Product Safety Assessment

TYRIN™ Chlorinated Polyethylene

Product Safety Assessment documents are available at www.dow.com/productsafety/finder/.

Select a Topic:
Names
Product Overview
Manufacture of Product
Product Description
Product Uses
Exposure Potential
Health Information
Environmental Information
Physical Hazard Information
Regulatory Information
Additional Information
References

Names
• CAS No. 64754-90-1
• Chlorinated ethylene homopolymer
• Chlorinated polyethylene
• CPE

Products include, but are not limited to:
• TYRIN™ 200 Chlorinated Polyethylene
• TYRIN 3611E Chlorinated Polyethylene
• TYRIN 6000 Chlorinated Polyethylene
• TYRIN 7100 Chlorinated Polyethylene
• TYRIN CM 3551E Chlorinated Polyethylene
• TYRIN CM 3630E Chlorinated Polyethylene

Back to top

Product Overview
• TYRIN™ chlorinated polyethylene (CPE) products are performance polymers used globally in many thermoplastic and elastomer applications. They offer a range of properties and have inherent resistance to heat, oxidation, and ozone due to their saturated molecular backbone, which is further enhanced by molecular modification with chlorine.¹ See Product Description.
• CPE products are used as the major or minor component in a variety of applications, both as thermoplastic resins and as elastomers.² See Product Uses.
• Generally, TYRIN CPE products do not pose a significant health hazard. Inhalation of dusts can cause respiratory irritation, but good housekeeping practices will limit this risk.³ See Health Information or Physical Hazard Information.
• Consumer exposure to TYRIN CPE products is likely, but no adverse effects are expected as a result of normal contact with them.⁴ See Exposure Potential.
• In fabricating operations with TYRIN CPE products, thermal decomposition can result in the release of hydrogen chloride, carbon monoxide, or other toxic or irritating vapors. Build-up of dusts can create a fire hazard.⁴ See Physical Hazard Information.

Back to top

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Manufacture of Product

Dow produces TYRIN™ chlorinated polyethylene (CPE) at facilities located in Stade, Germany. TYRIN CPE products are made by chlorinating polyethylene (PE) to form chlorinated polyethylene (CPE). The process is represented by the following equation and flow diagram:

\[
\text{PE} + \text{Cl}_2 \rightarrow \text{CPE} + \text{HCl}
\]

Product Description

TYRIN™ CPE products are performance polymers used globally in many thermoplastic and elastomer applications. They offer a range of end-product physical and chemical attributes and are inherently resistant to heat, oxidation, and ozone due to their saturated molecular backbone. Properties are further enhanced by molecular modification with chlorine. TYRIN CPE products are offered in dry-flowable crumb or powder form for uniform, fast dispersion during blending or compounding. TYRIN CPE products can be calendared, injection-molded, or extruded into tough, chemical- and weather-resistant end products that can also provide built-in ignition resistance.

Product Uses

Major applications and markets for CPE products include automotive hose and tubing, ignition-wire jacketing, and wire and cable jacketing for power, instrumentation, control, industrial, and portable cord applications, as well as various high-performance industrial applications such as hydraulic hoses, gaskets, diaphragms, and many other industrial parts.

The largest volume end uses are in the polymer modification market, automotive hose and tubing, flexible membranes, and wire and cable jacketing.

Exposure Potential

TYRIN™ CPE products are used in the production of industrial and consumer products. Based on the uses for these products, the public could be exposed through:
Product Safety Assessment: TYRIN™ Chlorinated Polyethylene

- **Workplace exposure** – Exposure can occur in a CPE manufacturing facility or in the various industrial or manufacturing facilities that use the product. Good housekeeping and dust control are necessary for safe handling of this product. If there is a potential for exposure to dust particles that could cause eye discomfort, wear chemical goggles. Use gloves to protect hands from mechanical or thermal injury. If molten CPE contacts the skin, do not remove it without the assistance of a physician. Each manufacturing facility should have a thorough training program for employees and appropriate work processes and safety equipment in place to limit unnecessary exposure to CPE products. See Health Information.

- **Consumer exposure to products containing CPE products** – Dow sells TYRIN CPE products for both consumer and industrial applications. Although consumer exposure to these products is likely, no adverse effects are expected as a result of normal contact with them. See Health Information.

- **Environmental releases** – In the event of a spill, the focus is on containing the spill. Respiratory protection may be necessary for cleaning up spills. If dust is present, eliminate all sources of ignition. For small spills, the material should be swept up and recovered. Spilled material may create a slipping hazard, so keep unnecessary personnel from entering the spill area. See Environmental, Health, and Physical Hazard Information.

- **Large release** – Industrial spills or releases are infrequent and generally contained. If a large spill does occur, the material should be swept up, collected, and reprocessed or disposed of according to applicable governmental requirements.

