

# Methyl methacrylate

## Other names:

2-(Methoxycarbonyl)-1-propene  
2-Methyl-2-propenoic acid methyl ester  
2-Methylacrylic acid, methyl ester  
2-Methylacrylic, methyl ester  
2-Propenoic acid, 2-methyl-, methyl ester  
2-methylpropenoic acid, methyl ester  
Acryester M  
Acrylic acid, 2-methyl-, methyl ester  
 $\text{CH}_2=\text{C}(\text{CH}_3)\text{COOCH}_3$   
Diakon  
MMA  
Metakrylan metylu  
Methacrylate de methyle  
Methacrylic acid methyl ester  
Methacrylsaeuremethyl ester  
Methyl 2-methyl-2-propenoate  
Methyl 2-methylpropenoate  
Methyl ester of 2-methyl-2-propenoic acid  
Methyl methacrylate monomer  
Methyl methylacrylate  
Methyl «alpha»-methylacrylate  
Methyl «alpha»-methylacrylate  
Methyl-methacrylat  
Methyl-«alpha»-methacrylate  
Methyl-«alpha»-methacrylate  
Methylester kyseliny methakrylove  
Methylmethacrylaat  
Metil metacrilato  
Monocite methacrylate monomer  
NCI-C50680  
NSC 4769  
Paladon  
Pegalan  
Rcra waste number U162  
TEB 3K  
methacrylic acid, methyl ester  
InChI=1S/C5H8O2/c1-4(2)5(6)7-3/h1H2,2-3H3  
VYQNEPGJFQJSBK-UHFFFAOYSA-N  
C5H8O2  
 $\text{C}=\text{C}(\text{C})\text{C}(=\text{O})\text{OC}$

## Inchi:

## InchiKey:

## Formula:

## SMILES:

Mol. weight [g/mol]: 100.12  
CAS: 80-62-6

## Physical Properties

Property code	Value	Unit	Source
affp	831.40	kJ/mol	NIST Webbook
basg	800.50	kJ/mol	NIST Webbook
chl	-2724.60 ± 4.00	kJ/mol	NIST Webbook
gf	-163.41	kJ/mol	Joback Method
hf	-348.70	kJ/mol	NIST Webbook
hf	-342.30	kJ/mol	NIST Webbook
hf	-331.00	kJ/mol	NIST Webbook
hfl	-388.80 ± 4.00	kJ/mol	NIST Webbook
hfl	-382.40	kJ/mol	NIST Webbook
hfus	8.90	kJ/mol	Joback Method
hvap	40.10	kJ/mol	NIST Webbook
ie	10.28	eV	NIST Webbook
ie	10.06	eV	NIST Webbook
ie	9.70	eV	NIST Webbook
log10ws	-0.80		Aqueous Solubility Prediction Method
logp	0.735		Crippen Method
mcvol	84.450	ml/mol	McGowan Method
pc	3881.95	kPa	Joback Method
rinpol	699.00		NIST Webbook
rinpol	677.00		NIST Webbook
rinpol	732.00		NIST Webbook
rinpol	710.40		NIST Webbook
rinpol	670.00		NIST Webbook
rinpol	672.00		NIST Webbook
rinpol	710.00		NIST Webbook
rinpol	696.00		NIST Webbook
rinpol	714.00		NIST Webbook
rinpol	699.00		NIST Webbook
rinpol	696.00		NIST Webbook
rinpol	696.00		NIST Webbook
rinpol	699.00		NIST Webbook
rinpol	677.00		NIST Webbook
rinpol	677.00		NIST Webbook
rinpol	677.00		NIST Webbook

