

✓ Triethanolamine (TEA) Product Overview

- **Product Name:** Triethanolamine (TEA)
- **CAS Number:** 102-71-6
- **Molecular Formula:** C₆H₁₅NO₃
- **Synonyms:** TEA, Triethanolamine, 2,2',2''-Nitrilotriethanol, Tri-(hydroxyethyl)amine

✓ Chemical and Physical Properties

- **Molecular Weight:** 149.19 g/mol
- **Density:** 1.125 g/cm³ (at 20°C)
- **Melting Point:** 21.5°C
- **Solubility:** Soluble in water and ethanol, slightly soluble in ether.

✓ Safety and Hazards

- **Hazard Statements:**
 - Harmful in contact with skin.
 - Causes serious eye irritation.
 - Toxic if inhaled or swallowed.
- **Precautions:**
 - Wear protective gloves and eye protection when handling.
 - Keep away from heat, sparks, and open flames.
 - In case of contact with eyes, rinse immediately with plenty of water and seek medical attention.

✓ Names and Identifiers

- **CAS:** 102-71-6
- **InChI:** InChI=1S/C₆H₁₅NO₃/c7-3-1-5-9-6(8)4-2-5/h5-6H,1-4H₂
- **InChIKey:** OKKJLVBELUTLKV-UHFFFAOYSA-N
- **SMILES:** N(CCO)CCO

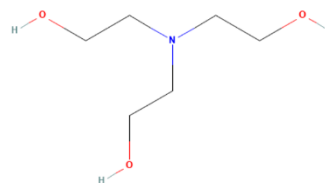
✓ Regulatory Information



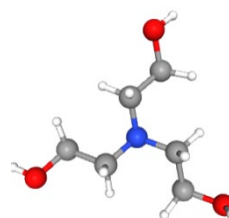
- **FDA:** Triethanolamine is approved for use in cosmetics and personal care products.
- **EU:** It is compliant with European regulations for use in various industrial and commercial products.

✓ Structural Information

- **2D Structure:**



- **3D Conformer:**



✓ Vendors and Supply Chain

- Available for purchase through major chemical suppliers such as:
 - Sigma-Aldrich
 - Thermo Fisher Scientific
 - Fisher Scientific
- Bulk pricing available upon request for industrial quantities.

✓ Use and Manufacturing

- **Uses:** Triethanolamine is widely used as an emulsifier, surfactant, and neutralizing agent in various industries:
 - **Cosmetics and Personal Care:** Used in formulations such as creams, lotions, and shampoos.
 - **Pharmaceuticals:** Used in topical formulations and as a pH adjuster in certain drugs.
 - **Agriculture:** Used as a stabilizer and pH adjuster in pesticide formulations.
 - **Industrial Cleaning:** Used in detergents and cleaning products due to its surfactant properties.

✓ Toxicity



- Triethanolamine has moderate toxicity when ingested or inhaled.
- Prolonged exposure can cause skin irritation or eye damage.
- Proper handling and protective gear are advised to minimize exposure.

✓ Materials and Industries Using Triethanolamine (TEA) 85% and 99%

1. Cosmetics and Personal Care Products:

- **Triethanolamine** is widely used in the formulation of **cosmetics** such as **moisturizers, shampoos, conditioners, and face creams**.
- **Material Interaction:** It acts as an **emulsifier**, allowing oil and water-based ingredients to mix, and as a **pH adjuster**, ensuring the product is gentle on the skin while maintaining the desired consistency.
- **Common Products:** Skin lotions, hair care products, bath oils, and deodorants.

2. Pharmaceuticals:

- In the **pharmaceutical industry**, **Triethanolamine** is used as a **buffering agent** and **pH adjuster** in topical formulations, creams, and ointments.
- **Material Interaction:** It ensures that the pH of medications remains stable and compatible with the skin.
- **Common Products:** Creams, ointments, and certain topical antibiotics.

3. Industrial Cleaning:

- TEA is used in **industrial cleaners** and **degreasers** due to its surfactant properties. It is effective in breaking down oils and fats, making it useful in manufacturing and cleaning applications.
- **Material Interaction:** Acts as a **surfactant** to emulsify and dissolve oils and grease, aiding in cleaning and de-greasing operations.

4. Agriculture and Pesticides:

- **Triethanolamine** is used in the formulation of **herbicides, insecticides, and fungicides** as a **stabilizer** and **surfactant**.
- **Material Interaction:** It helps improve the spreading, wetting, and penetration of pesticide active ingredients on plant surfaces.
- **Common Products:** Herbicide and pesticide formulations used in crop protection.

5. Textile Industry:

- TEA is used in the **textile industry** for **dyeing and finishing processes**, particularly for **acid dyes** and **textile treatment chemicals**.
- **Material Interaction:** It helps improve the wetting and dispersing properties of dyes, aiding in the even application of color.

6. Paints and Coatings:

- **Triethanolamine** is used in **paint formulations, coatings, and lacquers** to adjust the pH and improve **emulsification**.



- **Material Interaction:** It helps stabilize water-based paints and coatings by balancing the pH and assisting in pigment dispersion.
7. **Lubricants:**
- TEA is used as an **additive** in **lubricants** to control the pH of the formulations and act as a corrosion inhibitor.
 - **Material Interaction:** Helps prevent rust and corrosion by adjusting the pH and improving the lubricant's performance.
8. **Leather Tanning:**
- In the **leather tanning** process, TEA is used as a **pH adjuster** and **emulsifier** to modify the leather surface and improve the softness and texture of the leather.
 - **Material Interaction:** It acts as a **wetting agent** that helps in the even penetration of tanning agents.
9. **Paper Industry:**
- **Triethanolamine** is used in the **paper industry** as a **dispersing agent** and **pH stabilizer** during the **papermaking process**.
 - **Material Interaction:** It ensures proper dispersion of pigments and fibers, improving the quality of paper products.
10. **Water Treatment:**
- **Triethanolamine** is used in some **water treatment chemicals** and **disinfectant formulations** to adjust the pH and ensure efficient removal of impurities.
 - **Material Interaction:** Ensures that chemicals maintain their activity in water treatment processes by stabilizing the pH.
11. **Polymer Industry:**
- In **polymer manufacturing**, Triethanolamine is used to prepare **urea-formaldehyde resins** and **phenolic resins**.
 - **Material Interaction:** It reacts with other chemicals to form resins that are essential for adhesives, coatings, and molding compounds.
12. **Oilfield Chemicals:**
- **TEA** is used in the **oilfield industry** for **drilling fluids**, **cementing**, and **stimulation chemicals**.
 - **Material Interaction:** It is used as a **pH buffer** and **emulsifier** in oilfield formulations, enhancing the stability and performance of the products.
13. **Rubber Industry:**
- TEA is used as a **vulcanizing agent** and **stabilizer** in the **rubber manufacturing** process.
 - **Material Interaction:** It helps to improve the crosslinking of rubber compounds, leading to enhanced durability and performance of rubber products.
14. **Surfactants and Detergents:**
- **Triethanolamine** is used in the manufacture of **surfactants** for **detergents** and **cleaning products** due to its ability to emulsify oils and dirt.



- **Material Interaction:** It helps in the formulation of products that can easily remove dirt and oil from surfaces by acting as a **wetting agent** and **emulsifier**.

15. **Fuel Additives:**

- **TEA** can also be used as an additive in **fuel** formulations to enhance **combustion** and **reduce emissions**.
- **Material Interaction:** It helps improve the burning characteristics of fuels, leading to more efficient combustion in engines.