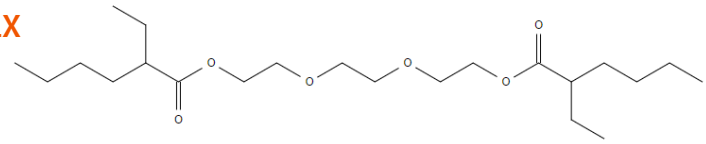
Celanese CLX
Product Quality, Regulatory & Technical Information Package
June 2025

Product Name: **Celanese CLX**



Chemical Name: Di-2-ethylhexanoic acid triethylene glycol ester

CAS number: 94-28-0

Celanese (bulk) Material number: 51013010

The Product is also available from Celanese as packed goods in IBC and drums.

Disclaimer

Celanese is supplying Celanese CLX as a technical grade product.

This document provides information about technical grade Celanese CLX ("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.

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Product Description

Celanese CLX is a clear, odorless liquid that mixes well with organic solvents but not with water. Celanese CLX contains less than 1.0 % monoester and has been stabilized to prevent the formation of peroxide. 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 contribute to an optimal result. Celanese CLX is characterized by a high resistance to hydrolysis. Celanese CLX is easy to formulate, meets VOC legislation, is efficient at lowering MFFT, and is compatible with common latex formulas, such as Vinyl Acrylic, Styrene Acrylic, pure Acrylic and VAE.

Celanese CLX is used as a coalescent in formulations for water-based adhesives, paints and coatings. Here it has a positive effect on gloss, open time and rheological properties. It is designed to replace the solvent in paint formulations based on conventional Vinyl Acrylic and Acrylic emulsions systems. Particular note should be made of its exceptionally low to no VOC content. Celanese CLX is also used in a broad variety of other applications.

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 safety data sheet and the sales specifications. Please consult www.celanese.com.

Property	Metric Units	English Units
Boiling Point @ 101.3 kPa (14.69 psi)	381 °C	718 °F
Density at 20 °C (68 °F) (DIN 51 757)	0.966 g/cm³	8.0617 lb/gal
Melting Temperature	- 70 °C	- 94 °F
Molar Mass	402.564 g/mol	
Refractive index nD at 20 °C (68 °F) (DIN 51 423, part 2)	1.444 – 1.446	
Surface Tension at 50 °C (122 °F)	22.41 mN/m	
Vapour pressure at 20 °C (68 °F)	< 0.01 mbar	< 0.0002 psia
Viscosity at 20 °C (68 °F)	16.4 mPa · s	
Volatile Organic Compounds (VOC, EPA-24)	< 0.1 %	
Water solubility at 20 °C (68 °F)	0.00153 g/l	

Storage and Handling Recommendations

Storage

Recommended Blanketing	Dry Nitrogen [a, b, c]	
Recommended Temperature		
Maximum	50 °C	(122 °F)
Minimum	0 °C	(32 °F)
Recommended pressure	Atmospheric	
Bulk Quantities	Outside, detached tanks	
Small Containers	Cool, dry, well ventilated area	

a. Refer to National Fire Protection Agency (NFPA) #77 "Static Electricity" or the respective national technical code for proper electrical grounding procedures.
b. 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.
c. Blanketing may be used to retain quality in long-term storage conditions.

Handling

- Thoroughly review 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. 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.
- 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) or the respective national technical code for hazardous location.
- For further information on safety and handling, please use the following link: https://www.celanese.com/sds-search

Materials of Construction

Unit / element	Acceptable Material	Alternate Material
Tank	Stainless Steel [a]	Aluminum [b], Steel, PE
Piping	Stainless Steel [a]	Aluminum [b], Steel, PE
Valves	Stainless Steel [a]	Stainless Steel [a]
Pumps	Stainless Steel [a]	Stainless Steel [a]
Safety Valves	Stainless Steel [a]	Stainless Steel [a]
Seals	PTFE [c], Graphite	–
Pump Seals	All seal ring combinations, Kalrez O-rings	–
Valve Seal	PTFE [c]	–
Pipe Joints	PTFE [c], Graphite	–
Heat Exchanger	Stainless Steel [a]	–
Tubing	Stainless Steel [a]	–
Tank Car	Stainless Steel [a]	–
Railroad Tank Car	Stainless Steel [a]	–
Cargo Ship	Stainless Steel [a]	–
Ship Tank	Stainless Steel [a]	–

a. Type 304 (1.4301) or 316 (1.4571) or 301 (1.4310) Stainless Steel
b. Type 3000, 5000, and 6000 series Aluminum
c. Polytetrafluoroethylene

Product Quality Statements

Manufacturing Locations

The Product is produced at manufacturing location in Frankfurt (Germany).