rinpol	732.00		NIST Webbook
rinpol	666.00		NIST Webbook
rinpol	694.00		NIST Webbook
rinpol	677.00		NIST Webbook
rinpol	700.00		NIST Webbook
rinpol	696.00		NIST Webbook
rinpol	713.44		NIST Webbook
rinpol	717.33		NIST Webbook
rinpol	714.30		NIST Webbook
rinpol	677.00		NIST Webbook
rinpol	723.00		NIST Webbook
rinpol	699.00		NIST Webbook
rinpol	716.28		NIST Webbook
ripol	1010.00		NIST Webbook
ripol	1002.00		NIST Webbook
ripol	1008.00		NIST Webbook
ripol	1002.00		NIST Webbook
ripol	1008.00		NIST Webbook
sl	266.20	J/molxK	NIST Webbook
tb	386.65	K	Joback Method
tc	572.77	K	Joback Method
tf	225.60 ± 0.20	K	NIST Webbook
tf	225.15 ± 0.40	K	NIST Webbook
tf	225.60	K	NIST Webbook
tf	225.50 ± 0.20	K	NIST Webbook
tf	225.26	K	Aqueous Solubility Prediction Method
tf	225.00	K	NIST Webbook
tf	225.60	K	NIST Webbook
tt	225.59 ± 0.02	K	NIST Webbook
vc	0.322	m3/kmol	Joback Method

## Temperature Dependent Properties

Property code	Value	Unit	Temperature [K]	Source
cpg	149.36	J/molxK	386.65	Joback Method
cpg	172.17	J/molxK	479.71	Joback Method
cpg	179.24	J/molxK	510.73	Joback Method
cpg	186.04	J/molxK	541.75	Joback Method
cpg	192.58	J/molxK	572.77	Joback Method
cpg	164.83	J/molxK	448.69	Joback Method

cpg	157.23	J/molxK	417.67	Joback Method
cpl	188.49	J/molxK	293.00	NIST Webbook
cpl	191.09	J/molxK	298.15	NIST Webbook
cpl	210.55	J/molxK	298.15	NIST Webbook
cpl	192.40	J/molxK	300.00	NIST Webbook
cpl	215.30	J/molxK	298.15	NIST Webbook
cpl	215.30	J/molxK	298.15	NIST Webbook
cps	150.20	J/molxK	210.00	NIST Webbook
dvisc	0.0006337	Paxs	288.15	Density, Excess Molar Volume, and Viscosity for the Methyl Methacrylate + 1-Butyl-3-methylimidazolium Hexafluorophosphate Ionic Liquid Binary System at Atmospheric Pressure
dvisc	0.0004100	Paxs	328.15	Excess Molar Volume and Viscosity Deviation for the Methanol + Methyl Methacrylate Binary System at T) (283.15 to 333.15) K
dvisc	0.0003938	Paxs	333.15	Excess Molar Volume and Viscosity Deviation for the Methanol + Methyl Methacrylate Binary System at T) (283.15 to 333.15) K
dvisc	0.0006808	Paxs	283.15	Density, Excess Molar Volume, and Viscosity for the Methyl Methacrylate + 1-Butyl-3-methylimidazolium Hexafluorophosphate Ionic Liquid Binary System at Atmospheric Pressure
dvisc	0.0004294	Paxs	323.15	Excess Molar Volume and Viscosity Deviation for the Methanol + Methyl Methacrylate Binary System at T) (283.15 to 333.15) K

dvisc	0.0005899	Paxs	293.15	Density, Excess Molar Volume, and Viscosity for the Methyl Methacrylate + 1-Butyl-3-methylimidazolium Hexafluorophosphate Ionic Liquid Binary System at Atmospheric Pressure
dvisc	0.0005540	Paxs	298.15	Density, Excess Molar Volume, and Viscosity for the Methyl Methacrylate + 1-Butyl-3-methylimidazolium Hexafluorophosphate Ionic Liquid Binary System at Atmospheric Pressure
dvisc	0.0005248	Paxs	303.15	Density, Excess Molar Volume, and Viscosity for the Methyl Methacrylate + 1-Butyl-3-methylimidazolium Hexafluorophosphate Ionic Liquid Binary System at Atmospheric Pressure
dvisc	0.0004956	Paxs	308.15	Density, Excess Molar Volume, and Viscosity for the Methyl Methacrylate + 1-Butyl-3-methylimidazolium Hexafluorophosphate Ionic Liquid Binary System at Atmospheric Pressure
dvisc	0.0004719	Paxs	313.15	Density, Excess Molar Volume, and Viscosity for the Methyl Methacrylate + 1-Butyl-3-methylimidazolium Hexafluorophosphate Ionic Liquid Binary System at Atmospheric Pressure

