Product Safety Assessment

CELLOSIZE™ Hydroxyethylcellulose

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Names
• CAS No. 9004-62-0
• CELLOSIZE™ hydroxyethylcellulose
• Hydroxyethylcellulose

Product Overview
• Hydroxyethylcellulose (HEC) is a nonionic, water-soluble polymer that can thicken, suspend, bind, emulsify, form films, stabilize, disperse, retain water, and provide protective colloid action. It is a free-flowing powder that readily dissolves in hot or cold water without excessive mixing or heating. For further details, see Product Description.
• HEC has a wide variety of uses including paint thickening, oil production, latex polymerization, agriculture, construction, cosmetics and detergents, paper and inks, textile sizes, coatings, binders, and adhesives and dyeing aids, and household products. For further details, see Product Uses.
• Dow does not sell HEC for direct consumer use, but it is used in many consumer products. For further details, see Exposure Potential.
• HEC products are not considered to present any significance health hazards under normal handling conditions. For further details, see Health Information.
• HEC is thermally stable at typical storage and use temperatures. Avoid temperatures above 200°C (392°F), as the material can decompose. Avoid contact with oxidizing materials. HEC dust, when suspended in air, can represent an explosion hazard. For further details, see Physical Hazard Information.

Manufacture of Product
• Production Locations – Dow produces HEC at facilities in Institute, West Virginia, United States; and Zwijndrecht, Belgium.
• Process – HEC is produced by exposing purified cellulose to sodium hydroxide and then reacting the alkali-treated cellulose with ethylene oxide. The hydrogen atoms in pendant hydroxyl (—OH) groups are replaced with hydroxyethyl groups, leading to a water-soluble polymer. The degree of substitution (average number of hydroxyl positions that have been reacted with ethylene oxide) and the molar substitution (average number of ethylene oxide molecules that have reacted with each unit) can be controlled to tailor the properties and characteristics to a variety of applications.

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**Product Description**

HEC is a nonionic, water-soluble polymer that can thicken, suspend, bind, emulsify, form films, stabilize, disperse, retain water, and provide protective colloid action. It is a free-flowing powder that readily dissolves in hot or cold water without excessive mixing or heating. HEC products typically contain 85 to 95% hydroxyethylcellulose, with the balance comprised of sodium acetate (CAS No. 127-09-3) and water (CAS No. 7732-18-5). Minor components such as isopropanol (CAS No. 67-63-0) and cellulose (CAS No. 9004-34-6) may also be present. HEC polymers are produced in several viscosity ranges and in grades that are enzyme resistant (ER), hydrate rapidly (WP), and disperse rapidly (OP). HEC products are marketed by Dow under the trade name CELLOSIZE™ hydroxyethylcellulose.

**Product Uses**

- **Paint thickening** – Used as a low-foaming and efficient stabilizer for water-based paints.
- **Oil production** – Used to build viscosity in drilling, work-over, and completion fluids for oil recovery operations.
- **Latex polymerization** – Used to create monomer emulsions, stabilize growing polymer particles during polymerization, and impart freeze/thaw and shear stability to the latex product.
- **Agriculture** – Used to suspend solid pesticides in water-based sprays, help bind the pesticide to foliage, and help thicken spray emulsions to reduce spray drift. HEC can also be used as a seed coating.
- **Construction** – Used in gypsum, cement, lime, and organic plasters, tile adhesives, and mortars.
- **Cosmetics and detergents** – Used as a thickener, film-former, binder, stabilizer, and dispersant in shampoos, creams, neutralizers, and lotions.
- **Paper and inks** – Used as a gloss and ink hold-out sizing. Also contributes to improved grease resistance and improved water retention of coating colors.
- **Textile sizes, coatings, binders, and adhesives and dyeing aids** – Used for warp sizing and finishes that can be removed by laundering, as well as an adhesive thickener and binder to control strike-through and improve print definition.
- **Household products** – Used as a thickener, stabilizer, and binder in liquid detergents and cleaners, fabric softeners, polishes, and air fresheners.

**Exposure Potential**

Hydroxyethylcellulose (HEC) is used in the production of industrial and consumer products. Based on the uses for HEC, the public could be exposed through:

- **Workplace exposure** – Exposure can occur either in a HEC manufacturing facility or in the various industrial or manufacturing facilities that use HEC. It is produced, distributed, stored, and consumed in closed systems. Those working with HEC in manufacturing operations could be exposed during maintenance, sampling, testing, or other procedures. Each manufacturing facility should have a thorough training program for employees and appropriate work processes and safety equipment in place to limit unnecessary HEC exposure. See [Health Information](#).

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• Consumer exposure to products containing HEC – Dow does not sell HEC for direct consumer use, but it is used in many products used by consumers. CELLOSIZE™ hydroxyethylcellulose (HEC) is presently approved, under regulations of the United States Food and Drug Administration (FDA), for use in indirect food applications, such as food packaging adhesives and can and paper coatings. See Health Information.

