

## Glacial Acetic Acid

### Product Quality, Regulatory & Technical Information Package

Status: 11. October 2021

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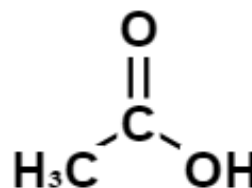
**Product Name:** Glacial Acetic Acid (technical grade)

**Chemical Name:** Acetic Acid

**CAS number:** 64-19-7

**Celanese (bulk) Material number:** 50000501 (Glacial Acetic Acid - Global)

51009356 (Glacial Acetic Acid for Industrial Use - China)



*Blends of the Product with water are available from Celanese.*

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## Disclaimer

Celanese is supplying Glacial Acetic Acid as a technical grade product.

This document provides information about technical grade Acetic Acid ("Product") produced by Celanese and its affiliates ("Celanese" or "we"). The information presented in this document is based on our present state of knowledge and is intended to provide general notes on the Product and its intended uses. It does not constitute a guarantee of any specific properties of the Products described herein or its suitability for a particular application. The customer must make the sole determination whether the Product is suitable for the desired use. Celanese undertakes no obligation to update the information in this document.

The practice of providing this information to customers is for their convenience and is not legally binding. It does not alter the terms and conditions of sale, including without limitation, any limits of liability, applicable to the underlying commercial transaction involving the Product(s) to which this information applies. The Information is intended for use by persons having skill with respect to the subject matter involved.

Celanese makes no warranties, express or implied, and assumes no liability for the accuracy or completeness or in connection with any use of this information. Nothing herein is intended as a license to operate under or a recommendation to infringe any patents.

## General

Further literature to the Product, such as Safety Data Sheet, Brochures and Specifications can be retrieved from Celanese website [www.celanese.com](http://www.celanese.com).

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## Glacial Acetic Acid

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#### Product Description

Acetic Acid is a clear, colorless liquid with an acrid taste and a pungent, vinegar-like odor. It is miscible in all proportions with water, ethyl alcohol, ether and other organic solvents, but is insoluble in carbon disulfide.

Acetic Acid is very corrosive and may react quickly, under certain conditions, resulting in rapid evolution of heat. Acetic Acid is stable under recommended storage conditions. Acetic Acid will burn when heated or exposed to an ignition source. It is one of the most important large-volume, synthetic organic acids.

The major use for Acetic Acid is as a raw material for vinyl acetate, produced by reaction with ethylene and oxygen. Vinyl acetate is in turn the raw material for polyvinyl acetate, an important polymer used in paints, adhesives, plastics and textile finishes.

Another important use for Acetic Acid is as a raw material for Acetic Anhydride. This chemical is principally used as an intermediate for cellulose acetate fibers and plastics.

A third significant use for Acetic Acid is as a solvent in the production of Terephthalic Acid from para-Xylene. Terephthalic Acid is one of the major raw materials for polyester fiber and film.

Large quantities of Acetic Acid are used to manufacture esters such as Ethyl Acetate and Butyl Acetate. These solvents find general application in the lacquer, plasticizer and pharmaceutical fields.

Chloroacetic Acid is manufactured from Acetic Acid and Chlorine. The primary end use of Chloroacetic Acid is Sodium Carboxymethylcellulose (CMC). Chloroacetic Acid is the starting point for the production of a series of herbicides, prime examples of which are 2,4-Dichloro-phenoxyacetic Acid and the iso-propyl ester of 2,4,5-Trichlorophenoxyacetic acid.

Textile finishing operations require considerable quantities of Acetic Acid. Acetic Acid is also used in the production of Sorbic Acid, various dyestuffs and pigments.

Other products made from Acetic Acid are salts of Acetic Acid and various rubber and photographic chemicals.

## Glacial Acetic Acid

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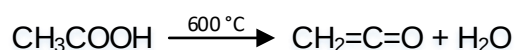
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Acetic Acid is a versatile chemical. The following reactions are typical:

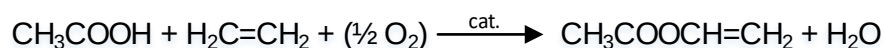
1. Anhydride Formation



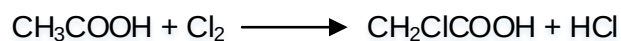
2. Ketene Formation



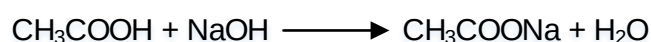
3. Vinyl Acetate Monomer



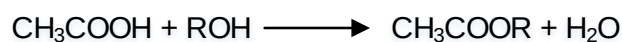
4. Halogenation



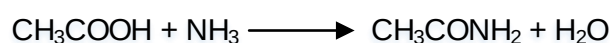
5. Salt Formation



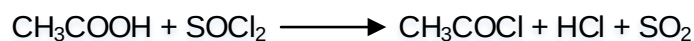
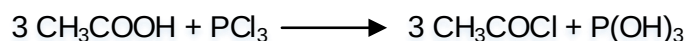
6. Ester Formation



7. Amide Formation



8. Acid Chloride Formation



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#### Physical properties

Data are intended for the purpose of product description and are not the subject of continuous monitoring. Further physical properties and characteristic data as well as information on safety and handling are listed in the material safety data sheet and the sales specifications. Please consult [www.celanese.com](http://www.celanese.com).

