Aerosol Cleaner Use in Auto Repair

Overexposure to solvent-based aerosol (spray can) cleaners affects the nervous system (the brain), causing nausea, dizziness, clumsiness, drowsiness, and other effects like those of being drunk. Overexposure for months or years can cause long-lasting and possibly permanent damage to the nervous system. The symptoms of long-term effects include fatigue, sleeplessness, poor coordination, difficulty in concentrating, loss of short-term memory, and personality changes such as depression, anxiety, and irritability. Solvents in aerosol automotive cleaners can irritate the eyes, nose, throat, and skin. Skin contact can cause skin rash (dermatitis). Some solvents can also cause chronic health effects such as damage to the nerves in the feet, legs, hands, and arms, damage to the reproductive system, birth defects, and cancer. Use the safer aerosol cleaners described in this fact sheet to help protect your health and the environment.

How to know if you are working with solvent-based aerosol cleaners

Solvents are used to dissolve grease. Aerosol and non-aerosol automotive cleaners can contain solvents. If you think the cleaner you are using contains solvents, ask to see the Material Safety Data Sheet (MSDS). The MSDS must identify the solvent in Section 2 by the Chemical Abstract Service (CAS) number. Under Cal/OSHA's Hazard Communication Standard (see page 4), your employer must tell you if you are using an aerosol cleaner that contains hazardous solvents, and must train you to use the cleaner safely.

Solvents frequently found in automotive aerosol cleaners

Solvent	CAS #
Acetone	67-64-1
Toluene	108-88-3
Xylene	1330-20-7
Methanol	67-56-1
Heptane	142-82-5
Ethylbenzene	100-41-4

Solvents can vary and most products contain more than one solvent. Check Section 2 of your current MSDSs.

How aerosol automotive cleaners are used

Aerosol automotive cleaners are used as…

- brake cleaners
- carburetor or fuel-injection air intake cleaners
- engine degreasers
- general purpose degreasers

Some aerosol automotive cleaning products that contain solvents

- CRC Brakleen Brake Parts Cleaner
- CRC Clean R Carb™ Carb Cleaner
- Radiator Speciality Company Non-Chlorinated Brake Cleaner
- Johnsens Non-Chlorinated Brake Parts Cleaner
- Radiator Speciality Carb Clean, Environmentally Responsible
- Non-Chlorinated Brake & Parts Cleaner
- Permatex, Inc. Pro-Strength Brake & Parts Cleaner
- Brake-Clean Earth Friendly Brake Parts Cleaner
- Moc Throttle Body & Air Intake Cleaner
- Moc Brake Wash
- 3M™ Throttle Plate & Carb Cleaner

These are examples of products with solvents listed on the MSDSs. Most automotive aerosol cleaners contain solvents. This is not a complete list. Be sure to check the MSDS for the ingredients of the aerosol cleaner you are using.

FACT SHEET

HESIS

HAZARD EVALUATION SYSTEM & INFORMATION SERVICE
California Department of Health Services
Occupational Health Branch
1515 Clay Street, Suite 1901, Oakland, CA 94612
510-622-4300 • www.dhs.ca.gov/ohb

DECEMBER 2004

California Department of Health Services • California Department of Industrial Relations

How you are exposed to solvent-based aerosol cleaners

Solvents in aerosol cleaners enter your body when you breathe vapors of the solvents or droplets of spray in the air. Some solvents, like toluene, methanol, 1-bromopropane (1-BP), and n-methyl pyrollidone, can enter your body when they touch your skin.

Your risk of health effects depends on which solvents are in the aerosol cleaner and the amount of the solvent that enters your body. The amount (the concentration) of the solvent in the air and how long you are exposed determines how much enters your body.

How solvent-based aerosol cleaners can affect your health

Central Nervous System (Brain). Solvents in aerosol cleaners can affect your brain the same way drinking alcohol does. Overexposure for a short time causes headache, nausea, dizziness, clumsiness, drowsiness and other effects like those of being drunk. Drinking alcohol within a few hours of exposure increases these effects and makes them last longer, because the effects of alcohol and solvents add together. The symptoms of short-term exposure usually clear up within hours after exposure stops.

These short-term effects on your health occur more quickly and become more noticeable and serious as the amount of solvent and the time you're exposed increases. These effects can increase your chances of being injured.

Repeated, frequent overexposure to solvents in aerosol cleaners over months or years can have long-lasting and possibly permanent effects on the nervous system. The symptoms of these long-term effects include fatigue, sleeplessness, poor coordination, difficulty in concentrating, loss of short-term memory, and personality changes such as depression, anxiety, and irritability.

Peripheral Nervous System. Overexposure to cleaners containing n-hexane (see **www.dhs.ca.gov/ohb/HESIS/nhexane/pdf**) can damage the nerves in the feet, legs, hands, and arms. The damage can last a long time and may become permanent. The symptoms include numbness, tingling, weakness (sometimes even paralysis), and reduced ability to feel touch, pain, vibration, and temperature.

