Product Description and Handling Guide
Plasticizer WVC 3800 (3G8)

Plasticizer WVC 3800 (3G8)
Triethylene glycol bis (2-ethylhexanoate)
CAS no. 94-28-0
EC no. 202-319-2

Product description

Plasticizer WVC 3800 is a clear, odorless liquid that mixes well with organic solvents but not with water. WVC 3800 contains less than 1.0 % monoester and has been stabilized to prevent the formation of peroxide. It mixes well with PVC and PVB and thanks to its low viscosity and low water content it provides exceptionally good processability. The low vapor pressure and good ability to mix with other plasticizers such as DOP and DOTP contribute to an optimal result. WVC 3800 is characterized by a high resistance to hydrolysis.

Possible applications

Plasticizer WVC 3800 is used in films for laminated safety glass. Plasticizer WVC 3800 is a valuable additive to PVB, where users appreciate key properties such as compatibility with polyvinyl butyral, high transparency, high boiling point, low water content and hydrophobicity. The product is also used as an additive in formulations for water-based adhesives, paints and coatings. Here it has a positive effect on gloss, open time and rheological properties. Particular note should be made of its exceptionally low VOC content. The plasticizer is also used in the many versatile plastisol applications, such as PVC coverings, tubing and textile coatings or in silkscreen printing.

Characteristic data

<table>
<thead>
<tr>
<th>Typical Properties</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molar mass</td>
<td>g/mol</td>
</tr>
<tr>
<td>Boiling point at 1013 hPa</td>
<td>ºC</td>
</tr>
<tr>
<td>Melting temperature</td>
<td>ºC</td>
</tr>
<tr>
<td>Density at 20 ºC (DIN 51 757)</td>
<td>g/cm³</td>
</tr>
<tr>
<td>Refractive index nD at 20 ºC (DIN 51 423, part 2)</td>
<td>1.444 – 1.446</td>
</tr>
<tr>
<td>Viscosity at 20 ºC</td>
<td>mPa · s</td>
</tr>
<tr>
<td>Vapour pressure at 20 ºC</td>
<td>hPa</td>
</tr>
<tr>
<td>Surface Tension at 20 ºC (conc. 1.375 mg/l)</td>
<td>mN/m</td>
</tr>
<tr>
<td>Water solubility at 20ºC</td>
<td>g/l</td>
</tr>
<tr>
<td>Volatile organic compounds (VOC, EPA-24)</td>
<td>%</td>
</tr>
</tbody>
</table>
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These characteristic 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

Shelf life
The shelf life of Plasticizer WVC 3800 is one year. The shelf life dates from the day of packaging, for bulk deliveries this is the day of loading. This period is in general applicable to material stored under conditions recommended by Celanese Chemicals.

Storage

<table>
<thead>
<tr>
<th>Recommended Blanketing</th>
<th>Dry Nitrogen&lt;sup&gt;1,2,3&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended Temperature</td>
<td></td>
</tr>
<tr>
<td>Maximum</td>
<td>50 °C</td>
</tr>
<tr>
<td>Minimum</td>
<td>0 °C</td>
</tr>
<tr>
<td>Recommended pressure</td>
<td>Atmospheric</td>
</tr>
<tr>
<td>Bulk Quantities</td>
<td>Outside, detached tanks</td>
</tr>
<tr>
<td>Small Containers</td>
<td>Cool, dry, well ventilated area</td>
</tr>
</tbody>
</table>

Handling

- Thoroughly review Material Safety Data Sheet before handling product.
- 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.
- Protect small containers from physical damage.
- Use proper electrical grounding and bonding procedures when loading, unloading and transferring<sup>1</sup>.
- Refer to the Material Safety Data Sheet for more information on materials to avoid.
- Use spark-resistant tools.
- Electrical equipment and circuits in all storage and handling areas must conform to requirements of national electrical code (Articles 500 and 501) for hazardous location.