| <b>Property (Grade: 99/100 %)</b>                                                      |                  | <b>Metric Units</b> | <b>English Units</b>             |
|----------------------------------------------------------------------------------------|------------------|---------------------|----------------------------------|
| Autoignition Temperature                                                               |                  | 463 °C              | 865 °F                           |
| Boiling Point @ 101.3 kPa (14.69 psi)                                                  |                  | 118.1 °C            | 244.6 °F                         |
| Critical Pressure <sup>[1]</sup>                                                       |                  | 5.786 MPa           | 839.2 psia                       |
| Critical Temperature <sup>[1]</sup>                                                    |                  | 321.45 °C           | 610.6 °F                         |
| Dielectric Constant @20 °C (68 °F) <sup>[1]</sup>                                      |                  | 6.194 F/m           |                                  |
| Dissociation Constant @25 °C (77 °F) <sup>[3]</sup>                                    |                  | 4.76                |                                  |
| Evaporation Rate (n-Butyl Acetate = 1)                                                 |                  | 0.97                |                                  |
| Flash point <sup>[4]</sup><br>(EN ISO 2719 Method A –<br>Pensky Martens in closed cup) | Conc.: 100 vol % | 39.5 °C             | 103.1 °F                         |
|                                                                                        | Conc.: 95 vol %  | 44.5 °C             | 112.1 °F                         |
|                                                                                        | Conc.: 90 vol %  | 51 °C               | 123.8 °F                         |
|                                                                                        | Conc.: 85 vol %  | 54 °C               | 129.2 °F                         |
|                                                                                        | Conc.: 80 vol %  | 59 °C               | 138.2 °F                         |
|                                                                                        | Conc.: 40 vol %  | none                | none                             |
| Heat of Combustion                                                                     |                  | 14.4 MJ/kg          |                                  |
| Heat of Vaporization (@ boiling point, atmospheric) <sup>[2]</sup>                     |                  | 404.32 kJ/kg        | 173.9 Btu/lb <sub>m</sub>        |
| Liquid Specific Heat @19.4 °C (66.9 °F) <sup>[1]</sup>                                 |                  | 2.044 kJ/(kg*K)     | 0.4883 Btu/(lb <sub>m</sub> *°F) |
| Liquid Thermal Conductivity @ 20 °C (68 °F) <sup>[2]</sup>                             |                  | 0.161 W/(m*K)       | 0.0931 Btu/(hr*ft*°F)            |
| Molar mass                                                                             |                  | 60.05 g/mole        |                                  |
| Refractive Index n <sub>D</sub> <sup>20</sup>                                          |                  | 1.372               |                                  |
| Solubility @20 °C (68 °F) wt%, Acid in Water                                           |                  | Complete            |                                  |
| Solubility @20 °C (68 °F) wt%, Water in Acid                                           |                  | Complete            |                                  |
| Solubility in alcohol, benzene, diethylether, acetone                                  |                  | Complete            |                                  |
| Solubility in carbon disulfide <sup>[1]</sup>                                          |                  | Insoluble           |                                  |
| Surface Tension @25 °C (77 °F)                                                         |                  | 27.1 mN/m           |                                  |
| Vapor Pressure @ 20 °C (68 °F) <sup>[1]</sup>                                          |                  | 15.7 mbar           | 0.31 psia                        |
| Vapor Pressure @ 50 °C (122 °F)                                                        |                  | 77 mbar             | 1.12 psia                        |

## Glacial Acetic Acid

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| <i>Acetic Acid</i><br>[ % (w/w) ] | <i>Acetic Acid</i><br>[ g/l ] | <i>Acetic Acid</i><br>[ mole/l ] | <i>Density at 20 °C</i><br>(68 °F) <sup>[5]</sup><br>[ g/cm <sup>3</sup> ] | <i>Solidification point</i><br>[ °C ( °F) ] <sup>[6]</sup> | <i>Viscosity at 25 °C</i><br>(77 °F) <sup>[7]</sup><br>[ mPas ] |
|-----------------------------------|-------------------------------|----------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------|-----------------------------------------------------------------|
| 100                               | 1050                          | 17.48                            | 1.0491                                                                     | 16.63 (61.93)                                              | 1.0560                                                          |
| 99                                | 1042                          | 17.35                            | 1.0519                                                                     | 14.80 (58.64)                                              | 1.2477                                                          |
| 98                                | 1034                          | 17.22                            | 1.0540                                                                     | 13.40 (56.12)                                              | 1.3784                                                          |
| 97                                | 1025                          | 17.04                            | 1.0559                                                                     | 12.03 (53.65)                                              | 1.4976                                                          |
| 96                                | 1016                          | 16.92                            | 1.0577                                                                     | 10.69 (51.24)                                              | 1.6059                                                          |
| 95                                | 1007                          | 16.77                            | 1.0593                                                                     | 9.37 (48.87)                                               | 1.7042                                                          |
| 90                                | 959.5                         | 15.98                            | 1.0653                                                                     | 3.18 (37.72)                                               | 2.0638                                                          |
| 85                                | 908.6                         | 15.13                            | 1.0687                                                                     | -2.46 (27.57)                                              | 2.2518                                                          |
| 80                                | 856.0                         | 14.25                            | 1.0701                                                                     | -7.68 (18.18)                                              | 2.3211                                                          |
| 70                                | 748.0                         | 12.46                            | 1.0691                                                                     | -17.31 (0.84)                                              | 2.2532                                                          |
| 60                                | 638.5                         | 10.63                            | 1.0646                                                                     | -25.34 (-13.61)                                            | 2.0653                                                          |
| 50                                | 528.8                         | 8.81                             | 1.0575                                                                     | -20.04 (-4.07)                                             | 1.8510                                                          |
| 40                                | 419.5                         | 6.99                             | 1.0484                                                                     | -15.18 (4.68)                                              | 1.6408                                                          |
| 30                                | 311.5                         | 5.19                             | 1.0377                                                                     | -10.76 (12.63)                                             | 1.4376                                                          |
| 20                                | 205.3                         | 3.42                             | 1.0258                                                                     | -6.77 (19.81)                                              | 1.2400                                                          |
| 10                                | 101.3                         | 1.69                             | 1.0131                                                                     | -3.22 (26.20)                                              | 1.0539                                                          |
| 5                                 | 50.28                         | 0.84                             | 1.0061                                                                     | -1.61 (29.10)                                              | 0.9688                                                          |