A new solvent, 1-bromopropane (1-BP) or n-propyl bromide (see **www.dhs.ca.gov/ohb/HESIS/bpropane/pdf**) can also damage the nerves, causing weakness, pain, numbness, and paralysis.

Skin. The solvents in aerosol products can dissolve your skin's natural protective oils. Frequent or prolonged contact can cause irritation and dermatitis (skin rash), with dryness, redness, flaking, and cracking of the skin–allowing solvents to easily enter your body.

Eyes, Nose, Throat and Lungs. Solvent vapors from aerosol cleaners can irritate your eyes, nose, throat, and lungs. Symptoms include stinging or burning of the eyes, burning or soreness of the nose and throat, hoarseness, coughing, chest tightness, and shortness of breath.

Liver and Kidneys. Most solvents rarely cause liver or kidney damage if exposures are kept near workplace limits and there are no noticeable effects on the nervous system. However, long-term exposure to solvent-based aerosols and drinking alcohol can increase your risk of liver damage.

A new solvent, decamethylcyclopentasiloxane (or D5), contained in some non-aerosol automotive cleaners, caused liver damage when test animals were exposed to low levels in the air. The effects of D5 on human health are not known.

Cancer. Some aerosol cleaners contain solvents like ethylbenzene that cause cancer in animals. Methylene chloride, perchloroethylene, and trichloroethylene cause cancer in animals; their use in automotive consumer products is prohibited in California (see **www.arb.ca.gov/regact/amr/finreg.pdf**).

D5 and 1-BP are being tested for cancer. Solvents that cause cancer in animals can also cause cancer in humans. Avoid exposure to products containing solvents that cause cancer whenever possible, or keep exposures to a minimum.

Pregnancy and Reproduction. Solvents in aerosol cleaners can reach the developing fetus when inhaled by pregnant workers; solvents can also contaminate breast milk. Therefore, pregnant or breastfeeding women should minimize their exposure to solvents in aerosol cleaners.

Some solvents cause specific toxic effects on the developing fetus and on reproduction. Low-level exposure to some glycol ether solvents causes birth defects in test animals. 1-BP and n-methyl pyrrolidone harm the developing fetus when animals are exposed during pregnancy. The effects of these solvents on human pregnancy have not been studied.

Certain glycol ether solvents damaged the testicles of test animals, and reduced the sperm counts in studies of exposed men. 1-BP caused sterility in both male and female test animals. Effects of 1-BP on human reproduction have not been studied.

Are there any tests for health effects and exposure?

If you are experiencing symptoms such as memory loss, confusion, and mood changes and have been exposed to solvents in aerosol cleaners for a long time, ask your doctor about neuropsychological testing.

A neurologist or a doctor who specializes in occupational medicine can test whether the nerves in your feet, legs, hands, and arms have been damaged by solvents such as n-hexane and 1-BP. The simplest way is to test nerve conduction velocity (how fast a nerve carries a message).

Complete physical examinations at the beginning of employment that include medical and work histories and periodic follow-up examinations are recommended.

There are tests that can determine the amount of some solvents (like toluene, ethylbenzene, and xylene) in your body. However, these tests are not generally recommended or required. Their usefulness depends on how each solvent is eliminated from the body. These tests can be difficult to conduct and interpret for mixtures of solvents, which often are present in aerosol automotive cleaners.

Reducing exposure to solvent-based aerosol cleaners

By law, employers must provide a safe and healthy workplace. Here are some ways employers and employees can work together to reduce exposure to solvent-based aerosol cleaners.

Substitute safer cleaning products whenever possible. Consult suppliers and see "Resources" on page 4.

- Clean **brakes** with *water-based* aerosol cleaners and non-aerosol water-based cleaning systems.
- Clean **carburetor** or **fuel-injection intakes** with aerosol cleaners formulated with *soy and acetone*.
- Degrease **engines** with *water-based* aerosol cleaners.
- Use *water-based* aerosol cleaners or aerosol cleaners formulated with *soy and acetone* for **general purpose cleaning**.
- Use aerosol products with **less toxic solvents** such as acetone, heptane, and isopropyl alcohol instead of solvents that cause cancer and other chronic health damage.

Avoid using products for which you do not have MSDSs and information on health hazards.

- Get MSDSs for all aerosol cleaning products; make sure you understand the health hazard information.

Use less, if you must use solvent-based cleaners.

Store rags soaked with solvent-based aerosol cleaners safely.

- Use self-closing, hinged metal containers to prevent hazards caused by evaporating solvents.

Make sure there is good ventilation if you use solvent-based cleaners.

