



**Minnesota
Pollution
Control
Agency**

Selecting and Managing Brake and Carburetor Cleaners

Hazardous Waste Division Fact Sheet #4.10 July 1998

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Background

Brake cleaners and carburetor cleaners often contain more than ten percent F-listed solvents such as methylene chloride (dichloromethane), tetrachloroethylene, toluene and/or methyl ethyl ketone. In addition to health and safety concerns, these chemicals, if managed improperly, can pose a serious threat to our environment.

**Selecting Brake and Carburetor Cleaners —
Minnesota Department of
Transportation's (MnDOT)
Evaluation Tool**

The challenge for users who prefer solvent-based cleaners is to find the least toxic cleaner that will perform as needed. To help do this, MnDOT developed an evaluation tool for aerosol cleaners which allows brake and carburetor cleaners to be evaluated based on their chemical composition.

Use of this evaluation tool presupposes that you know the chemical makeup of the cleaner you wish to evaluate: that either the Material Safety Data Sheet (MSDS) accurately lists all chemicals and percentages of chemicals contained in the cleaner, or that you can get this information from the manufacturer. Using a MSDS and other chemical information, MnDOT rated the chemicals in Table 1 based on vapor

pressure, health hazards, cancer risk, flashpoint, odor, hazardous air pollutant (HAP) status, health risk to ground water and whether it is listed in Minnesota Rules (7045.0135) F list for toxicity or ignitability (Table 2). The higher the number, the greater the hazard. Using these criteria, MnDOT evaluated all the formulations listed in Table 3. Products are shown in order of lowest to highest score, with comments on special precautions. (For an example of how brake cleaners were evaluated using this process, see Table 4, page 5).

Prevention Tips

- Use the least toxic cleaner that will do the job.
- Catch drips and spills with a drip pan.
- Don't mix cleaners containing listed solvents with your parts washer solvent or used oil.
- Consider purchasing cleaners in bulk liquid form and using hand sprayers or charged reusable aerosols to apply them. Not only will you likely save initial purchase dollars, but you won't need to evaluate and manage failed or partially empty aerosol cans as regulated waste. Remember to use a funnel to prevent spills and waste!

Table 1: Brake Cleaner Chemical Scores

Chemical	Score (S)
d-Limonene	7
Isopropyl alcohol (Isopropanol)	13
Heptane	26
Xylene	27
Acetone	30
Methanol	32
1,1,1-Trichloroethane	34
Ethyl Benzene	37
Hexane	41
Methyl ethyl ketone	43
Methyl isobutyl ketone	44
Petroleum naphtha	50
Toluene	53
Trichloroethylene	56
Perchloroethylene	84
Methylene chloride	109

MnDOT prefers using the least hazardous cleaners that will do the job. If the performance of the less hazardous products is undesirable and a more hazardous cleaner is needed, MnDOT users are careful to use only the least amount necessary and to avoid using it with towels and sorbents.

Air Quality Requirements

A cleaner that is ranked best in terms of health, safety and environmental concerns may still be of concern for volatile organic compounds (VOCs) and/or hazardous air pollutants (HAPs). These two air quality requirements may apply:

1. If you are using a bucket to soak parts, it is affected by the National Emission Standards for Halogenated Solvent Cleaning Equipment (NESHAP) **IF**:
 - the container is greater than 2 gallons in capacity, and
 - the solvent is greater than 5 percent by weight of any of these six halogenated solvents:

Table 2: F-listed solvents (T = Toxic; I = Ignitable)

Solvent	T	I
Acetone		✓
Benzene	✓	✓
<i>n</i> -Butyl alcohol		✓
Carbon disulfide	✓	✓
Carbon tetrachloride	✓	
Chlorobenzene	✓	
Chlorinated fluorocarbons (CFCs)	✓	
Cresols	✓	
Cresylic acid	✓	
Cyclohexanone		✓
2-Ethoxyethanol	✓	✓
Ethyl acetate		✓
Ethyl benzene		✓
Ethyl ether		✓
Isobutanol	✓	✓
Methanol		✓
Methylene chloride	✓	
Methyl ethyl ketone	✓	✓
Methyl isobutyl ketone		✓
Nitrobenzene	✓	
2-Nitropropane	✓	✓
Orthodichlorobenzene	✓	
Pyridine	✓	✓
Tetrachloroethylene	✓	
Toluene	✓	✓
<i>1,1,1</i> -Trichloroethane	✓	
<i>1,1,2</i> -Trichloroethane	✓	
<i>1,1,2</i> -Trichloro- <i>1,2,2</i> -trifluoroethane	✓	
Trichloroethylene	✓	
Trichlorofluoromethane	✓	
Xylene		✓
All spent solvent mixtures/blends containing, before use, a total of ten percent or more by volume of one or more of the solvents listed above.		

trichloroethylene; methylene chloride; perchloroethylene; 1,1,1-trichloroethane; chloroform; or carbon tetrachloride.

(NOTE: All six of these solvents are HAPs.)

Aerosols are not affected by the NESHAP.

Table 3: Brake cleaning products evaluated by MnDOT

(The product with the least hazard is listed first.)

