

Eastman solvents—Technical tip

Using Eastman methyl acetate in cleaning applications

Introduction

Eastman Chemical Company, the world's leading producer of methyl acetate, offers this solvent in two grades to suit a variety of application needs:

- **Regular (industrial) grade** offers a minimum assay of 96%, a maximum methanol content of 2.5%, and a maximum water content of 1.5%.
- **High purity grade** offers a minimum assay of 99.5%, a maximum methanol content of 0.10%, and a maximum water content of 0.05%.

In many applications, Eastman methyl acetate can be an effective replacement for acetone and other fast-evaporating solvents.

Table 1 Sales specifications

Property	Eastman methyl acetate	Eastman methyl acetate, high purity
Strength—assay	96.0% min.	99.5% min.
Methanol	2.5% max.	0.10% max.
Water	1.5% max.	0.05% max.
Acidity as acetic acid	0.15% max.	0.05% max.
Color, PCS	5 max.	5 max.

Considerations

Wide formulation latitude

Eastman methyl acetate can be used alone or in easily blended formulations to optimize cleaning efficiency. Because methyl acetate is miscible with most organic solvents, it finds use in a variety of cleaning applications, including automotive, aerospace, marine, and industrial.

Some common cleaning applications include:

- Universal cleaner
- Low-VOC and environmental cleaners
- Aerosol carburetor cleaners
- Paint gun cleaners
- Cleaners for printing inks
- Cleaners for industrial wipes

Regulatory and VOC-exempt status

Concerns for work place safety and the environment have led to the deselection of chlorinated solvents in many applications. In the United States, methyl acetate was added to the list of compounds excluded from the definition of volatile organic compound (VOC) on the basis that these compounds have been determined to have negligible photochemical reactivity. Methyl acetate is relatively nontoxic, nonreactive, and readily biodegradable, making it useful in environmentally friendly formulations.

Fast evaporation rate

Fast drying is often a key performance requirement in cleaning applications. A slow-drying solvent can impede the cleaning process, adding additional labor cost. In addition, slow-drying solvents can attract airborne contaminants and leave residues that negate the effectiveness of the cleaning processes.

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Table 2 shows physical properties of methyl acetate versus other fast-evaporating solvents. Methyl acetate evaporates faster than MEK and ethyl acetate, allowing its use as a replacement for those solvents in applications where VOC reduction is required. Methyl acetate is similar to acetone in evaporation rate, VOC exemption, and non-HAP status but offers a higher flash point and hydrophobic property.

The hydrophobic nature of methyl acetate can be a key performance criteria in cleaning applications where moisture-related problems can damage or corrode parts, leading to defects or rejects. For example, it can be used in automotive and aviation applications prior to coating or painting parts.

Table 2 Physical properties of methyl acetate vs. other fast-evaporating solvents

	MEK	Methylene chloride	Acetone	Ethyl acetate	Eastman methyl acetate, HP
CAS number	78-93-3	75-09-2	67-64-1	141-78-6	79-20-9
Evaporation rate ^a	3.8	14.5	6.3	4.1	6.2
Azeotropes, BP °C	73.4	38.3	None	70.4	56.1
Boiling point @ 760 mm Hg °F	175	102–106	132–135	168–173	132.4–136.7
Electrical resistance, megohms	0.2	1.5	<0.01	20	4.0
Hansen solubility parameters					
Hydrogen bonding	2.5	3	3.4	3.5	3.7
Nonpolar	7.6	8.9	7.6	7.7	7.6
Polar	4.4	3.1	5.1	2.6	3.5
Total	9.1	9.7	9.8	8.8	9.2
Solubility @ 20°C, wt%					
In water	27.1 wt%	—	Complete	7.4 wt%	22.7 wt%
Water in	12.5 wt%	—	Complete	3.3 wt%	8.8 wt%
Surface tension @ 20°C, dynes/cm	24.6	26.5	22.3	23.9	25.2
Vapor pressure @ 20°C mm Hg	70.2	340	185	86	179.5
Wt/vol @ 20°C, lb/gal	6.67	10.98 ^b	6.6	7.51	7.78
Flash point, Tag closed cup, °C	–9	None	–20	–4	–15

^aEvaporation rate, (n-butyl acetate = 1)

^bWt/vol @ 25°C lb/gal

Conclusion

The regular (industrial) and the high purity grades of Eastman methyl acetate provide wide formulation latitude in a variety of cleaning applications. Contact Eastman to discuss which grade of Eastman methyl acetate best suits your specific application needs.



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