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

Plasticizer WVC 3800 is available from Celanese Chemicals as bulk material and as 1 ton IBC Container.
# Plasticizer WVC 3800 (3G8)

## Materials for storage and transport

<table>
<thead>
<tr>
<th>Unit / element</th>
<th>Recommendation</th>
<th>Permissible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tank</td>
<td>Stainless Steel&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Aluminum&lt;sup&gt;2&lt;/sup&gt;, Steel, PE</td>
</tr>
<tr>
<td>Piping</td>
<td>Stainless Steel&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Aluminum&lt;sup&gt;2&lt;/sup&gt;, Steel, PE</td>
</tr>
<tr>
<td>Valves</td>
<td>Stainless Steel&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Stainless Steel&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>Pumps</td>
<td>Stainless Steel&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Stainless Steel&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>Safety Valves</td>
<td>Stainless Steel&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Stainless Steel&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>Seals</td>
<td>PTFE&lt;sup&gt;3&lt;/sup&gt;, Graphite</td>
<td>–</td>
</tr>
<tr>
<td>Pump Seals</td>
<td>All seal ring combinations, Kalrez O-rings</td>
<td>–</td>
</tr>
<tr>
<td>Valve Seal</td>
<td>PTFE&lt;sup&gt;3&lt;/sup&gt;</td>
<td>–</td>
</tr>
<tr>
<td>Pipe Joints</td>
<td>PTFE&lt;sup&gt;3&lt;/sup&gt;, Graphite</td>
<td>–</td>
</tr>
<tr>
<td>Heat Exchanger</td>
<td>Stainless Steel&lt;sup&gt;1&lt;/sup&gt;</td>
<td>–</td>
</tr>
<tr>
<td>Tubing</td>
<td>Stainless Steel&lt;sup&gt;1&lt;/sup&gt;</td>
<td>–</td>
</tr>
<tr>
<td>Tank Car</td>
<td>Stainless Steel&lt;sup&gt;1&lt;/sup&gt;</td>
<td>–</td>
</tr>
<tr>
<td>Railroad Tank Car</td>
<td>Stainless Steel&lt;sup&gt;1&lt;/sup&gt;</td>
<td>–</td>
</tr>
<tr>
<td>Cargo Ship</td>
<td>Stainless Steel&lt;sup&gt;1&lt;/sup&gt;</td>
<td>–</td>
</tr>
<tr>
<td>Ship Tank</td>
<td>Stainless Steel&lt;sup&gt;1&lt;/sup&gt;</td>
<td>–</td>
</tr>
</tbody>
</table>

1. Type 304 (1.4301) or 316 (1.4571) or 301 (1.4310) Stainless Steel  
2. Type 3000, 5000, and 6000 series Aluminum  
3. Polytetrafluoroethylene  

For further information on safety and handling, please use the following link: [http://www.celanese.com/msds/](http://www.celanese.com/msds/)

## Other Product Information:

The following statements about Plasticizer WVC 3800 (3G8) manufactured at Celanese are based to the best of our manufacturing and process knowledge. The practice of providing this information to customers is for their convenience. It does not alter the terms and conditions of sale, including any warranties or limitations on liability, applicable to the underlying commercial transaction involving the product to which this certification applies. We believe this information to be accurate and reliable, but customers should make their own determination on the suitability of this product for a particular application.
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Plasticizer WVC 3800 is not to be regarded as a hazardous substance and does not require classification and labelling according to Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures.

Chemical Inventory Status

The substance is listed in the following chemical inventories:

<table>
<thead>
<tr>
<th>Chemical Inventory Status</th>
<th>Listed</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>AICS (Australia)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>DSL (Canada)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>IECSC (China)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>EINECS (Europe)</td>
<td>X</td>
<td>EC-No.: 202-319-2</td>
</tr>
<tr>
<td>ENCS (Japan)</td>
<td>X</td>
<td>ENCS No.: (2)-658</td>
</tr>
<tr>
<td>ISHL (Japan)</td>
<td>X</td>
<td>ISHL No.: (2)-658</td>
</tr>
<tr>
<td>KECI (Korea)</td>
<td>X</td>
<td>Korean ID Number: KE-13751</td>
</tr>
<tr>
<td>NZIoC (New Zeeland)</td>
<td>X</td>
<td>May be used as a component in a product covered by a group standard but it is not approved for use as a chemical in its own right.</td>
</tr>
<tr>
<td>PICCS (Philippines)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>NECSI (Taiwan)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>TSCA (USA)</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

REACH

REACH (“Registration, Evaluation, Authorization and Restriction of Chemicals”) Celanese is aware of the obligations imposed by the European Union legislation 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, please contact Celanese at REACH@celanese.com

The product is to be regarded as a substance and has been registered.
Chemical name: Triethylene glycol bis (2-ethylhexanoate)
CAS number: 94-28-0
EINECS number: 202-319-2
Registration number
Celanese Chemicals Europe GmbH 01-2119475524-34-0002
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Statement on Volatile Organic Compound (VOC)

A table providing an overview on the VOC status is given below.

