Product Safety Assessment

DOW™ Brake Fluids

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
- DOW™ Brake Fluid
- Brake Fluid 1000
- DOW Racing Fluid
- Racing fluid
- DOW Brake Fluid 300
- DOW Brake Fluid 310
- DOW Brake Fluid 315
- DOW™ Brake Fluid 345
- DOW Brake Fluid 360
- DOW Brake Fluid 399
- DOW Brake Fluid 455
- DOW Brake Fluid 457
- DOW™ Brake Fluid 460
- DOW Brake Fluid 565
- DOW Brake Fluid 700
- DOT 3 hydraulic brake fluid
- DOT 4 hydraulic brake fluid
- DOT 5.1 hydraulic brake fluid
- DOT 3 hydraulic brake fluid
- DOT 4 hydraulic brake fluid
- DOT 5.1 hydraulic brake fluid

Product Overview
- Dow Automotive is a producer of hydraulic brake fluids for original equipment manufacturer (OEM) and aftermarket customers. DOW™ brake fluids are colorless to amber-yellow viscous liquids. These products are formulated according to manufacturer specifications. Dow Automotive manufactures a complete line of (U.S. Department of Transportation) DOT 3, DOT 4, and DOT 5.1 motor-vehicle brake fluids. DOW brake fluids are fully tested and certified and exceed industry safety standards. For further details, see Product Description.
- DOW brake fluids are added to the hydraulic braking system during the vehicle assembly process. DOW brake fluids are also used in race cars and in aftermarket applications. For further details, see Product Uses.
- Worker exposure to brake fluid is possible during production of the brake fluids, and use of these materials in manufacturing or vehicle maintenance or repair. DOW brake fluids are used in OEM applications, as well as by professional or amateur mechanics. For further details, see Exposure Potential.
- Health information for a specific DOW brake fluid product is summarized on the relevant Safety Data Sheet. Health risks associated with individual products may vary based on formulation components. Users of these products must follow the precautions provided on the specific Safety Data Sheet and product label. For further details, see Health Information.
- Triethylene glycol monomethyl ether, a component of DOW™ brake fluids, is ultimately biodegradable, unlikely to bioaccumulate in the food chain, and is practically non-toxic to fish and aquatic organisms. For further details, see Environmental Information.

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Product Safety Assessment: DOW™ Brake Fluids

- DOW brake fluids are stable under recommended storage conditions but can oxidize at elevated temperatures. Containers should be kept sealed to prevent the absorption of moisture. Avoid contact with strong acids, strong bases, and strong oxidizers. For further details, see Physical Hazard Information.

Back to top

Manufacture of Product

- **Locations** – Dow Automotive manufactures DOW™ brake fluid at facilities in the U.S., Latin America, and Europe, and distributes brake fluids globally.
- **Process** – DOW brake fluids are formulated according to manufacturer specifications.

Back to top

Product Description\(^1,2,3\)

DOW™ brake fluids are colorless to amber yellow, viscous liquids manufactured by Dow Automotive. These products are formulated from glycol ethers, borate esters, and/or mixtures thereof. They also contain lubricants and additives, such as stabilizers and corrosion inhibitors. DOW brake fluids are fully tested and certified for performance specifications and meet or exceed relevant industry safety standards: Federal Motor Vehicle Safety Standard (FMVSS) No. 571 116; U.S. Department of Transportation DOT 3, DOT 4, and DOT 5.1; Society of Automotive Engineers (SAE) standards J1703 and J1704, and International Standards Organization (ISO) 4925.

Triethylene glycol monomethyl ether (CAS No. 112-35-6) and its glycol ether analogues are components of DOW brake fluids. For safety information on Dow’s glycol ether products and other brake fluid components, visit Dow’s Product Safety Assessment Finder.

Back to top

Product Uses\(^1,4,5\)

DOW™ brake fluids are used in aftermarket and OEM applications. Hydraulic brake fluids are designed for use over a broad temperature range to transmit pressure from the brake pedal through hydraulic lines to the braking mechanisms in the wheels.

Back to top

Exposure Potential\(^2,3\)

DOW™ brake fluids are used in aftermarket and OEM applications. Based on the uses for these products, the public could be exposed through:

- **Workplace exposure** – DOW brake fluids are manufactured in closed systems using engineering controls that prevent the escape of liquid or vapors and minimize release to the environment. The chance of worker exposure is further reduced by proper use of personal protective equipment. Workers who produce these products and those using them during vehicle assembly may be exposed during sampling, testing, application, or other procedures. Mechanics using these products for brake maintenance or repair can also contact these materials. Facilities that manufacture or use these products should have a thorough training program for employees and appropriate work processes and safety equipment in place to limit unnecessary exposure. See Health Information.

- **Consumer exposure to DOW brake fluids** – Professional or amateur mechanics could contact these materials during maintenance or repair. Always read the product information before use and follow the label/use instructions carefully. See Health Information.

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- **Environmental releases** – *Triethylene glycol monomethyl ether*, a component of DOW brake fluids, may slowly evaporate from products containing it. The substance is very soluble in water, and when introduced, will have a tendency to remain in water. Because *triethylene glycol monomethyl ether* is ultimately biodegradable, it will be removed from water and soil environments, including sewage treatment plants. If these materials are spilled, prevent from entering soil, ditches, sewers, waterways, or groundwater. For small spills, absorb with materials such as cat litter, sand, sawdust, or vermiculite. Collect in suitable and properly labeled containers. If a large spill occurs, isolate the area and evacuate personnel. Contain spilled material if possible. Pump recovered material into suitable and properly labeled containers. Use appropriate safety equipment. See Environmental, Health, and Physical Hazard Information.