| <i>Glacial Acetic Acid - Vapor Pressure</i> <sup>[1]</sup> |           |             |  |           |           |             |
|------------------------------------------------------------|-----------|-------------|--|-----------|-----------|-------------|
| T<br>(°C)                                                  | T<br>(°F) | P<br>(mbar) |  | T<br>(°C) | T<br>(°F) | P<br>(mbar) |
| 0                                                          | 32        | 4.7         |  | 150       | 302       | 2461        |
| 10                                                         | 50        | 8.5         |  | 160       | 320       | 3160        |
| 20                                                         | 68        | 15.7        |  | 170       | 338       | 4041        |
| 30                                                         | 86        | 26.5        |  | 180       | 356       | 5091        |
| 40                                                         | 104       | 45.3        |  | 190       | 374       | 6333        |
| 50                                                         | 122       | 74.9        |  | 200       | 392       | 7813        |
| 60                                                         | 140       | 117.7       |  | 210       | 410       | 9612        |
| 70                                                         | 158       | 182.8       |  | 220       | 428       | 11733       |
| 80                                                         | 176       | 269.4       |  | 230       | 446       | 14249       |
| 90                                                         | 194       | 390.4       |  | 240       | 464       | 17057       |
| 100                                                        | 212       | 555.3       |  | 250       | 482       | 20210       |
| 110                                                        | 230       | 776.7       |  | 260       | 500       | 23854       |
| 118.2                                                      | 245       | 1013        |  | 270       | 518       | 28077       |
| 130                                                        | 266       | 1386.5      |  | 280       | 536       | 32801       |
| 140                                                        | 284       | 1841.1      |  |           |           |             |

| <i>Glacial Acetic Acid - Liquid Density</i> <sup>[1]</sup> |           |                                 |  |           |           |                                 |
|------------------------------------------------------------|-----------|---------------------------------|--|-----------|-----------|---------------------------------|
| T<br>(°C)                                                  | T<br>(°F) | Density<br>(g/cm <sup>3</sup> ) |  | T<br>(°C) | T<br>(°F) | Density<br>(g/cm <sup>3</sup> ) |
| 20                                                         | 68        | 1.0491                          |  | 130       | 266       | 0.9235                          |
| 26                                                         | 79        | 1.0420                          |  | 139       | 282       | 0.9119                          |
| 34                                                         | 93        | 1.0324                          |  | 140       | 284       | 0.9092                          |
| 52                                                         | 126       | 1.0134                          |  | 145       | 293       | 0.9030                          |
| 60                                                         | 140       | 1.0060                          |  | 156       | 313       | 0.8889                          |
| 63                                                         | 145       | 1.0007                          |  | 180       | 356       | 0.8555                          |
| 75                                                         | 167       | 0.9875                          |  | 220       | 428       | 0.7941                          |
| 85                                                         | 185       | 0.9761                          |  | 260       | 500       | 0.7136                          |
| 97                                                         | 207       | 0.9611                          |  | 300       | 572       | 0.5950                          |
| 100                                                        | 212       | 0.9599                          |  | 320       | 608       | 0.4615                          |
| 107                                                        | 225       | 0.9506                          |  | 321       | 610       | 0.3506                          |
| 117                                                        | 243       | 0.9391                          |  |           |           |                                 |

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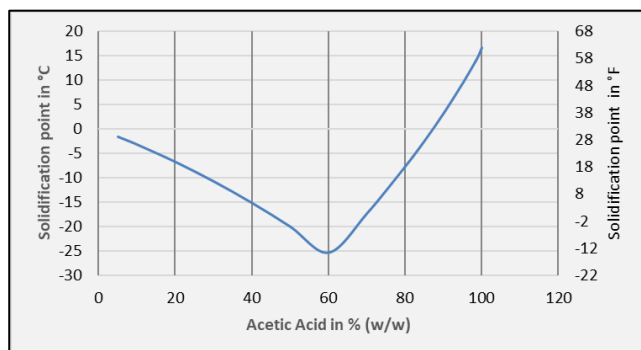


Figure 1: Solidification Point as a function of Acetic Acid concentration (blends with water)

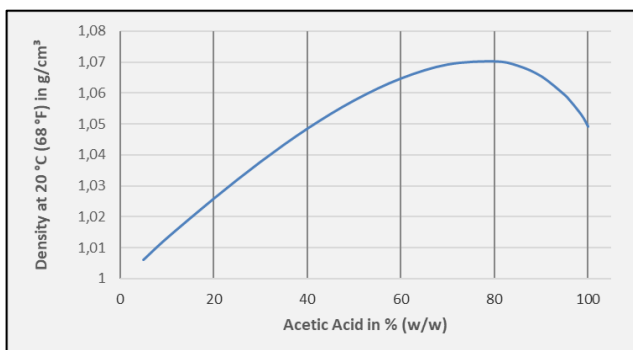


Figure 2: Density as a function of Acetic Acid concentration (blends with water)

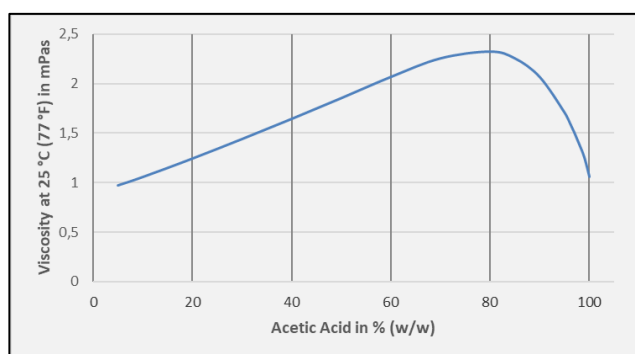


Figure 5: Viscosity as a function of Acetic Acid concentration (blends with water)