dvisc	0.0004497	Paxs	318.15	Excess Molar Volume and Viscosity Deviation for the Methanol + Methyl Methacrylate Binary System at T) (283.15 to 333.15) K
dvisc	0.0004294	Paxs	323.15	Density, Excess Molar Volume, and Viscosity for the Methyl Methacrylate + 1-Butyl-3-methylimidazolium Hexafluorophosphate Ionic Liquid Binary System at Atmospheric Pressure
dvisc	0.0004100	Paxs	328.15	Density, Excess Molar Volume, and Viscosity for the Methyl Methacrylate + 1-Butyl-3-methylimidazolium Hexafluorophosphate Ionic Liquid Binary System at Atmospheric Pressure
dvisc	0.0003938	Paxs	333.15	Density, Excess Molar Volume, and Viscosity for the Methyl Methacrylate + 1-Butyl-3-methylimidazolium Hexafluorophosphate Ionic Liquid Binary System at Atmospheric Pressure
dvisc	0.0003636	Paxs	343.15	Density, Excess Molar Volume, and Viscosity for the Methyl Methacrylate + 1-Butyl-3-methylimidazolium Hexafluorophosphate Ionic Liquid Binary System at Atmospheric Pressure

dvisc	0.0003398	Paxs	353.15	Density, Excess Molar Volume, and Viscosity for the Methyl Methacrylate + 1-Butyl-3-methylimidazolium Hexafluorophosphate Ionic Liquid Binary System at Atmospheric Pressure
dvisc	0.0004719	Paxs	313.15	Excess Molar Volume and Viscosity Deviation for the Methanol + Methyl Methacrylate Binary System at T) (283.15 to 333.15) K
dvisc	0.0004956	Paxs	308.15	Excess Molar Volume and Viscosity Deviation for the Methanol + Methyl Methacrylate Binary System at T) (283.15 to 333.15) K
dvisc	0.0005248	Paxs	303.15	Excess Molar Volume and Viscosity Deviation for the Methanol + Methyl Methacrylate Binary System at T) (283.15 to 333.15) K
dvisc	0.0005540	Paxs	298.15	Excess Molar Volume and Viscosity Deviation for the Methanol + Methyl Methacrylate Binary System at T) (283.15 to 333.15) K
dvisc	0.0006337	Paxs	288.15	Excess Molar Volume and Viscosity Deviation for the Methanol + Methyl Methacrylate Binary System at T) (283.15 to 333.15) K

dvisc	0.0005899	Paxs	293.15	Excess Molar Volume and Viscosity Deviation for the Methanol + Methyl Methacrylate Binary System at T) (283.15 to 333.15) K
dvisc	0.0004497	Paxs	318.15	Density, Excess Molar Volume, and Viscosity for the Methyl Methacrylate + 1-Butyl-3-methylimidazolium Hexafluorophosphate Ionic Liquid Binary System at Atmospheric Pressure
dvisc	0.0006808	Paxs	283.15	Excess Molar Volume and Viscosity Deviation for the Methanol + Methyl Methacrylate Binary System at T) (283.15 to 333.15) K
hfust	12.24	kJ/mol	225.00	NIST Webbook
hfust	12.24	kJ/mol	225.00	NIST Webbook
hfust	14.44	kJ/mol	225.59	NIST Webbook
hfust	13.45	kJ/mol	225.50	NIST Webbook
hsubt	60.70	kJ/mol	208.50	NIST Webbook
hvapt	37.90	kJ/mol	333.00	NIST Webbook
hvapt	33.30 ± 0.40	kJ/mol	340.50	NIST Webbook
hvapt	36.30 ± 0.20	kJ/mol	340.50	NIST Webbook
hvapt	38.80 ± 0.10	kJ/mol	340.50	NIST Webbook
hvapt	38.00	kJ/mol	339.00	NIST Webbook
hvapt	37.70	kJ/mol	333.00	NIST Webbook
hvapt	39.00	kJ/mol	337.00	NIST Webbook
rhoI	926.15	kg/m3	308.15	Densities, ultrasonic speeds, viscosities and excess properties of binary mixtures of methyl methacrylate with N,N-dimethylformamide and N,N-dimethylacetamide at different temperatures