- **In case of fire** – Keep people away and deny unnecessary entry. Use water fog or fine spray, dry-chemical or carbon-dioxide fire extinguishers, or foam. Alcohol-resistant foams (ATC type) are preferred. Use of a direct water stream may spread the fire. Fight the fire from a protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Firefighters should wear positive-pressure, self-contained breathing apparatus (SCBA) and protective firefighting clothing. Follow emergency procedures carefully. See Health and Physical Hazard Information.

For more information, review the relevant Safety Data Sheet.

**Health Information**

Health information for specific DOW™ brake fluids is summarized on the relevant Safety Data Sheet. Health risks associated with individual products may vary based on formulation components. An overview is presented below. Users of DOW brake fluids must follow the precautions provided on the specific Safety Data Sheet.

**Eye contact** – Eye contact with most brake fluids may cause slight irritation with slight corneal injury. Brake fluids with a pH greater than 9 may cause severe eye irritation and severe corneal injury.

**Skin contact** – Skin contact may cause irritation with local redness. Prolonged or repeated skin contact, or contact with broken skin, may cause a more severe response, even a burn. Prolonged skin contact is unlikely to result in absorption of harmful amounts.

**Inhalation** – At room temperature, brake fluids are not an inhalation risk due to their low volatility. Inhalation of heated material or mists may irritate the upper respiratory tract (nose and throat).

**Ingestion** – Brake fluids have low toxicity if swallowed. Small amounts swallowed incidental to normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury.

**Effects of Repeated exposure** – Brake fluids contain components that have been reported to cause effects on the following organs in animals: testes, central nervous system, gastrointestinal tract, kidneys, liver, thymus, and bladder.

For more information, review the relevant Safety Data Sheet.
Environmental Information\textsuperscript{2,6}

DOW™ brake fluids are formulations made up of many compounds. Environmental risks associated with individual products may vary. Spilled brake fluid should be prevented from entering soil, ditches, sewers, or groundwater.

Triethylene glycol monomethyl ether, a component in DOW brake fluids, has a low volatility, and may slowly evaporate from products containing it. The substance is very soluble in water, and when introduced, will have a tendency to remain in water. It has minimal tendency to bind to soil or sediment.

Triethylene glycol monomethyl ether is unlikely to persist in the environment. The substance is ultimately biodegradable, which suggests the chemical will be removed from water and soil environments, including biological wastewater treatment plants.

Triethylene glycol monomethyl ether is not likely to accumulate in the food chain (bioconcentration potential is low) and is practically non-toxic to fish and other aquatic organisms on an acute basis.

The OECD SIDS Initial Assessment Profile for triethylene glycol monomethyl ether concluded that the chemical is currently of low priority for further work due to its low hazard potential for human health and the environment.

For more information, see the relevant Safety Data Sheet.

Physical Hazard Information\textsuperscript{2}

DOW™ brake fluids are stable under recommended storage conditions, but can oxidize at elevated temperatures. Decomposition products depend on temperature, air supply, and the presence of other materials. Generation of gas during decomposition can cause pressure build-up in closed systems. Do not distill to dryness. Store indoors, in tightly-closed, properly vented containers. Containers should be kept sealed to prevent the absorption of moisture. Avoid contact with strong acids, strong bases, and strong oxidizers.

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 DOW™ brake fluids. These regulations may vary by city, state, country, or geographic region. Information may be found by consulting the relevant Safety Data Sheet or Contact Us.

Additional Information

- Safety Data Sheets (www.dow.com/webapps/msds/msdssearch.aspx)
- Contact Us (www.automotive.dow.com/contact/)
- Dow Customer Information Group (www.dow.com/assistance/dowcig.htm) or 1-800-258-2436 or 1-989-832-1556 (U.S.) or 1-800-331-6451 (Canada)
Product Safety Assessment: DOW™ Brake Fluids

- OECD SIDS Initial Assessment Report for SIAM 4: 2-(2-(2-Methoxyethoxy)ethoxy)-ethanol
  CAS No: 112-35-6, Tokyo, Japan, 20-22 May, 1996, UNEP Publications
  (http://www.chem.unep.ch/irptc/sids/OECDSIDS/112356.pdf)

For more business information about DOW™ brake fluids, visit the Dow Automotive web site at

References

1 DOW™ Brake Fluids Exceed Technical Specifications and Standard Requirements, Dow
   Automotive, Form No. 299-51123-1006 HMC/GG
2 Dow Brake Fluid 310 Material Safety Data Sheet, The Dow Chemical Company
3 Dow Brake Fluid 700 Material Safety Data Sheet, The Dow Chemical Company
4 Dow Automotive – Automotive Fluids webpage:
5 Dow Brake Fluid 310 D.O.T 3 Hydraulic Brake Fluid, Technical Data Sheet, Dow Automotive,
   Form No. 299-50366
6 Dow Brake Fluid IB71 Material Safety Data Sheet, The Dow Chemical Company

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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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