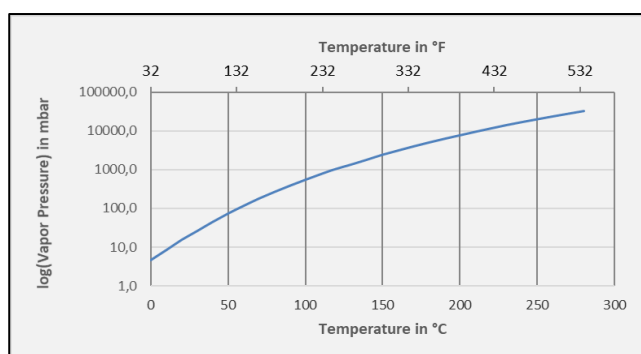


Figure 4: Vapor Pressure (log) as a function of Temperature (Glacial Acetic Acid)

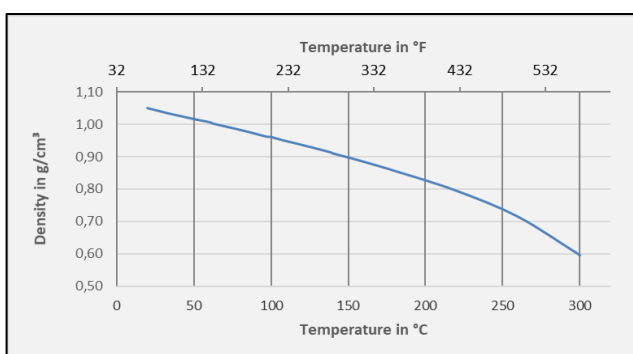


Figure 3: Density as a function of Temperature (Glacial Acetic Acid)

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## Storage and Handling Recommendations

### Storage

|                         |                                                 |
|-------------------------|-------------------------------------------------|
| Recommended Blanketing  | Air <sup>a,b</sup> or Dry Nitrogen <sup>c</sup> |
| Recommended Temperature |                                                 |
| Maximum (Glacial)       | 100°F (37.8°C)                                  |
| Minimum (Glacial)       | 65°F (18.3°C)                                   |
| Minimum (56 %)          | 0°F (-17.8°C)                                   |
| Minimum (70%)           | 10°F (-12°C)                                    |
| Minimum (84%)           | 32°F (0°C)                                      |
| Recommended pressure    | Atmospheric                                     |
| Bulk Quantities         | Outside, detached tanks                         |
| Small Containers        | Cool, dry, well ventilated area                 |

- Refer to National Fire Protection Agency (NFPA) #77 "Static Electricity" or the respective national technical code for proper electrical grounding procedures.
- See the National Fire Protection Agency (NFPA) #30 "Flammable and Combustible Liquids Code" or the respective national technical code and consult with qualified fire protection specialists to determine specific storage tank design requirements.
- Blanketing may be used to retain quality in long-term storage conditions.

### Handling

- Thoroughly review Material Safety Data Sheet before handling product.
- Protect small containers from physical damage. Keep containers closed when not in use. Open containers slowly to allow any excess pressure to vent.
- Keep away from heat, sparks, flame or other sources of ignition. Use spark-resistant tools.
- See the National Fire Protection Agency (NFPA) #30 "Flammable and Combustible Liquids Code" or the respective national technical code and consult with qualified fire protection specialists to determine specific storage tank design requirements.
- Use proper electrical grounding and bonding procedures when loading, unloading and transferring. Refer to the National Fire Protection Agency (NFPA) #77 "Recommended Practice for Static Electricity" or the respective national technical code for proper electrical grounding procedures.
- Electrical equipment and circuits in all storage and handling areas must conform to requirements of national electrical code (Articles 500 and 501) or the respective national technical code for hazardous location.
- Blanketing may be used to retain quality in long-term storage conditions.
- For further information on safety and handling, please use the following link:  
<http://www.celanese.com/msds/>

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#### Packaging

The following containers are suitable for handling and transportation of the Product:

- DOT 111A60AL1 or 111A100W6 Insulated Tank Cars
- DOT MC 307 or DOT 407 Tank Trucks
- IMO 1 ISO Tank
- Ship Tank and Barge

The Product is available from Celanese as bulk material.

Dilutions of the Product with demineralized water are available from Celanese as bulk material.

#### Materials of Construction

| <i>Unit / element</i> | <i>Acceptable Material</i>                                                                                        | <i>Alternate Material</i>                         |
|-----------------------|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| Tank                  | Stainless Steel <sup>a</sup>                                                                                      | Stainless Steel <sup>b</sup>                      |
| Piping                | Stainless Steel <sup>a</sup>                                                                                      | Stainless Steel <sup>b</sup>                      |
| Valves                | Stainless Steel <sup>a</sup>                                                                                      | Stainless Steel <sup>b</sup>                      |
| Pumps                 | Stainless Steel <sup>a</sup>                                                                                      | Stainless Steel <sup>b</sup>                      |
| Relief Valves         | Stainless Steel <sup>a</sup>                                                                                      | Alloy 20                                          |
| Gaskets               | Glass filled PTFE <sup>e</sup>                                                                                    | Graphite with Stainless Steel <sup>a</sup> Insert |
| Pump Seals            | Single Mechanical Seal:<br>Stainless Steel / Hastelloy C-276<br>metallic components <sup>c</sup> , Kalrez O-rings | –                                                 |
| Valve Packing         | PTFE <sup>e</sup>                                                                                                 | Graphite                                          |
| Pipe End Connections  | Butt welded and flanged system                                                                                    |                                                   |
| Heat Exchanger        | Product side:<br>Stainless Steel <sup>a, f</sup>                                                                  | Product side:<br>Stainless Steel <sup>b</sup>     |
| Hoses                 | Stainless Steel <sup>a</sup>                                                                                      | Stainless Steel <sup>b</sup>                      |
| Tank Truck            | Stainless Steel <sup>a, b</sup>                                                                                   | Aluminum <sup>d</sup>                             |
| Tank Car              | Stainless Steel <sup>a, b</sup>                                                                                   | Aluminum <sup>d</sup>                             |
| ISO Tank              | Stainless Steel <sup>a, b</sup>                                                                                   | –                                                 |
| Barge                 | Stainless Steel <sup>a, b</sup>                                                                                   | –                                                 |
| Ship Tank             | Stainless Steel <sup>a, b</sup>                                                                                   | –                                                 |