European Union
Different definitions for "Volatile organic compound" exist in the EU:

1. Directive 2010/75/EU on industrial emissions (integrated pollution prevention and control) (Recast)


Directive 2010/75/EU defines:
‘volatile organic compound’ means any organic compound as well as the fraction of creosote, having at 293.15 K a vapour pressure of 0.01 kPa or more, or having a corresponding volatility under the particular conditions of use; (Article 3, 45)

This Directive shall cover industrial activities with a major pollution potential, defined in Annex I to the Directive, and contains special provisions for certain installations.


Directive 2004/42/CE defines:
‘Volatile organic compound (VOC)’ means any organic compound having an initial boiling point less than or equal to 250°C measured at a standard pressure of 101,3 kPa; (Article 2, 5)

The Paints Directive aims to prevent the negative environmental effects of emissions of volatile organic compounds (VOC) from decorative paints and vehicle refinishing products.


Regulation (EC) No 66/2010 on the EU Ecolabel provides that specific EU Ecolabel criteria are to be established according to product groups. Commission Decision 2014/312/EU provides definitions for ‘Volatile organic compounds’ (VOC) and ‘Semi volatile organic compounds’ (SVOCs) for product group of indoor and outdoor paints and varnishes in Article 2:
(13) ‘Volatile organic compounds’ (VOC) means any organic compounds having an initial boiling point less than or equal to 250 °C measured at a standard pressure of 101,3 kPa as defined in Directive 2004/42/EC and which, in a capillary column, are eluting up to and including Tetradecane (C14H30) for non-polar systems or Diethyl adipate (C10H18O4) for polar systems;
(14) ‘Semi volatile organic compounds’ (SVOCs) means any organic compound having a boiling point of greater than 250 °C and which, in a capillary column (6) are eluting with a retention range between n-Tetradecane (C14H30) and n-Docosane (C22H46) for non-polar systems and diethyl adipate (C10H18O4) and methyl palmitate (C17H34O2) for polar systems;
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Switzerland
Ordinance on the Incentive Tax on Volatile Organic Compounds (OVOC) 814.018
The Swiss OVOC defines:
For the purpose of this Ordinance, volatile organic compounds (VOCs) are organic compounds with a vapour pressure of at least 0.1 mbar at 20°C or a boiling point of a maximum 240°C at 1013.25 mbar. (Art. 1)

France-Grenelle de l’environnement
Arrêté du 19 avril 2011 relatif à l’étiquetage des produits de construction ou de revêtement de mur ou de sol et des peintures et vernis sur leurs émissions de polluants volatils (NOR : DEVL1104875A)
defines a volatile organic compound (VOC) as an organic compound with an initial boiling point between 50°C and 286°C. ("2. « Composé organique volatil (COV) » : tout composé organique dont le point d’ébullition initial se situe entre 50 °C et 286 °C ;")

From January 1, 2012, construction products for indoor applications (including paints and coatings) require an indication of the individual product's level of emission. This is achieved by assigning each product a label A+, A, B, or C.

The grading A+, A, B, or C is based on the provisions detailed in Arrêté du 19 avril 2011 relatif à l’étiquetage des produits de construction ou de revêtement de mur ou de sol et des peintures et vernis sur leurs émissions de polluants volatils.

Since the Arrêté is addressing requirements for final products, chemical substances as supplied by Celanese do not fall within its scope.

We confirm that our product Plasticizer WVC 3800 is not a VOC according to the criteria of the Arrêté since the product has a boiling point of 381 °C at 1013 hPa.

Questions and Answers in French on "Étiquetage des émissions en polluants volatils des produits de construction et de décoration" are available at http://www.developpement-durable.gouv.fr/Chapitre-II-Industriels-comment.html

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Plasticizer WVC 3800 (3G8)¹</td>
<td>94-28-0</td>
<td>Not a VOC</td>
<td>Not a VOC</td>
<td>Not a VOC</td>
<td>Not a VOC</td>
<td>Not a VOC (polar system)</td>
<td>Not a VOC</td>
</tr>
</tbody>
</table>

¹ The VOC content measured acc. to EPA Method 24 (Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings) is < 0.1 %
Animal Origin, Genetically Modified Organisms

**BSE/TSE Statement**
To the best of our knowledge Plasticizer WVC 3800 and the raw materials used in the production of this material are not derived from human or animal origin.

**Genetically Modified Organisms**
To the best of our knowledge this product is not based on raw materials obtained through genetically modified organisms. GMOs and biotechnical means are not used during the manufacturing process.