- Industrial Park Frankfurt-Hoechst
  Brueningstr. 50
  65926 Frankfurt
  Germany

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-search

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.

Analytical Methods

Applied analytical methods according to the sales specifications provided as attachment.

Specifications	Analytical Methods [1]
Di-2-ethylhexanoic acid triethylene glycol ester	DIN 51 405 (GC)
Mono-2-ethylhexanoic acid triethylene glycol ester (Mono Ester)	DIN 51 405 (GC)
Di-2-ethylhexanoic acid diethylene glycol ester	DIN 51 405 (GC)
BHT Stabilizer	DIN 51 405 (GC), qual.
Water	DIN 51 777 / ASTM D 1364 (mod. Karl-Fischer-Method)
Acid Number	DIN EN ISO 2114 / ASTM D 1613
Color	DIN EN 1557 / DIN ISO 6271 / ASTM D 1209 / ASTM 5386
Peroxide Value	DIN EN ISO 27 107
Appearance	Visual Examination

[1] Alternative equivalent methods can be used at Celanese Terminals.

Manufacturing Process & Raw Materials

The production of the Product relies on chemical synthesis, namely esterification. Triethylene glycol and 2-Ethylhexanoic Acid are being used as raw materials for the synthesis according to the chemical equation:

Triethylene glycol + 2 · 2-Ethylhexanoic Acid → Celanese CLX + Water

The crude Product is purified via distillation. The Product is stabilized with Butyl Hydroxy Toluene (BHT).

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.

Shelf Life

The shelf life of the Product 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 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

The Product is not available as a certified Kosher grade.

Celanese supplies basic chemicals. Our production technology relies on a continuous production process, and the raw materials are of petrochemical origin. All catalysts and processing aids are of synthetic origin; we do not use any raw materials having an animal (diary) origin, nor is our process likely to be contaminated by such.

Halal

The Product is not available as a certified Halal grade.

Celanese supplies basic chemicals. Our production technology relies on s continuous production process, and the raw materials are of petrochemical origin. All catalysts and processing aids are of synthetic origin;

we do not use any raw materials having an animal (diary) origin, nor is our process likely to be contaminated by such. Ethanol is not used as raw material or processing aid.

ICH Guidelines

The Product does not, based on Celanese's knowledge, contain solvents in the concentration limits specified by the ICH Guideline Q3C(R9) for residual solvents.

The Product does not contain intentionally added sources of biological substances as described in ICH: Q5A (R2): Viral safety evaluation of biotechnology products derived from cell lines of human or animal origin.

Radiation

The Product is not subjected to any artificial radiation.

Regulatory Statements

The Product is listed in 40 CFR 180.910 as part of this chemical family:

- Alkanoic and alkenoic acids, mono- and diesters of α-hydro-ω-hydroxypoly (oxyethylene) with molecular weight (in amu) range of 200 to 6,000.

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.

Global Country Inventories

The substance is listed in the following country inventories:

Chemical Inventory Status	listed	comments
Australia (AIIC)	yes	
Canada (DSL)	yes	
China (IECSC)	yes	
Japan (ENCS)	yes	
New Zealand (NZIOC)	yes	
Philippines (PICCS)	yes	
USA (TSCA)*	yes	active
Korea (KECI)	yes	
Taiwan (TCSI)	yes	

* It is not subject to any action under TSCA Section 4, 5, 6, 8a, 8d, or 12b.

Allergens

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

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

Raw Material Statement referring to 2014/312/EU

Raw Material Statement with reference to Commission Decision 2014/312/EU on establishing the ecological criteria for the award of the EU Ecolabel for indoor and outdoor paints and varnishes

Status: July 2024

Based on the raw materials and the manufacturing process, to the best of our knowledge the Product may be used in a finished paint/varnish with a content of up to 3% (w/w) according to the specifications set out in Section 5(a) of the Annex of the Commission Decision 2014/312/EU.

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:

- Persistent Bioaccumulative Toxic (PBT) Chemicals listed by the TRI Program as of May 16, 2021
- Chemicals listed in EPA's Toxic and Priority Pollutants Under the Clean Water Act as of May 16, 2021 and listed in 40 CFR 401.15 and 40 CFR 423, Appendix A respectively
- Persistent Organic Pollutants (POPs)
- Substances listed in North Carolina TAC List 15A NCAC 02Q .0711 other than those listed in the VOC section as of May 16, 2021
- Substances listed in the GADSL 2021 Reference List