- Type 316, 316L/316 Dual Grade, or 2205 Stainless Steel
- Type 304 or 304/304 Dual Grade Stainless Steel when temperature does not exceed 140 °F (60 °C).
- Use Alloy-C-276 seal components for long service life.
- Use 3000, 5000, 6000 series Aluminum when temperature does not exceed 120 °F (49 °C).
- Polytetrafluoroethylene
- For higher than 150°F (65 °C) metal temperatures consult a metallurgist.

## Glacial Acetic Acid

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## Product Quality Statements

### *Manufacturing Locations*

The Product is produced at manufacturing locations in Clear Lake (USA), Nanjing (China) and Singapore.

- Clear Lake Plant  
9502 Bayport Blvd.  
Pasadena, TX 77507-1498  
USA
- Nanjing Plant  
No. 66, West Fangshui Road,  
Nanjing Jiangbei New Materials High-Tech Park,  
Jiangsu, China, 210047
- Singapore Plant  
21 Sakra Avenue  
Singapore 627883

### *ISO Certification*

The Product is a technical grade material produced under ISO 9001 rules. Certificates are available at Celanese web page (Select Filter "Intermediate Chemistry" and additional filters to retrieve the Certificate from the respective Manufacturing site):

<https://www.celanese.com/Certificate>

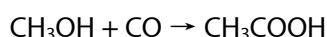
### *Specification*

The Product is supplied according to Celanese Sales Specification. A copy of the Sales Specification is attached to this dossier.

1. Celanese has a product traceability and withdrawal/recall program in place which we believe is appropriate for technical grade products.
2. The Product is not manufactured under GMP rules.
3. Celanese makes no nutrition statement.
4. There is no food or pharmaceutical grade hazard assessment program available for the Product.

### *Manufacturing Process & Raw Materials*

Acetic acid is produced by rhodium-catalyzed methanol carbonylation. In this process, methanol and carbon monoxide react to produce acetic acid according to the chemical equation:



The acetic acid is purified by distillation.

The Product is manufactured continuously using dedicated production units and closed equipment.

Celanese does not use raw materials of animal origin. During the manufacturing process, the material does not come into contact with materials of animal origin. The raw materials are fully synthetic.

## Glacial Acetic Acid

### Product Quality, Regulatory & Technical Information Package

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#### *Shelf Life*

The shelf life of the Product and its water blends is one year.

The shelf life dates from the date of packaging, and for bulk deliveries this is the date of loading. This period is in general applicable to material

- packaged in discrete containers such as drums or bulk containers and
- stored under conditions recommended by Celanese.

For the Product this entails storage at ambient temperatures in tightly sealed, undamaged containers in a cool and well-ventilated place under dry air or dry nitrogen blanket. Blanketing may be used to retain quality in long term storage conditions, especially to prevent access of humidity.

Most products will have a longer useful life, but should be examined by the owner at its sole responsibility at the end of the recommended storage life to determine purity and condition of product. Bulk storage life, under recommended storage conditions, may be longer if the Product is routinely monitored for specific indications of the condition of the material, or if the Product in the tank is removed and replenished with fresh material on a routine basis. Any use of the Product after expiration of the shelf life is the sole responsibility of the buyer.

#### *Kosher*

A Kosher grade is available in some countries. Special shipping arrangements must be made in advance. Contact your Sales Representative for more information.

#### *Halal*

A Halal grade is available in some countries. Special shipping arrangements must be made in advance. Contact your Sales Representative for more information.

#### *Residual Solvents (ICH Guideline)*

The Product does not, based on Celanese's knowledge, contain solvents in the concentration limits specified by the ICH Guideline Q3C(R6) for residual solvents.

The Product itself is defined as a class 3 solvent by the ICH Guideline for residual solvents.

#### *Radiation*

The Product is not subjected to any artificial radiation.

## Glacial Acetic Acid

### Product Quality, Regulatory & Technical Information Package

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## Regulatory Statements

The Product as of this date is not listed in the following regulations:

- Clean Water Act
- Clean Air Act
- CEPA List of Toxic Substances
- EPCRA Section 302
- Department of Homeland Security: Chemicals of Interest
- SARA 313
- California Proposition 65 (January 2020 list)
- Canada ERAP

The Product is not subject to Chemical Weapons Convention or Drug Precursor Substance reporting.

### *Animal Testing*

The Product was not subject of animal testing for cosmetic purposes by or on behalf of Celanese in order to meet the requirements of Regulation (EC) No 1223/2009 on cosmetic products.

As a chemical products manufacturer and importer, Celanese is required to participate in the chemical industry's efforts to ensure the protection of human health and the environment, and also has obligations under the REACH regulation (Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals).

Celanese practice is to extensively search internally and externally for existing toxicological information before initiating testing. Where existing information does not exist for relevant endpoints, a comprehensive effort will be made to avoid the use of animals by employing alternative methods. When other means have been exhausted and animal testing may be required to develop data to ensure the protection of health and the environment, scientifically sound techniques to reduce the numbers of animals will be used. All applicable animal welfare laws will be followed to ensure care and compassion are exercised.

### *BSE/TSE*

The Product is not derived from human or animal sources and thus we are not aware of any BSE/TSE.

### *Genetically Modified Organisms (GMO)*

The chemistry to manufacture the Product does not use genetically modified or engineered organisms or biomaterials. No GMO/GME substances are added to the Product.