Allergens Guide
Celanese Acetyl Intermediates does not use any ingredients of animal or plant origin in the manufacture of Plasticizer WVC 3800 (CAS no. 94-28-0). Therefore, we can certify that the supplied Plasticizer WVC 3800 does not contain any of the eight main food allergens (peanuts, tree nuts, fish, shellfish, eggs, milk, soy, and wheat). Plasticizer WVC 3800 is manufactured through an entirely synthetic process and will not contain any gluten. No nutritional data is available for Plasticizer WVC 3800.

Heavy Metals
Due to the raw materials used and our manufacturing process, Plasticizer WVC 3800 is not expected to contain heavy metals. However, heavy metals are not controlled by our routine analytical procedures and quality control system.

**Statement on Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (recast) (RoSH)**
Chemical substances as supplied by Celanese do 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)
Celanese does not manufacture such homogeneous materials. To support our customers in evaluating the requirements given by directive 2011/65/EU, we can provide the following statement on the above mentioned substances and their contents in our product Plasticizer WVC 3800.

We confirm that, to the best of our knowledge and based on raw materials, manufacturing and process knowledge, that in Plasticizer WVC 3800 supplied by Celanese Chemicals Europe GmbH the mentioned substances are not expected. 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.
Statement on Directive 2012/19/EU on waste electrical and electronic equipment (WEEE) (recast)

Directive 2012/19/EU on waste electrical and electronic equipment (WEEE) (recast) repeals Directive 2002/96/EC with effect from 15 February 2014. The directive is addressed to the EU member states and is designed to prevent electrical and electronic waste by requiring EU countries to ensure the equipment is recovered, reused or recycled.

Directive 2012/19/EU applies only indirectly to Celanese Chemicals products used as raw materials or solvents in the manufacture of electrical and electronic equipment, since substances as supplied by Celanese do not fall within the scope of directive 2012/19/EU. To the extent that Plasticizer WVC 3800 may be used in the manufacture of the articles subject to this regulation, Plasticizer WVC 3800 is not expected to contain the chemical impurities listed in Annex II to the directive.

This statement is based on the production process and raw materials used for our products.

Statement on Directive 2009/48/EC on the safety of toys

Directive 2009/48/EC on the safety of toys according to Article 2 (1) “shall apply to products designed or intended, whether or not exclusively, for use in play by children under 14 years of age (hereinafter referred to as toys)

This regulation is not directly applicable to Celanese’s products, since Celanese does not manufacture toys. To support our customers in evaluating the requirements given by directive 2009/48/EC, we can provide the below information for our product Plasticizer WVC 3800.

Requirements for chemical properties are provided in Directive 2009/48/EC, Annex II Particular Safety Requirements, Part III. Chemical Properties.

**Classification under Regulation (EC) No 1272/2008**


**Allergenic Fragrances**

Toys shall not contain certain allergenic fragrances as specified in Annex II, Part III No. 11. We confirm that, to the best of our knowledge and based on raw materials, manufacturing and process knowledge, that in Plasticizer WVC 3800 supplied by Celanese Chemicals Europe GmbH the mentioned substances are not expected. 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.
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Metal content
Migration limits, from toys or components of toys, shall not be exceeded for certain elements as specified in Annex II, Part III No. 13. These migration limits refer to migration in certain toy materials, not to raw materials used in the manufacture of such toys.

We confirm that, to the best of our knowledge and based on raw materials, manufacturing and process knowledge, that in the product Plasticizer WVC 3800 supplied by Celanese Chemicals Europe GmbH the mentioned metals:

- Aluminium
- Antimony
- Arsenic
- Barium
- Boron
- Cadmium
- Chromium (III)
- Chromium (VI)
- Cobalt
- Copper
- Lead
- Manganese
- Mercury
- Nickel
- Selenium
- Tin
- Organic Tin
- Zinc
- Strontium

are not expected to be present.

Impurities referred to by the directives listed above are not controlled by our routine analytical procedures and quality control system. They are not measured on a regular basis.
The information contained in this publication is based on our present state of knowledge and is intended to provide general notes on our products and their uses. It should not be construed as promising or guaranteeing specific properties of the products described or their suitability for a particular application. User is solely responsible for determining the suitability of the products for the intended purpose. To the best of our knowledge the information in this publication is accurate; however we do not assume any liability whatsoever for the accuracy and completeness of such information. We strongly recommend that users seek and adhere to our current instructions for handling these products, and to entrust the handling of such products to adequately trained personnel only. Please adhere to the instructions and information contained in the corresponding Material Safety Data Sheets (MSDS) before attempting to process our products. Any existing industrial property rights must be observed. User is solely responsible for investigating and checking the regulatory approval status. The quality of our products is guaranteed under our General Conditions of Sale.