- **In case of fire** – Deny unnecessary entry into the area. If dust is present, eliminate all sources of ignition. Use water fog, dry-chemical fire extinguishers, or foam to fight the fire. Firefighters should wear positive-pressure, self-contained breathing apparatus (SCBA) and protective firefighting clothing. If protective equipment is not available, fight the fire from a protected location or safe distance. During a fire, smoke may contain the original material in addition to combustion products of varying composition that may be toxic and/or irritating. Follow emergency procedures carefully. See Environmental, Health, and Physical Hazard Information.

For more information, download the relevant Safety Data Sheet from the Dow Plastics Additives web site (CPE Compounds) or request it from the Dow Customer Information Group.

**Health Information**

TYRIN™ CPE products have very low acute oral toxicity. Harmful effects are not anticipated from swallowing small amounts. It may cause minor irritation with eye or skin contact due to mechanical effects, but is not absorbed through the skin. Dust may cause irritation to the upper respiratory tract. Some materials used in compounding and formulating may pose a hazard to health and safety. Users should observe the handling recommendations provided by the suppliers of these additives.

For more information, download the relevant Safety Data Sheet from the Dow Plastics Additives web site (CPE Compounds) or request it from the Dow Customer Information Group.

**Environmental Information**

Because TYRIN™ CPE products are water-insoluble polymeric solids, they are expected to be inert in the environment. No bioconcentration (accumulation in the food chain) is expected because of the relatively high molecular weight of the material. Neither is appreciable

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biodegradation expected, but surface photodegradation may occur with exposure to sunlight. In the aquatic environment, the material will sink and remain in the sediment. It is not expected to be acutely toxic to aquatic organisms.

For more information, download the relevant Safety Data Sheet from the Dow Plastics Additives web site (CPE Compounds) or request it from the Dow Customer Information Group.

Back to top

Physical Hazard Information

Because of the chlorine content, TYRIN™ CPE products do not readily support ignition. However, they will burn under certain conditions of heat and oxygen supply. TYRIN CPE products should not be exposed to direct flame or extreme heat. In a fire situation, toxic gases such as carbon monoxide and hydrogen chloride can be released.

TYRIN CPE products are stable at normal temperatures. However, thermal decomposition can occur in some fabricating operations, resulting in the release of hydrogen chloride, carbon monoxide, and other toxic or irritating vapors. Good ventilation and a supply of fresh air of fabrication areas are necessary to control hazardous vapors in the work environment. TYRIN CPE products, like all chlorine-containing polymers, should be chemically stabilized for processing stability and improved long-term heat exposure. Prolonged exposure of TYRIN CPE products to temperatures in excess of 150°C can result in dehydrochlorination. Keep process temperatures below 200°C to minimize this risk.

Zinc compounds, including zinc oxide, can decompose TYRIN™ CPE products and contact should be avoided in all compounds.

For more information, download the relevant Safety Data Sheet from the Dow Plastics Additives web site (CPE Compounds) or request it from the Dow Customer Information Group.

Back to top

Regulatory Information

Regulations may exist that govern the manufacture, sale, transportation, use, and/or disposal of TYRIN™ CPE products. These regulations may vary by city, state, country, or geographic region. Information may be found by consulting the relevant Safety Data Sheet, Technical Data Sheet, or Contact Us.

Some TYRIN CPE products contain a substance which is on the Candidate List of Substances of Very High Concern (SVHC) for Authorization by the European Chemical Agency (ECHA) as dangerous to the environment.

Back to top

Additional Information

- Download individual Safety Data Sheets or Technical Data Sheets by following the appropriate links from the Dow Plastics Additives web site (select CPE Compounds) or request them from the Dow Customer Information Group
- Contact Us (www.dow.com/additives/contact/)

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TYRIN™ Chlorinated Polyethylene: Safety and Handling Information for TYRIN Chlorinated Polyethylene, The Dow Chemical Company, Form No. 776-00044-1005 (http://www.dow.com/elastomers/lit/tyrin_lit.htm)


Fact Sheet: TYRIN Chlorinated Polyethylene Thermoplastic Products and Elastomers, The Dow Chemical Company, Form No. 776-00901 (http://www.dow.com/elastomers/lit/tyrin_lit.htm)


For more business information about TYRIN CPE products, visit the Dow Plastics Additives website at www.dow.com/additives/.

References
1 Fact Sheet: TYRIN Chlorinated Polyethylene Thermoplastic Resins and Elastomers, The Dow Chemical Company, Form No. 776-00901
3 TYRIN 6000 Chlorinated Polyethylene Resin Material Safety Data Sheet, The Dow Chemical Company
4 TYRIN Chlorinated Polyethylene: Safety and Handling Information for TYRIN Chlorinated Polyethylene, The Dow Chemical Company, Form No. 776-00044-1005
5 Estimates by The Dow Chemical Company
NOTICES:

As part of its 2015 Sustainability Goals, Dow has committed to make publicly available safety assessments for its products globally. This product safety assessment is intended to give general information about the chemical (or categories of chemicals) addressed. It is not intended to provide an in-depth discussion of health and safety information. Additional information is available through the relevant Safety Data Sheet, which should be consulted before use of the chemical. This product safety assessment does not replace required communication documents such as the Safety Data Sheet.

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Back to top

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