The product is not verified through the Non-GMO Project Verification Program.

## Glacial Acetic Acid Product Quality, Regulatory & Technical Information Package

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### *Global Country Inventories*

The substance is listed in the following country inventories:

|           |             |              |
|-----------|-------------|--------------|
| Australia | Korea       | Taiwan       |
| Canada    | Mexico      | Turkey       |
| China     | New Zealand | USA - Active |
| EU        | Philippines |              |
| Japan     | Switzerland |              |

### *Allergens*

The Product does not, based on Celanese's knowledge, contain the following substances and products thereof commonly associated with food allergens:

- |          |                  |               |
|----------|------------------|---------------|
| • Peanut | • Barley         | • Crustaceans |
| • Soya   | • Lupine         | • Gluten      |
| • Bean   | • Molluscs       | • Glycerol    |
| • Milk   | • Sulfur Dioxide | • Mustard     |
| • Egg    | • Sulphites      |               |
| • Fish   | • Tree nuts      |               |
| • Peas   | • Wheat          |               |

### *Excluded substances*

These substances are not, based on Celanese's knowledge, present in the Product. They are not known to be generated in the production process, nor are we aware of such substances appearing as impurities in the raw materials. However, we do not have a specification for those substances, nor do we analyze for them.

Normal trace levels of metals may be found in the product.

Substances listed in:

- Prohibition of Certain Toxic Substances Regulations, 2012 (SOR/2012-285), as of December 2020
- California Proposition 65 as of December 2020
- US EPA Priority Pollutants under the Clean Water Act as of Dec. 2019
- US EPA List of Ozone-Depleting Substances as of December 2019
- US Hazardous Air Pollutants (HAPS) as of December 2019
- Aflatoxins
- Algaecide / biocide
- Alkyl phenol ethoxylates (APEO)
- Aromatic amines
- Aromatic hydrocarbons
- Asbestos
- Azo compounds
- BADGE (2,2-bis(4-hydroxyphenyl)propane bis(2,3-epoxypropyl) ether)
- BFDGE (bis(hydroxyphenyl)methane bis(2,3-epoxypropyl) ethers)
- Bisphenol A
- Bisphenol F
- Brominated flame retardants
- Butylated hydroxytoluene (BHT)

## Glacial Acetic Acid

### Product Quality, Regulatory & Technical Information Package

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- Coloring Agents / Dyes
- Dioxins
- Epoxy compounds
- Ethylene oxide
- Flame retardants
- Fluorochemicals
- Formaldehyde and Formaldehyde releasers
- Glycol ethers
- Gold
- Jatropa
- Melamine
- Microplastics
- Mineral Oil Aromatic Hydrocarbons (MOAH)
- Mineral Oil Saturated Hydrocarbons (MOSH)
- Nanomaterials
- Naphthalene
- Natural Latex
- Nitrates
- Nitrogen oxide
- Nitrosamines
- Nitrosating agents
- NOGE (novolac glycidyl ether)
- Organotin compounds
- Ortho phenyl phenol (OPP)
- Ozone depleting substances
- Palm Oils / Palm Kernel Oils
- Paradichlorobenzene (PDCB)
- Perfluorinated substances
- Pesticides
- Phosphates
- Phthalates
- Pigments
- Polybrominated substances
- Polychlorinated substances
- Polyvinyl chloride (PVC)
- Radioactive substances
- Sewer sludge
- Silicones
- Tantalum
- Tin
- Tribromophenol
- Triclosan
- Tris (nonylphenyl) phosphite
- Tungsten

### *EU REACH*

Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

Celanese is aware of the obligations imposed by REACH on EU manufacturers and importers as well as on downstream users.

We are obliged to comply with the requirements of the REACH legislation relating to our European manufacturing facilities, our own imports as well as our obligations as a downstream user in the European chemical industry.

Should you require additional information on REACH and SVHC, please contact Celanese at [REACH@celanese.com](mailto:REACH@celanese.com).

## Glacial Acetic Acid

### Product Quality, Regulatory & Technical Information Package

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#### *Food & Food Contact*

Celanese produces and offers the Product exclusively as a technical product. The Product is not of a Food or Food contact grade. Any suitability for use is the sole responsibility of the buyer to verify fitness of the Product for the intended use and fitness of the final good for introduction into the market and to ensure compliance of the final goods with the relevant regulations.

Acetic Acid itself is listed in the following regulations for use in food contact applications:

- US FDA 21CFR 184.1005
- Europe BfR
- China GB 9685-2016

Commission Regulation (EU) No 10/2011 on plastic materials and articles intended to come into contact with food

The Product is placed on the market by Celanese exclusively as a technical grade material. Regulation 10/2011/EU as amended applies to the materials and articles specified in Article 2 of this regulation. The Product does not fall under the scope of this regulation.

The component Acetic Acid is generally listed in ANNEX I, Table 1 in the "Union list of authorized monomers, other starting substances, macromolecules obtained from microbial fermentation, additives and polymer production aids" with the following entry

|     |                                                                                                           |                                                                                                                                 |
|-----|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| (1) | FCM substance No                                                                                          | 115                                                                                                                             |
| (2) | Ref. No                                                                                                   | 10090<br>30000                                                                                                                  |
| (3) | CAS No                                                                                                    | 0000064-19-7                                                                                                                    |
| (4) | Substance name                                                                                            | acetic acid                                                                                                                     |
| (5) | Use as additive or polymer production aid (yes/no)                                                        | substance is authorized to be used as additive or polymer production aid                                                        |
| (6) | Use as monomer or other starting substance or macromolecule obtained from microbial fermentation (yes/no) | substance is authorized to be used as monomer or other starting substance or macromolecule obtained from microbial fermentation |
| (7) | FRF applicable (yes/no)                                                                                   | migration results cannot be corrected by the Fat Consumption Reduction Factor (FRF)                                             |
| (8) | SML [mg/kg]                                                                                               | no entry                                                                                                                        |

#### Dual Use Additives (Food)

The Product is placed on the market by Celanese exclusively as a technical grade material. It is ultimately the responsibility of the customer to determine the suitability of the Product for their specific end use application.

