Unsaturated monocarboxylic acid, for manufacturing polymers and for use as a feedstock for syntheses.

**Structural formula**  
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\begin{align*}
\text{C}_3\text{H}_4\text{O}_2
\end{align*}
\]

**Product specification**

- Assay (Gas chromatography) % 99.5 (min.)
- Water content (ASTM E 203) % 0.1 (max.)
- Diacrylic acid content on despatch (gas chromatography) ppm 2000 (max.)
- Color on despatch (APHA, ASTM D 1209) 20 (max.)
- Standard stabilization ppm MEHQ 200 ± 20

**Other properties**

- Appearance clear, colorless
- Physical form liquid at >13°C
- Odor pungent
- Density at 25°C g/cm³ 1.046
- Refractive index n₂₀ at 20°C 1.418-1.422
- Boiling point °C 141
- Freezing point °C ca. 13
- Viscosity @ 20°C mPa•s 1.3
- Specific heat of liquid at 20°C kJ/kg°C 2.05
- Heat of evaporation at boiling point kJ/kg 634
- Heat of polymerization kJ/kg 1079
- Heat of combustion at 25°C kJ/kg 19085
- Vapor pressure at 20°C mbar 3.8
- Temperature rating for electrical equipment (VPE 170/171) °C T 2 (300-450)
Applications

Acrylic acid is an unsaturated carboxylic acid. It reacts as a vinyl compound and as a carboxylic acid. It readily undergoes polymerization and addition reactions. It can be used as a carboxylic acid to produce acylic esters, acrylamide, N-substituted acrylamides and acrylyl chloride by common methods.

Copolymers can be produced with acrylic and methacrylic esters, acrylonitrile, maleic acid esters, vinyl acetate, vinyl chloride, vinylidene chloride, styrene, butadiene and ethylene.

Homopolymers of acrylic acid and copolymers which contain a preponderance of acrylic acid have a glassy consistency and are frequently soluble in water. They can be used in the form of their free acids and ammonium and alkali salts in many different applications, such as thickeners, dispersing agents, flocculants, protective colloids for stabilizing emulsions and polymer dispersions, wetting agents, coatings and textile finishes.

Acrylic acid readily undergoes addition reactions with a wide variety of organic and inorganic compounds. This makes it a very useful feedstock for the production of many low molecular compounds. For instance, acrylic acid can be used to produce derivatives of propionic acid with water, alcohols, amines, halogens and chlorinated hydrocarbons. It can also be used with other substances to produce unsaturated fatty acids, heterocyclic compounds and Diels-Alder addition products.

Processing

Acrylic acid polymerizes very readily. It is generally stabilized with 200 ppm of hydroquinone monomethyl ether (MEHQ). It is only supplied in its stabilized form, because it can polymerize with explosive violence if it is not stabilized. It is not usually necessary to remove the stabilizer because its action can be compensated for by adding an excess of initiator.

Safety

General

The usual safety precautions when handling chemicals must be observed. These include the measures described in Federal, State and Local health and safety regulations, thorough ventilation of the workplace, good skin care and wearing of protective goggles.

Material Safety Data Sheet

A Material Safety Data Sheet has been compiled for acrylic acid glacial that contains up-to-date information on all concerns relevant to safety.

Industrial Hygiene

Refer to the Material Safety Data Sheet for information regarding industrial hygiene.

Labelling

Refer to the Material Safety Data Sheet for information regarding labeling.
Storage and Handling

In order to prevent polymerization, glacial acrylic acid must always be stored under air, and never under inert gases. The presence of oxygen is required for the stabilizer to function effectively. Glacial acrylic acid must be stored between 15 and 25°C. Under these conditions, a storage stability of one year can be expected. However, diacrylic acid is formed during storage which cannot be prevented by any chemical additives. Diacrylic acid may affect the performance of acrylic acid in some applications. In order to minimize the likelihood of overstorage, the storing procedure should strictly follow the “first-in-first-out” principle. For extended storage periods over four weeks, it is advisable to replenish the dissolved oxygen content.

To prevent freezing, the temperature of acrylic acid should never drop below 15°C. Improper thawing can result in violent polymerisation. Do not attempt to thaw frozen or partially frozen acrylic acid unless you have received prior approval from your supplier.

For more detailed information, please consult also the brochure “SAFE HANDLING AND STORAGE OF ACRYLIC ACID” of EBAM.

Important

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