- Local exhaust ventilation is most effective, but may not be feasible in many shops. It captures solvent vapors at the source before workers breathe them.
- General ventilation, using a fan-powered system to bring fresh air into the work area, is the next best way to ventilate shops. Current American Society of Heating, Refrigeration, and Air-Conditioning Engineers recommendations are 150 cfm of fresh air for every 150 square feet of an auto repair room.
- Open doors and windows usually provide unreliable ventilation.
- Indoor fans that blow contaminated air around without removing it from your work area are not effective.

Use respirators only if ventilation and other control methods are not effective and feasible.

- A "dust mask" does not remove solvent vapors from the air and will ***not*** protect you..
- A half-face respirator with organic vapor cartridge can reduce exposure to solvents in aerosol cleaners. Employers must comply with the Cal/OSHA Respiratory Protection Standard [Title 8, California Code of Regulations (CCR), Section 5144]. Requirements include making sure respirators fit properly and that you are medically fit to wear a respirator. See **www.dir.ca.gov/title8/5144.html**.

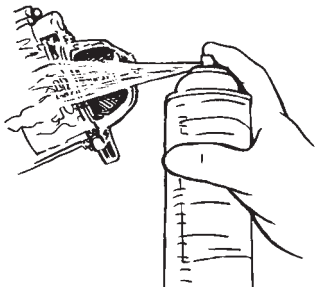
Protect your skin from contact with aerosol cleaning products.

- Wear protective gloves, such as nitrile, when using all aerosol automotive cleaners. Thin, low-cost, disposable nitrile gloves are available.
- Check manufacturers' specifications to make sure gloves resist penetration by the mixture of solvents in the aerosol cleaner you use. Inspect and replace gloves often to prevent leaks.
- Be aware of products containing solvents such as n-methyl pyrrolidone and 1-BP that can penetrate intact skin.

Continues on page 4…

Continued from page 3...

- Do not use latex gloves when working with solvent-based cleaners. They are not protective. They also can cause allergic skin rash and wheezing, shortness of breath, coughing, and other symptoms of asthma.
- Use chemical protective clothing such as aprons or sleeves if skin contact occurs at areas other than your hands.
- Employers are required to supply gloves or any other necessary protective equipment under California regulation [Title 8, CCR, Sections 3383 and 3384].



RESOURCES

Where to get help

- **HESIS** answers questions about chemicals and other workplace hazards and has many free publications.

  For information on workplace hazards: **(510) 622-4317**.

  For HESIS Publications: **(510) 622-4138**. See **www.dhs.ca.gov/ohb.**

- **Institute for Research and Technical Assistance (IRTA)** has information on safe alternatives for solvent-based cleaners. **(818) 244-0300**.

- **California Division of Occupational Safety and Health (Cal/OSHA)** investigates workers' complaints and makes enforcement inspections. Complainants' identities are kept confidential. Call the nearest Cal/OSHA district office to your workplace or see **www.dir.ca.gov/DOSH/districtoffices.htm.**

- **Other resources for employees** may include your supervisor, your union, your company health and safety officer, your doctor, or your company doctor.

- **Cal/OSHA Consultation Service** helps employers who want free, non-enforcement help to evaluate the workplace and improve the health and safety conditions. Employers can call **(800) 963-9424**.

- **Occupational health services** can be found at:
  - University of California (UC) San Francisco: **(415) 885-7580**
  - UC Davis: **(530) 754-7635**
  - UC Irvine: **(949) 824-8641**
  - UC San Diego: **(619) 471-9210**

Regulations that help protect workers

- **Legal Exposure limits.** The Cal/OSHA Standards Board sets Permissible Exposure Limits (PELs) for the amounts of solvents and other chemicals in workplace air. PELs are intended to protect the health of most workers who are exposed every day over a working lifetime [Title 8, CCR, Section 5155]. See **www.dir.ca.gov/title8/5155.html.**

- **Hazard Communication Standard.** Under Title 8, CCR, Section 5194, your employer must tell you if any hazardous substances are used in your work area, must train you to use them safely, and must make MSDSs available. See **www.dir.ca.gov/title8/5194.html.**

- **Injury and Illness Prevention Program.** Under Title 8, CCR, Section 3203, every employer must have an effective, written Injury and Illness Prevention Program (IIPP) that includes: (1) methods for identifying and quickly correcting workplace hazards; (2) health and safety training; (3) a system for communicating clearly with all employees about health and safety matters and (4) record-keeping. See **www.dir.ca.gov/title8/3203.html.**

Arnold Schwarzenegger, Governor
State of California

Kimberly Belshé, Secretary
Health and Human Services Agency

Victoria L. Bradshaw, Secretary
Labor and Workforce Development Agency

Sandra Shewry, Director
Department of Health Services

John Rea, Acting Director
Department of Industrial Relations

JANE NORLING DESIGN

OSP 05 88032