"Certain substances used in food contact plastics are, at the same time, authorized food additives or authorized flavorings respectively by Regulation (EC) No 1333/2008 or Regulation (EC) No 1334/2008 or their implementing measures. These substances are called dual-use additives.

To decide if a substance can be considered as a dual-use additive, it is sufficient that the chemical identity of the plastic additive matches that of an authorized food additive or flavoring, regardless of its purity or whether or not the substance is subject to a restriction in food and/or in the plastic." <sup>a</sup>

## Glacial Acetic Acid

### Product Quality, Regulatory & Technical Information Package

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#### Food Additives

Regulation (EC) No 1333/2008 on food additives

The Product is not listed.

#### Flavorings

Regulation (EC) No 1334/2008 on flavorings and certain food ingredients with flavoring properties for use in and on foods and amending Council Regulation (EEC) No 1601/91, Regulations (EC) No 2232/96 and (EC) No 110/2008 and Directive 2000/13/EC.

The Product is generally listed in Annex I Union List Of Flavorings and Source Materials, PART A Union list of flavoring substances:

|     |                                                                       |             |
|-----|-----------------------------------------------------------------------|-------------|
| (1) | FL No                                                                 | 08.002      |
| (2) | Chemical name                                                         | Acetic acid |
| (3) | CAS No                                                                | 64-19-7     |
| (4) | JECFA No                                                              | 81          |
| (5) | CoE No                                                                | 2           |
| (6) | Purity of the named substance at least 95% unless otherwise specified |             |
| (7) | Restrictions of Use                                                   |             |
| (8) | Footnote                                                              |             |
| (9) | Reference                                                             | JECFA       |

<sup>a</sup> Quote from "Union Guidelines on Regulation (EU) No 10/2011 on plastic materials and articles intended to come into contact with food" (published by the European Commission Health And Consumers Directorate-General, 21.02.2014)

[http://ec.europa.eu/food/food/chemicalsafety/foodcontact/docs/10-2011\\_plastic\\_guidance\\_en.pdf](http://ec.europa.eu/food/food/chemicalsafety/foodcontact/docs/10-2011_plastic_guidance_en.pdf)

#### Packaging Inks in Swiss Ordinance of the FDHA on Materials and Articles (817.023.21)

Packaging inks are regulated in the section 12 of the Ordinance of the FDHA on Materials and Articles, and the provisions of this Section apply to packaging inks as specific constituent elements of materials and articles.

General listings in Annex 2 and Annex 10 to the Swiss Ordinance of the FDHA on Materials and Articles (817.023.21):

#### Annex 2

|    |                                                                                                                       |                |
|----|-----------------------------------------------------------------------------------------------------------------------|----------------|
| 1  | Stoff-Nr..                                                                                                            | 33             |
| 2  | Bezeichnung des Stoffes                                                                                               | Acetic acid    |
| 3  | CAS-Nr.                                                                                                               | 0000064-19-7   |
| 4  | Verpackungsmaterial-Referenz-Nr. der Europäischen Kommission für den Stoff                                            | 10090<br>30000 |
| 5  | Verwendung als Monomer oder als anderer Ausgangsstoff oder als durch mikrobielle Fermentation gewonnenes Makromolekül | M              |
| 6  | Verwendung als Zusatzstoff oder als Hilfsstoff bei der Herstellung von Kunststoffen                                   | A              |
| 7  | FRF anwendbar                                                                                                         |                |
| 8  | SML [mg/kg]                                                                                                           |                |
| 9  | SML(T): Gruppenbeschränkungs-Nr                                                                                       |                |
| 10 | Beschränkungen und Spezifikationen                                                                                    |                |
| 11 | Hinweise zur Konformitätsprüfung                                                                                      |                |

## Glacial Acetic Acid

### Product Quality, Regulatory & Technical Information Package

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#### Annex 10

|   |                         |                |
|---|-------------------------|----------------|
| 1 | Nr.                     | 33             |
| 2 | Bezeichnung des Stoffes | Acetic acid    |
| 3 | CAS-Nr.                 | 0000064-19-7   |
| 4 | Ref-Nr.                 | 10090<br>30000 |
| 5 | Verwendung              | M, AD          |
| 6 | Teil                    | A              |
| 7 | SML [mg/kg]             |                |

#### *Restriction of Hazardous Substances (RoHS)*

Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (recast) (RoHS)

The Product as supplied by Celanese does not fall within the scope of directive 2011/65/EU, since it applies to electrical and electronic equipment (EEE) "falling within the categories set out in Annex I." (Art. 2)

Annex II of Directive 2011/65/EU lists "Restricted substances [...] and maximum concentration values tolerated by weight in homogeneous materials"

- Lead (0.1 %)
- Mercury (0.1 %)
- Cadmium (0.01 %)
- Hexavalent chromium (0.1 %)
- Polybrominated biphenyls (PBB) (0.1 %)
- Polybrominated diphenyl ethers (PBDE) (0.1 %)
- Bis(2-ethylhexyl) phthalate (DEHP) (0.1 %)
- Butyl benzyl phthalate (BBP) (0.1 %)
- Dibutyl phthalate (DBP) (0.1 %)
- Diisobutyl phthalate (DIBP) (0.1 %)

The Product, based on Celanese's knowledge, does not contain these substances at the required limits. However, these substances are not routinely tested in our analytical procedures and quality control system, therefore, analytical data on the existence/non-existence of this component cannot be provided.