rhoI	937.63	kg/m3	298.15	Volumetric Properties of 3-Methylbutyl Ethanoate with Ethyl Acrylate, Butyl Acrylate, Methyl Methacrylate, and Styrene at 25 C
rhoI	949.10	kg/m3	288.15	Densities, ultrasonic speeds, viscosities and excess properties of binary mixtures of methyl methacrylate with N,N-dimethylformamide and N,N-dimethylacetamide at different temperatures
rhoI	943.37	kg/m3	293.15	Densities, ultrasonic speeds, viscosities and excess properties of binary mixtures of methyl methacrylate with N,N-dimethylformamide and N,N-dimethylacetamide at different temperatures
rhoI	937.63	kg/m3	298.15	Densities, ultrasonic speeds, viscosities and excess properties of binary mixtures of methyl methacrylate with N,N-dimethylformamide and N,N-dimethylacetamide at different temperatures
rhoI	914.67	kg/m3	318.15	Densities, ultrasonic speeds, excess and partial molar properties of binary mixtures of acetonitrile with some alkyl methacrylates at temperatures from 293.15 K to 318.15 K

rhoI	920.42	kg/m3	313.15	Densities, ultrasonic speeds, excess and partial molar properties of binary mixtures of acetonitrile with some alkyl methacrylates at temperatures from 293.15 K to 318.15 K
rhoI	926.16	kg/m3	308.15	Densities, ultrasonic speeds, excess and partial molar properties of binary mixtures of acetonitrile with some alkyl methacrylates at temperatures from 293.15 K to 318.15 K
rhoI	931.90	kg/m3	303.15	Densities, ultrasonic speeds, excess and partial molar properties of binary mixtures of acetonitrile with some alkyl methacrylates at temperatures from 293.15 K to 318.15 K
rhoI	937.64	kg/m3	298.15	Densities, ultrasonic speeds, excess and partial molar properties of binary mixtures of acetonitrile with some alkyl methacrylates at temperatures from 293.15 K to 318.15 K
rhoI	943.38	kg/m3	293.15	Densities, ultrasonic speeds, excess and partial molar properties of binary mixtures of acetonitrile with some alkyl methacrylates at temperatures from 293.15 K to 318.15 K

rhoI	914.66	kg/m3	318.15	Densities, ultrasonic speeds, viscosities and excess properties of binary mixtures of methyl methacrylate with N,N-dimethylformamide and N,N-dimethylacetamide at different temperatures
rhoI	920.41	kg/m3	313.15	Densities, ultrasonic speeds, viscosities and excess properties of binary mixtures of methyl methacrylate with N,N-dimethylformamide and N,N-dimethylacetamide at different temperatures
rhoI	931.89	kg/m3	303.15	Densities, ultrasonic speeds, viscosities and excess properties of binary mixtures of methyl methacrylate with N,N-dimethylformamide and N,N-dimethylacetamide at different temperatures
rhoI	937.65	kg/m3	298.15	Densities and volumes of mixing of the ternary system toluene + butyl acrylate + methyl methacrylate and its binaries at 298.15 K
sfust	64.00	J/molxK	225.59	NIST Webbook
sfust	59.65	J/molxK	225.50	NIST Webbook

speedsl	1181.00	m/s	298.15	Densities, Excess Molar Volumes at T = (298.15 to 313.15) K, Speeds of Sound, Excess Isentropic Compressibilities, Relative Permittivities and Deviations in Molar Polarizations at T = (298.15 and 308.15) K for Methyl Methacrylate + 2-Butoxyethanol or + Dibutyl Ether + Benzene, + Toluene and + p-Xylene
speedsl	1152.00	m/s	308.15	Densities, Speeds of Sound, Excess Molar Volumes, and Excess Isentropic Compressibilities at T = (298.15 and 308.15) K for Methyl Methacrylate + 1-Alkanols (1-Butanol, 1-Pentanol, and 1-Heptanol) + Cyclohexane, + Benzene, + Toluene, + p-Xylene, and + Ethylbenzene
speedsl	1182.00	m/s	298.15	Densities, Speeds of Sound, Excess Molar Volumes, and Excess Isentropic Compressibilities at T = (298.15 and 308.15) K for Methyl Methacrylate + 1-Alkanols (1-Butanol, 1-Pentanol, and 1-Heptanol) + Cyclohexane, + Benzene, + Toluene, + p-Xylene, and + Ethylbenzene

