surfactant	Dow	2.00
Dispelair™ CF-246	Defoamer	Blackburn	2.00
Rocima™ 361	Biocide	Dow	3.00
Ti-Pure™ R-706	Pigment	DuPont	180.00
CC-700	Extender	Local	105.00
Kaolin DB-80	Extender	Local	60.00
Grind subtotal			515.50
Letdown			
Primal™ DC-420V	Binder	Dow	300.00
Ropaque™ Ultra E	Opaque polymer	Dow	60.00
Optifilm™ enhancer 400	Coalescent	Eastman	30.20
Dispelair™ CF-246	Defoamer	Blackburn	1.00
Acrysol™ RM-2020 NPR	Thickener	Dow	6.00
Acrysol™ TT-935	Thickener	Dow	0.00
Mill base subtotal			912.70
Sample adjustment			
Vantex™-T	Neutralizing aid	Eastman	Adjust pH = 9.0
AMP (95%)	Neutralizing aid	Angus	
DI-Water	Water	—	Adjust
Total			1000.00

Formulation-II: Acronal® Eco559 (50% PVC)			
Material	Type	Supplier	Grams
Grind			
DI-Water	Water	—	150.00
Natrosol™ 250 HBR	Thickener	Ashland	2.50
Propylene glycol	Solvent	Local	0.00
Orotan™ 731A	Dispersant	Dow	9.00
Kathon™ LXE	Biocide	Dow	2.00
Triton™ EF-106	Surfactant	Dow	2.00
Dispelair™ CF-246	Defoamer	Blackburn	2.00
Rocima™ 361	Biocide	Dow	3.00
Ti-Pure™ R-706	Pigment	DuPont	180.00
CC-700	Extender	Local	105.00
Kaolin DB-80	Extender	Local	60.00
Grind subtotal			515.50
Letdown			
Acronal® Eco559	Binder	BASF	288.00
Ropaque™ Ultra E	Opaque polymer	Dow	60.00
Optifilm™ enhancer 400	Coalescent	Eastman	5.00
Dispelair™ CF-246	Defoamer	Blackburn	1.00
Acrysol™ RM-2020 NPR	Thickener	Dow	6.00
Acrysol™ TT-935	Thickener	Dow	6.00
Mill base subtotal			881.50
Sample adjustment			
Vantex™-T	Neutralizing aid	Eastman	Adjust pH = 9.0
AMP (95%)	Neutralizing aid	Angus	
DI-Water	Water	—	Adjust
Total			1000.00



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