#### *Volatile Organic Compounds (VOC)*

The Product fulfills the criteria and is considered a VOC according to

- 2010/75/EU on industrial emissions (integrated pollution prevention and control) (Recast)
- 2004/42/CE on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain paints and varnishes and vehicle refinishing products (Paints Directive)
- Swiss OVOC, Ordinance on the Incentive Tax on Volatile Organic Compounds 814.018

# Glacial Acetic Acid

## Product Quality, Regulatory & Technical Information Package

Status: 11. October 2021

### Attachment I: Sales Specifications

Global

## Sales Specification



1 of 1

### Acetic Acid

#### Specifications<sup>(1)</sup>

#### Units

#### Limits

|                            |       |      |       |
|----------------------------|-------|------|-------|
| Acetic Acid <sup>(2)</sup> | wt. % | min. | 99.85 |
| Freezing Point             | °C    | min. | 16.35 |
| Water                      | wt. % | max. | 0.15  |
| Color                      | Pt-Co | max. | 10    |
| Distillation Range         | °C    | max. | 1     |
| Formic Acid                | wt. % | max. | 0.05  |
| Aldehydes as Acetaldehyde  | wt. % | max. | 0.05  |
| Iron                       | ppm   | max. | 0.4   |
| Heavy Metals, as Pb        | ppm   | max. | 0.5   |
| Chlorides                  | ppm   | max. | 1     |
| Sulfates                   | ppm   | max. | 1     |
| Sulfurous Acid             | ppm   | max. | 1     |
| Permanganate Time          | hours | min. | 2     |

#### References:

- 1 Analytical methods available upon request.
  - 2 Determined by freezing point.
- Product Numbers: 50000501 / 50001486

Spec No. HAC-001  
 Revised: Nov-2016  
 Supersedes: Feb-2014

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# Glacial Acetic Acid

## Product Quality, Regulatory & Technical Information Package

Status: 11. October 2021

China

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### Intermediate Chemistry Sales Specification


**Celanese**  
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## Glacial Acetic Acid for Industrial Use (China)

| PARAMETER                        | UNITS        | LIMITS         |
|----------------------------------|--------------|----------------|
| Appearance <sup>(1)</sup>        | --           | Clear and Free |
| Assay by Freeze Pt               | min, %(m)    | 99.85          |
| Freezing Point                   | min, °C      | 16.35          |
| Color                            | max, Pt-co   | 10.0           |
| Water                            | max, %(m)    | 0.15           |
| Formic acid                      | max, %(m)    | 0.03           |
| Aldehydes, as Acetaldehyde       | max, %(m)    | 0.02           |
| Permanganate Time <sup>(2)</sup> | min, minutes | 120            |
| Heavy Metals, as Pb              | max, ppm(m)  | 0.5            |
| Iron                             | max, ppm(m)  | 0.40           |
| Chlorides                        | max, ppm(m)  | 1.0            |
| Sulfates                         | max, ppm(m)  | 1              |
| Sulfurous Acid                   | max, ppm(m)  | 1              |
| Distillation Range               | max, °C      | 1.0            |
| Propionic Acid                   | max, ppm     | 500            |
| Non-Volatile Residue             | max, %(m)    | 0.005          |

**References:**

<sup>(1)</sup> Clear and Free from Suspended Matter

<sup>(2)</sup> By GB/T 1628 Method

Revised: Sep-2020  
Material Number: 51009356

Supersedes: Jun-2017  
Spec No. HAC-003

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# Glacial Acetic Acid

## Product Quality, Regulatory & Technical Information Package

Status: 11. October 2021

Europe


**Celanese**  
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### Sales Specification

1 of 1

## Acetic Acid

**Technical Grade, 99/100 %**  
(glacial)

CAS-No. 64-19-7

| Characteristic                                    | Limit          | Unit    | Method                                               |
|---------------------------------------------------|----------------|---------|------------------------------------------------------|
| Acetic Acid                                       | min. 99.85     | % (w/w) | Calculated from Freezing point                       |
| Freezing Point                                    | min. 16.35     | °C      | ASTM D 1493 / HAC-STD-001EX (internal)               |
| Water                                             | max. 0.15      | % (w/w) | DIN 51 777 / ASTM D 1364 (mod. Karl-Fischer-Method)  |
| Platinum/Cobalt Color (Hazen/APHA Color)          | max. 10        |         | DIN EN 1557 / DIN ISO 6271 / ASTM D 1209 / ASTM 5386 |
| Distillation Range (incl. 118.1 °C) <sup>1)</sup> | max. 1.0       | °C      | ASTM D 1078                                          |
| Formic Acid                                       | max. 500       | mg/kg   | ASTM D 3546                                          |
| Acetaldehyde                                      | max. 500       | mg/kg   | DIN 51 405 (GC)                                      |
| Iron                                              | max. 0.40      | mg/kg   | Photometric / ICP                                    |
| Heavy Metals as Lead                              | max. 0.5       | mg/kg   | Sulfide Method                                       |
| Sulfates                                          | max. 1.0       | mg/kg   | HAC-17 (internal)                                    |
| Sulfurous Acid                                    | max. 1.0       | mg/kg   | HAC-18 (internal)                                    |
| Total Chlorine                                    | max. 1.0       | mg/kg   | DIN 51 408                                           |
| Permanganate Time / Oxidizable Impurities         | min. 2         | hours   | FCC, 10 <sup>th</sup> ed., Monograph Specifications  |
| Appearance                                        | Clear and free |         | Visual Examination                                   |

**Remarks:**  
<sup>1)</sup> Product conforms to limit, but test is not routinely performed.

Product-No. 50000501  
 Version-No. 5  
 Released November 15, 2016

Test methods used are available upon request. Contact your Sales Support for copies.  
 For additional physical properties, see Celanese Product Description and Handling Guide.

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## Glacial Acetic Acid

### Product Quality, Regulatory & Technical Information Package

Status: 11. October 2021

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#### References

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