- 2,4,6-Tris(tert-butyl)phenol (2,4,6-TTBP)
- 3-iodo-2-propynyl butylcarbamate (IBPC)
- Adipic acid dihydrazide (ADH)
- Aflatoxins
- Algaecide / biocide
- Alkyl phenol ethoxylates (APEO) and their derivatives
- Amines
- 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
- Coloring Agents / Dyes
- Crystalline silica and leucophyllite minerals
- Cytokines
- Decabromodiphenyl ether (DecaBDE)
- Dioxins
- Epoxy compounds
- Ethylene oxide
- Flame retardants
- Fluorochemicals
- Formaldehyde and Formaldehyde releasers
- Glycol ethers
- 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)
- Pentachlorothiophenol (PCTP)
- Per- and polyfluoroalkyl substances (PFAS)[2]
- Pesticides
- Phenol, isopropylated phosphate (PIP (3:1))
- Phosphates
- Phthalates
- Pigments
- Plasticizers
- Polybrominated substances
- Polychlorinated substances
- Polymer Dispersions, i.a. silicon resin based
- Polyvinyl chloride (PVC)
- Preservatives & Preservative Stabilizers
- Protein subunits
- Pyridine
- Quaternary ammonium compounds
- Radioactive substances

[2] PFAS as defined by the OECD: PFAS definition published by Organization for Economic Co-operation and Development (OECD) provided at this LINK(last accessed on 25 July 2024)or via DOI 10.1787/e458e796-en

- Gold
- Halogenated solvents
- Heavy metals
- Hexachlorobutadiene (HCBD)
- Hybridoma cells
- Isothiazolinone compounds
- Jatropha
- Melamine
- Methanol
- Microplastics
- Mineral Oil Aromatic Hydrocarbons (MOAH)
- Mineral Oil Saturated Hydrocarbons (MOSH)
- Monoclonal antibodies
- N-(3-aminopropyl)-N-dodecylpropane-1,3-diamine
- Nanomaterials per US EPA definition
- Nanoparticle-based protein Therapeutics
- Resins
- Sewer sludge
- Shellac
- Silicones
- Subunit vaccines from in-vitro cell culture
- Tantalum
- Tin
- Titanium dioxide
- Tribromophenol
- Triclosan
- Trimethylolpropane (TMP)
- Tris (nonylphenyl) phosphite
- Tungsten
- (Unreacted) Monomers
- Vinyl Chloride
- Viral vectors and Viral vector derived products
- Zinc oxide
- Zinc pyrithione

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.

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.

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

Status: 21st January 2021

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
Not listed

Annex 10

1	Nr.	222
2	Bezeichnung des Stoffes	Triethyleneglycol bis(2-ethylhexanoate)
3	CAS-Nr.	0000094-28-0
4	Ref-Nr.	
5	Verwendung	AD
6	Teil	B
7	SML [mg/kg]	
8		
9	Beschränkungen und Spezifikationen	

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)

Status: 21st January 2021

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 these substances cannot be provided.

Volatile Organic Compounds (VOC)

Status: 21st January 2021

The Product does not fulfill the criteria and is not 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)
- 2014/312/EU on the Commission Decision of 28 May 2014 establishing the ecological criteria for the award of the EU Ecolabel for indoor and outdoor paints and varnishes
- Swiss OVOC, Ordinance on the Incentive Tax on Volatile Organic Compounds 814.018

The Product does not fulfill the criteria and is not considered a SVOC (polar system) according to

- 2014/312/EU on the Commission Decision of 28 May 2014 establishing the ecological criteria for the award of the EU Ecolabel for indoor and outdoor paints and varnishes

The VOC content measured according to EPA Method 24 (Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings) is < 0.1 %.

Attachment I: Sales Specifications

Celanese
The chemistry inside innovation™

Celanese CLX

(Di-2-ethylhexanoic acid triethylene glycol ester)

CAS-No. 94-28-0

Sales Specification

Specifications [1]		Limit	Unit
Di-2-ethylhexanoic acid triethylene glycol ester	min.	97.0	% (a/a)
Mono-2-ethylhexanoic acid triethylene glycol ester (Mono Ester)		< 1.0	% (a/a)
Di-2-ethylhexanoic acid diethylene glycol ester	max.	0.5	% (a/a)
BHT Stabilizer	min.	50	ppm
Water	max.	0.07	wt. %
Acid Number	max.	0.10	mg KOH/g
Color	max.	30	Pt-Co
Peroxide Value	max.	1.5	m_{eq} O/kg
Appearance	-	CFSM [2]	-

(1) Test methods available upon request.
(2) Clear and Free from Suspended Matter.

Product Numbers: 51013010

Additional Product numbers in use for other packaging. Please contact your Sales Support.

Spec. CLX-001-Global-Jun25

Supersedes: CelaneseCLX_51013010_SLS_e_V2 of November 15, 2016 (Version-No. 2)

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