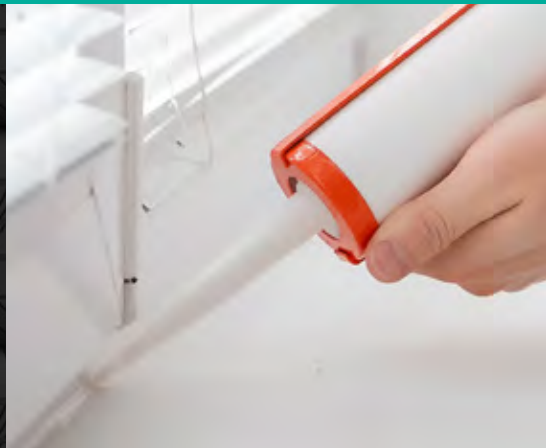


EASTMAN

Eastman specialty ketones

Smart choice of building blocks for chemical synthesis solutions





Good chemistry is about the bonds you keep.

Chemical synthesis companies seek an optimal balance of performance, sustainability and value for their products. Ketones play a prominent role in achieving that balance. Ketone moiety is common in natural products and pharmaceuticals and in dyes, fragrances and flavors. It is also a versatile reaction center in organic synthesis.*

Eastman specialty ketones are smart choices for chemical synthesis companies. They have active carbonyl and α -hydrogen groups that are reactive with multiple chemicals like potassium cyanate, amine and formaldehyde. Ketone-based synthesis products created through these reactions have been applied in the agricultural, veterinary, pharmaceutical and industrial sectors.

As a global leading solvent supplier, Eastman offers a range of ketone products to help customers deliver high-quality and high-performance products: MAK (methyl *n*-amyl ketone), MIAK (methyl isoamyl ketone) and MPK (methyl *n*-propyl ketone).

Source: <https://www.nature.com/articles/s41467-020-17224-2>

*Practical applications are not limited to those listed.

Table 1. Eastman ketone products

Products	Evaporation rate (<i>n</i> -butyl acetate = 1)	Color Pt-Co	Specific gravity @ 20°C/20°C	Boiling point @ 760 mm Hg		Freezing point	Flash point	Assay
				Dry point	Initial		Tag closed cup	
Methyl <i>n</i> -amyl ketone (MAK)	0.4	10 max.	0.818	153.5°C (308°F)	147°C (297°F)	-33°C (-27°F)	39°C (102°F)	99 wt% min.
Methyl propyl ketone (MPK)	2.3	15 max.	0.81	105°C (221°F)	101°C (214°F)	-86°C (-123°F)	8°C (46°F)	90 wt% min.
Methyl propyl ketone (MPK) — high purity	2.3	15 max.	0.81	—	101°C (217°F)	-84°C (-119°F)	78°C (50°F)	98.5 wt% min.
Methyl propyl ketone (MPK) — ultra high purity	2.3	15 max.	0.807	—	103°C (217°F)	-84°C (-119°F)	10°C (50°F)	99.5 wt% min.
Methyl isoamyl ketone (MIAK)	0.5	10 max.	0.813	148°C (298°F)	141°C (286°F)	-74°C (-101°F)	36°C (96°F)	98.5 wt% min.

Product details

MAK

Chemical structure

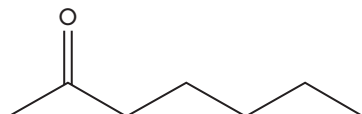


Table 2. Methyl amyl ketone (MAK)

Products	CAS	Assay	Acid as acetic	Water	Total alcohol	Other ketones
Methyl amyl ketone (MAK)	110-43-0	99% min.	0.02% max.	0.03% max.	0.2% max.	0.5% max.

Applications



Agriculture intermediate/additives

MAK is compounded with various active ingredients to produce herbicide safener. These herbicides now apply globally to safeguard crops against weeds.

