

# N-BUTYL METHACRYLATE

## PRODUCT IDENTIFICATION

CAS NO.	97-88-1
EINECS NO.	202-615-1
FORMULA	$\text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{COO}(\text{CH}_2)_3\text{CH}_3$
MOL WT.	142.20
H.S. CODE	2916.14
TOXICITY	Oral rat LD50: > 2000 mg/kg
SYNONYMS	2-Methyl-2-Propenoic Acid Butyl Ester;

Butyl 2-Methyl-2-Propenoate; 2-Methyl butyl acrylate; Butil Metacrilato (Italian); Butyl 2-methyl-2-propenoate; 2-Methyl-butylacrylaat (Dutch); BMA; 2-methyl-butylacrylat (German); Butylmethacrylaat (Dutch); Methacrylate Butyle (French); Methacrylsaeurebutylester (German);

## DERIVATION

## CLASSIFICATION

## PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	clear liquid
MELTING POINT	-75 C
BOILING POINT	160 - 163.5 C
SPECIFIC GRAVITY	0.896
SOLUBILITY IN WATER	Insoluble
pH	
VAPOR DENSITY	4.9
AUTOIGNITION	290 C
NFPA RATINGS	
REFRACTIVE INDEX	1.4230
FLASH POINT	46 C
STABILITY	The stability depends upon dissolved oxygen and MEHQ inhibitor. The presence of oxygen is necessary for inhibitor to prevent polymerization.

## APPLICATIONS

Acrylic acid is the simplest unsaturated carboxylic acid which has double bond and carboxyl group in C3 or molecule with the formula  $\text{CH}_2=\text{CHCOOH}$ . The vinyl group is attached to the carbonyl carbon directly. The systemic name is 2-propenoic acid. Acrylic acid has two reaction points or functional groups required for polymerization process. Purified (glacial) acrylic acid is a clear, colorless liquid with a characteristic acrid odor, miscible with water, alcohols and ethers. Acrylic acid is produced from C 3 refinery. Acrylic acid undergoes the typical reactions of a carboxylic acid and forms acrylic esters - basic alkyl esters are methyl, butyl, ethyl acrylate and 2-ethylhexyl acrylate. Acrylic acid and its esters undergo the reactions of the double bond which readily combine with themselves or other monomers (e.g amides, methacrylates, acrylonitrile, vinyl, styrene and butadiene) to form homopolymers or co-polymers which are used in the production of coatings, adhesives, elastomers, super absorbent polymers, flocculants, as well as fibres and plastics. Acrylate polymers show a wide range of properties dependent on the type of the monomers and reaction conditions.

Alkyl acrylates are clear, volatile liquid; slightly soluble in water and completely soluble in alcohols, ethers and almost organic solvents; Acrylate esters containing a double bond and functional carboxyl group are used as a monomer or co-monomer in making acrylic and modacrylic fibres. It is used in formulating paints and dispersions for paints, inks, and adhesives. It is used in making cleaning products, antioxidant agents, amphoteric surfactants. It is used in making aqueous resins and dispersions for textiles and papers. Methyl acrylate also used



making vitamin B1.

	Methyl acrylate	Ethyl acrylate	Butyl acrylate	2-Ethylhexyl acrylate
CAS RN	96-33-3	140-88-5	141-32-2	103-11-7
Formula (MW)	$\text{CH}_2=\text{CHCOOCH}_3$	$\text{CH}_2=\text{CHCOOCH}_2\text{CH}_3$	$\text{CH}_2=\text{CHCOO}(\text{CH}_2)_3\text{CH}_3$	$\text{CH}_2=\text{CHCOO}(\text{CH}_2)_5\text{CH}_3$
Mole Weight	86.09	100.12	128.17	184.28
Specific Gravity	0.9567	0.923	0.9015	0.887
Viscosity cP (20 C)	0.49	0.6	0.9	1.7
Boiling Point C at 760 mm Hg	79.6	100	147	216 C (Decompose)
Melting Point C	< -75	-72	-64	-90
Solubility in water	slightly soluble 30 - 60 (g/l)	slightly soluble (15 g/l)	Slightly soluble (2-7 g/l)	negligible

Methyl methacrylate (MMA) is ester of the unsaturated C4 carboxylic acid. The term of metha indicates an additional methyl group attached to the alpha carbon of acrylic acid. Methyl methacrylate is a flammable, colorless liquid; melting at -48 C, boiling at 101 C, soluble in the most organic solvents but insoluble in water. It is prepared by the esterification of methacrylamide sulfate with methanol. (The reaction of acetone and hydrogen cyanide forms acetone cyanohydrin, which is further treated with sulfuric acid to produce methacrylamide sulfate). Ammonium bisulfate is a byproduct. MMA is produced commercially also from C4 route (isobutylene and tert-butyl alcohol) through two oxidation process. This process don't need sulphuric acid and no acidic products. MMA is the monomer to make polymethyl methacrylate (PMMA) used as a shatterproof replacement for glass. It is a key ingredient in the production of cast and extruded acrylic sheet, acrylic emulsions, molding powders and extrusion resins. Polymers and copolymers of methyl methacrylate are also used in undissolved surface coatings, adhesives, sealants, impact modifiers, emulsion polymers, surgical bone cements, packaging applications, vinyl siding and other construction materials.

Acrylics including (meth)acrylic acids, acrylic esters, and acrylic compounds containing reactive halogens, nitriles, and amide groups are versatile monomers forming any class of hard, soft, resilient and transparent synthetic plastics or resins and viscous oils by varying the starting materials and the polymerization processes. The monomer can be either homopolymerized or be copolymerized with other type monomers capable of being polymerized. The resultant homopolymers can provide abundance hydrophilic property groups. Copolymers may be either hydrophilic or hydrophobic. Sodium acrylate is copolymerized with acrylamide to make an anionic copolymer used as a flocculant in water treatment. Acrylic esters copolymers with minor amounts of another functional monomer containing a reactive halogen or ethylenically unsaturated ester can form inter-linked polymer chains that display good heat and oil resistance. Homopolymers and copolymers have a variety of industrial applications including;

- Plastics
- Textiles
- Thickening Agents
- Dispersing Agents
- Surfactants
- Chelating Agents
- Adhesives
- Water-based coatings

- Water Treatment

n-Butyl Methacrylate is a base material for coatings and adhesives. It is used in resins, solvent, coatings, adhesive, oil additives, dental products, textile emulsions, leather and paper finishing.

#### SALES SPECIFICATION

APPEARANCE	clear liquid
PURITY	99.0% max
COLOR, APHA	20 max
FREE ACID	0.005% max
WATER	0.1% max
INHIBITOR	25ppm (Monomethyl Ether Hydroquinone)

#### TRANSPORTATION

PACKING	180kgs in drum
HAZARD CLASS	3 (Packing Group: III)
UN NO.	2227

#### REMARKS