speeds	1153.00	m/s	308.15	Densities, Excess Molar Volumes at T = (298.15 to 313.15) K, Speeds of Sound, Excess Isentropic Compressibilities, Relative Permittivities and Deviations in Molar Polarizations at T = (298.15 and 308.15) K for Methyl Methacrylate + 2-Butoxyethanol or + Dibutyl Ether + Benzene, + Toluene and + p-Xylene
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## Correlations

Information	Value
Property code	pvap
Equation	$\ln(P_{vp}) = A + B/T + C \cdot \ln(T) + D \cdot T^2$
Coeff. A	1.28053e+02
Coeff. B	-8.95480e+03
Coeff. C	-1.71457e+01
Coeff. D	1.47176e-05
Temperature range (K), min.	224.95
Temperature range (K), max.	564.00

## Sources

McGowan Method: <http://link.springer.com/article/10.1007/BF02311772>

NIST Webbook: <http://webbook.nist.gov/cgi/cbook.cgi?ID=C80626&Units=SI>

Densities, Excess Molar Volumes at T = (298.15 to 313.15) K, Speeds of Sound, Excess Isentropic Compressibilities, Relative Permittivities and Deviations in Molar Polarizations at T = (298.15 and 308.15) K for Methyl Methacrylate + 2-Butoxyethanol or + Dibutyl Ether + Benzene, + Toluene and + p-Xylene: <https://www.doi.org/10.1021/je034022n>

Liquid-Liquid Equilibria for the Ternary Systems Water + Ethanol + Methanol: <https://www.doi.org/10.1021/je700118q>

Densities, Excess Molar Volumes at T = (298.15 to 313.15) K, Speeds of Sound, Excess Isentropic Compressibilities, Relative Permittivities and Deviations in Molar Polarizations at T = (298.15 and 308.15) K for Methyl Methacrylate + 2-Butoxyethanol or + Dibutyl Ether + Benzene, + Toluene and + p-Xylene: <https://www.doi.org/10.1016/j.jct.2013.01.013>

Excess Molar Volumes at T = (298.15 to 313.15) K, Speeds of Sound, Excess Isentropic Compressibilities, Relative Permittivities and Deviations in Molar Polarizations at T = (298.15 and 308.15) K for Methyl Methacrylate + 2-Butoxyethanol or + Dibutyl Ether + Benzene, + Toluene and + p-Xylene: <https://www.doi.org/10.1021/je3010535>

Excess Molar Volumes at T = (298.15 to 313.15) K, Speeds of Sound, Excess Isentropic Compressibilities, Relative Permittivities and Deviations in Molar Polarizations at T = (298.15 and 308.15) K for Methyl Methacrylate + 2-Butoxyethanol or + Dibutyl Ether + Benzene, + Toluene and + p-Xylene: <https://www.doi.org/10.1021/je049639z>

Liquid-Liquid Equilibria at High Pressures: <https://www.doi.org/10.1016/j.fluid.2011.07.008>

Liquid-Liquid Equilibria for systems of water + methanol + methyl anthranilate at several temperatures:

Phase Behavior Studies of 2-Hydroxyethyl Methacrylate and Methyl Methacrylate with Water + 2-Butanol or Methyl Methacrylate or Butyl Methacrylate or Isobutyl Methacrylate at 288.15K and 318.15K. Excess Molar Volumes, Excess Enthalpies, Excess Compressibilities, Densities of 290.15 and 300.15K for Methyl Methacrylate, Butyl Methacrylate, Isobutyl Methacrylate, and 2-Butanol in the Methyl Methacrylate and 2-Butanol + 2-Ethylchloroethane, Benzene, 1-Pentene, methylcyclohexane, Hexahydrozincophosphate Ionic Liquid Binary System at a Mesomorphic Method: Pressures and volumes of mixing of the ternary system toluene + butyl acrylate. Density-molar masses, densities, excesses and partial molar properties of binary mixtures of acrylonitrile with some alkyl methacrylates at temperatures from 298.15 to 318.15K. Salinity and temperature on the solubility of organic compounds. Liquid equilibria of water + 1-butanol + methyl methacrylate or 2-pentanol + methyl methacrylate or isobutyl methacrylate at 288.15K and 318.15K: Densities, speeds of sound and excess properties of (benzonitrile + methyl methacrylate, toluene + methyl methacrylate, dioxane + methyl methacrylate, and benzene + methyl methacrylate) and (benzonitrile + 2-pentanol, toluene + 2-pentanol, 1-propanol + methyl methacrylate, butyl methacrylate, and isobutyl methacrylate):

<https://www.doi.org/10.1021/je700272v>

<https://www.doi.org/10.1021/ie7002572>

<https://www.doi.org/10.1021/je100652b>

<https://www.doi.org/10.1007/s10765-005-5571-9>

<https://www.doi.org/10.1021/je900091b>

<https://www.chemic.org/files/research/kdb/mol/mol1171.mol>

<http://onschallenge.wikispaces.com/file/view/AqueousDataset002.xlsx/351826032/AqueousDataset002.xlsx>

<https://www.doi.org/10.1016/j.jct.2006.05.012>

<https://www.doi.org/10.1016/j.jct.2018.03.013>

[https://en.wikipedia.org/wiki/Joback\\_method](https://en.wikipedia.org/wiki/Joback_method)

<https://www.doi.org/10.1016/j.jct.2011.11.020>

<https://www.doi.org/10.1016/j.fluid.2007.07.011>

<http://pubs.acs.org/doi/abs/10.1021/cj990307I>

<https://www.doi.org/10.1016/j.ijct.2018.12.031>

<https://www.doi.org/10.1021/ie800164w>

<https://www.doi.org/10.1016/j.fluid.2007.05.018>

<https://www.cheric.org/research/kdb/hcprop/showprop.php?cmpid=1171>

## Legend

<b>affp:</b>	Proton affinity
<b>basg:</b>	Gas basicity
<b>chl:</b>	Standard liquid enthalpy of combustion
<b>cpg:</b>	Ideal gas heat capacity
<b>cpl:</b>	Liquid phase heat capacity
<b>cps:</b>	Solid phase heat capacity
<b>dvisc:</b>	Dynamic viscosity
<b>gf:</b>	Standard Gibbs free energy of formation
<b>hf:</b>	Enthalpy of formation at standard conditions
<b>hfl:</b>	Liquid phase enthalpy of formation at standard conditions
<b>hfus:</b>	Enthalpy of fusion at standard conditions
<b>hfust:</b>	Enthalpy of fusion at a given temperature
<b>hsubt:</b>	Enthalpy of sublimation at a given temperature
<b>hvap:</b>	Enthalpy of vaporization at standard conditions
<b>hvapt:</b>	Enthalpy of vaporization at a given temperature
<b>ie:</b>	Ionization energy
<b>log10ws:</b>	Log10 of Water solubility in mol/l
<b>logp:</b>	Octanol/Water partition coefficient
<b>mcvol:</b>	McGowan's characteristic volume
<b>pc:</b>	Critical Pressure
<b>pvap:</b>	Vapor pressure

<b>rho:</b>	Liquid Density
<b>rinpol:</b>	Non-polar retention indices
<b>ripol:</b>	Polar retention indices
<b>sfust:</b>	Entropy of fusion at a given temperature
<b>sl:</b>	Liquid phase molar entropy at standard conditions
<b>speedsl:</b>	Speed of sound in fluid
<b>tb:</b>	Normal Boiling Point Temperature
<b>tc:</b>	Critical Temperature
<b>tf:</b>	Normal melting (fusion) point
<b>tt:</b>	Triple Point Temperature
<b>vc:</b>	Critical Volume

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