MIAK

Chemical structure

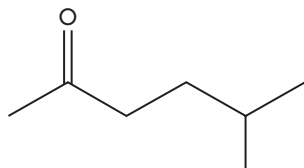


Table 3. Methyl isoamyl ketone (MIAK)

Products	CAS	Assay	Acid as acetic	Water	Total alcohol
Methyl isoamyl ketone (MIAK)	110-12-3	98.5% min.	0.01% max.	0.05% max.	0.4% max.

Applications



Wetting agent

MIAK is used as a raw material in the synthesis of nonionic gemini structural surfactants to produce alkyne diol; 2,5,8,11-tetramethyl-6-dodecyn-5,8-diol; and corresponding polyethoxylated derivatives.

This series of surfactants provide both wetting and defoaming to minimize any potential harmful effects. They have been widely used in waterborne cutting fluid, waterborne coatings and inks, adhesives, and semiconductor cleaning and processing.

Source: US5650543 [P]. 1993. Air Products & Chemicals



Rubber additives

MIAK is also used as a raw material in the synthesis of the most widely used series of special antioxidants for rubber, N,N'-substituted *p*-phenylene diamines (PPD type). They protect rubber against causticity created by oxygen, ozone, heat, light and metal ions with excellent persistency.

Main products include 77PD (N, N-bis(1,4-dimethylamyl)-1,4-benzenediamine); 7PPD (N-(1,4-dimethylamyl)-N'-benzyl-1,4-benzenediamine); and TMPPD (2,4,6-tri-(N-1,4-dimethylamyl benzenediamine)-1,3,5-triazine).

Sources: JP57156446 [P]. 1982. Sumitomo Chemical; J Org Chem, 1995, 60: 2642-2644; US4794135 A [P]. 1988. Uniroyal Chemical Company



Pharmacy

In one of the published synthetic routes, MIAK is the starting material for the intermediate (3-[(dimethylamino)methyl]-5-methylhexan-2-one, CAS 91342-74-4) of tetrabenazine, which is used for symptomatic treatment of hyperkinetic movement disorders.

Source: Molecular Crystals and Liquid Crystals, Vol. 557 (2012) pp. 39-49

MPK

Chemical structure

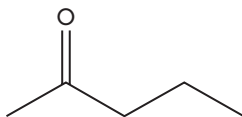


Table 4. Methyl propyl ketone (MPK)

Products	CAS	Assay	Acid as acetic	Water	Total alcohol	Methyl isobutyl ketone
Methyl propyl ketone (MPK)	107-87-9	90% min.	0.01% max.	0.05% max.	0.3% max.	10% max.
Methyl propyl ketone (MPK) — high purity	107-87-9	98.5% min.	0.02% max.	0.2% max.	0.6% max.	0.7% max.
Methyl propyl ketone (MPK) — ultra high purity	107-87-9	99.5% min.	0.02% max.	0.1% max.	0.1% max.	0.1% max.

Applications



Oxime

MPK is the key raw material for MPKO (methyl *n*-propyl ketoxime). MPKO is used in alkyd paint as an anti-skinning agent and as a synthetic raw material of silicone sealant cross-linkers.



Fragrance

MPK can be used as a raw material to synthesize perfume material. It can also be used as a perfume material to create odors like pear, apple, butter and cheese in food, personal care and tobacco products. Its listed Flavor and Extract Manufacturers Association (FEMA) code is 2842.



Pharmaceutical

MPK is the starting material for the key intermediate (4-amino-1-methyl-3-propyl-1H-pyrazole-5-carboxamide, CAS 139756-02-8) of sildenafil, which is a medication used to treat erectile dysfunction and pulmonary arterial hypertension.

Source: Journal of Pharmaceutical and Biomedical Analysis, Vol. 96 (2014) pp. 170–186

Product. Innovation. Support. Commitment.

In developing chemical synthesis solutions, you need not only the right building blocks but also the support behind them. We stand behind our products with innovative and proven technical and business support. Our sales, business and technical teams are available to help with your business opportunities and product development.

The right combination of products and people make a winning solution. Eastman does not just make the building blocks for better chemicals. We make the building blocks for better business.

Call your Eastman representative or visit eastman.com/solvents to learn more about the benefits of Eastman specialty ketones in your solutions.



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