• Environmental releases – In the event of a spill, the focus is on containing the spill to prevent contamination of soil and surface or ground water. For small spills, sweep up the material immediately and dispose of the material properly. Use care to minimize generation of airborne dust. For large spills, see bullet point immediately below. This material is considered practically nontoxic to aquatic organisms on an acute basis. 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 and reprocessed or disposed of according to applicable governmental requirements. Do not use water for clean-up as surfaces can become extremely slippery. See Environmental, Health, and Physical Hazard Information.

• In case of fire – Isolate the fire and deny any unnecessary entry into the area. Use water or carbon-dioxide or dry-chemical extinguishers for small fires. Avoid creating airborne dusts, which could represent an explosion hazard. Firefighters should wear positive pressure, self-contained breathing apparatus (SCBA) and protective fire-fighting clothing. Follow emergency procedures carefully. See Physical Hazard Information.

For more information, see the relevant Safety Data Sheet.

Health Information

Eye and skin contact – These products are essentially nonirritating to the eye. Prolonged skin exposure is not likely to cause significant irritation or result in absorption of harmful amounts.

Inhalation – HEC dust may cause irritation to the upper respiratory tract (nose and throat).

Ingestion – HEC has very low toxicity if swallowed and is approved for indirect food packaging applications. It is not intended for human consumption and ingestion of significant amounts of HEC may result in gastrointestinal irritation.

Other – Animal studies on similar cellulosic products did not cause cancer, birth defects, or other toxic effects to the fetus, nor did it interfere with reproduction. Genetic toxicity studies on similar cellulosic materials have been negative.

For more information, see the relevant Safety Data Sheet.

Environmental Information

The bioconcentration potential (tendency to accumulate in the food chain) of HEC is low, and it is expected to have low mobility in soil. Biodegradation is not expected to occur. HEC is not expected to be toxic to aquatic organisms on an acute basis.

For more information, see the relevant Safety Data Sheet.
Physical Hazard Information\textsuperscript{2}\textsuperscript{10}

HEC is thermally stable at typical storage and use temperatures. Avoid temperatures above 200°C (392°F), as the material can decompose. Avoid contact with oxidizing materials.

HEC dust, when suspended in air, can represent an explosion hazard. Do not permit dust to accumulate, avoid generating air-borne dust, and minimize sources of ignition. Ground and bond all equipment.

For more information, see the relevant Safety Data Sheet.

Regulatory Information

Regulations may exist that govern the manufacture, sale, transportation, use, and/or disposal of hydroxyethylcellulose. These regulations may vary by city, state, country, or geographic region. Information may be found by consulting the relevant Safety Data Sheet or the Dow Customer Information Group.

Additional Information

- Safety Data Sheet (\url{http://www.dow.com/webapps/msds/msdssearch.aspx})
- Dow Customer Information Group (\url{http://www.dow.com/assistance/dowcig.htm})
- CELLOSIZER\textsuperscript{TM} Hydroxyethyl Cellulose, The Dow Chemical Company, Form No. 325-00001-0805 AMS, August 2005
- CELLOSIZE Hydroxyethylcellulose, Amerchol (a subsidiary of The Dow Chemical Company), Form No. 324-00006-0305 AMS, March 2005
- CELLOSIZE Hydroxyethyl Cellulose—Explosibility Data, The Dow Chemical Company, Form No. 325-00064-0305AMS, March 2005
- CELLOSIZE Hydroxyethyl Cellulose—Used in Household Cleaning Products, The Dow Chemical Company, Form No. 325-00026-1201 AMS, December 2001
- CELLOSIZE Hydroxyethyl Cellulose for Oilfield Applications, The Dow Chemical Company, Form No. 325-00005-0204 AMS, February 2004
- CELLOSIZER\textsuperscript{TM} Hydroxyethyl Cellulose for Coating Applications, The Dow Chemical Company, Form No. 325-00002-1002 AMS, October 2002

For more business information about hydroxyethylcellulose, visit Dow’s Cellulosics web site: \url{http://www.dow.com/dowwolff/en/industrial_solutions/}.

References

1. CELLOSIZER\textsuperscript{TM} Hydroxyethyl Cellulose, The Dow Chemical Company, Form No. 325-00001-0805 AMS, August 2005, page 3-7.
2. CELLOSIZE Hydroxyethyl Cellulose QP-4400H Material Safety Data Sheet, The Dow Chemical Company
3. CELLOSIZER\textsuperscript{TM} Hydroxyethyl Cellulose, The Dow Chemical Company, Form No. 325-00001-0805 AMS, August 2005, page 8.

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7 CELLOSIZE™ Hydroxyethylcellulose, Amerchol (a subsidiary of The Dow Chemical Company), Form No. 324-00006-0305 AMS, March 2005, page 2.

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