Brake Cleaner Product	Product Scores	Special Precautions
Zep Big Orange (d-limonene)	4.9 - 5.6	none
3M Brake <i>non-chlor</i> Cleaner	13.1 - 33.3	flammability
3M High Power	13.8 - 33.2	flammability
Zep ID Orange	28.0 - 31.5	flammability
3M Gasket Prep & Parts*	13.6 - 35.9	flammability/carcinogenic
CRC <i>non-chlor</i> Brakleen-green*	27.8 - 39.3	flammability/carcinogenic
Carb-R-Cleaner*	30.9 - 42.4	flammability/carcinogenic
Zep ID Red Aerosol*	33.5 - 38.9	flammability/carcinogenic
Airosol Parts Master- <i>chlor</i> *	40.6 - 46.5	flammability/carcinogenic
Warren Dist. MAG 1*	52.8 - 52.8	carcinogenic
Zep Aerosolve II*	50.4 - 56.0	carcinogenic
CRC <i>chlorinated</i> Brakleen-red*	55.1 - 84.0	carcinogenic
Airosol Parts Master non-chlor	---	not enough info on MSDS
Justice Bros BPC/20A	---	not enough info on MSDS

Shop towels contaminated with these cleaners must be collected and laundered or managed as a hazardous waste. Filters from water-based parts washers that have been contaminated must be managed as a hazardous waste. Contaminated items **may not be added to the used oil sorbent drum.*

2. You also need to determine whether or not your company needs an air permit. **First, you must identify all emission sources at the site.** The concerns with bucket cleaning or use of aerosols would be VOCs and HAPs. (Note: methylene chloride, perchloroethylene, and 1,1,1-trichloroethane are not VOCs.) **Then, you must determine your emissions.** If you use less than 200 gallons of VOCs in a 12-month period and all other emission sources qualify as insignificant activities, you do not need an air permit.

For more help determining air quality requirements, identifying insignificant activities, or determining whether or not you need a permit, call the Minnesota Pollution Control Agency's (MPCA) Air Quality Small Business Assistance Program. (Telephone numbers are on page 5.)

Managing Waste

- Nonhazardous Waste Brake and Carburetor Cleaner**

Check with your oil hauler. Some nonhazardous solvents may be able to be mixed with used oil. Water-based cleaners may be able to be discharged

into a sanitary sewer (not a septic system). Check with your local wastewater treatment plant operator.

- Hazardous Waste Brake and Carburetor Cleaner**

When used in small amounts, many aerosol brake and carburetor cleaners simply evaporate, leaving no waste. (Evaporation of some of these chemicals may cause health and safety concerns. Be sure to read the MSDS and follow health and safety precautions.)

When used in greater amounts, prevent cleaners from entering drains and avoid using sorbents by using drip pans to catch excess solvent. If using non-aerosol cleaners and dipping parts, allow excess liquid to drain off the parts; return usable cleaner to the product container for reuse.

Place hazardous waste solvent in a closed container marked with the words *Waste Brake/Carb Cleaner — Hazardous Waste* and the date you first started placing this material in the container (accumulation start date). Since waste cleaner may accumulate very slowly, you may wish to use a small container and/or collect the waste under satellite-accumulation rules*. Choosing a container that is acceptable for shipping will prevent the need to transfer the waste and limit the potential for spills and employee exposure.

*Under satellite accumulation rules, also mark the container with the date the container becomes full. The fill date determines when the container must be shipped. For more information, see hazardous waste fact sheet #1.04, *Label and Store Hazardous Waste Correctly*.

- **Waste Brake and Carburetor Cleaner and Your Parts Washer**

Although it may seem like a good idea to catch the drips in your parts washer, be careful! Parts washers generally contain either a mineral-spirits type cleaner that is hazardous because it is ignitable or a water-based cleaner. Adding even a little bit of brake or carburetor solvent that is on the F list (Table 2) will contaminate the parts washer, resulting in *all* of the cleaner becoming “listed.” The disposal method for listed wastes is different — and generally more expensive. If you mix F listed waste brake or carburetor cleaner or contaminated parts washer solvent with used oil, the whole container of oil may become contaminated and your oil hauler may not be able to accept it. This could require the contaminated oil to be managed as hazardous waste — a very expensive option.

- **Waste Sorbent Materials and Shop Towels**

Place any waste sorbent materials contaminated with brake or carburetor cleaners containing toxic chemicals listed in Table 2 in a closed container marked with the words *Waste Brake/Carb Cleaner Sorbents — Hazardous Waste* and the date you first started placing this material in the container. Disposable shop towels contaminated with toxic brake and carburetor solvents should also be managed this way. If you are using sorbent materials destined for incineration, towels and sorbents can likely be accumulated in the same container. Check with your waste hauler and/or disposal facility.

When you accumulate enough to require disposal (this depends on your generator size), check with the hauler that manages your parts washer solvent or used oil. Some of them are also able to take these types of cleaners. A list of service providers is available from the MPCA. Ask for fact sheet #6.00, *Used Oil Services* or #6.02, *Registered Hazardous Waste Transporters*.

Launderable shop towels contaminated with brake and carburetor cleaners (both hazardous and nonhazardous) should be wrung, if necessary, to remove any liquid. While on site, those contaminated with hazardous cleaners should be stored in a closed container marked with the words *Brake/Carb Cleaner Contaminated Towels — Hazardous Waste*. Keep a log of how often and how many of these towels are picked up. Towels transported to a laundry do not require a hazardous waste manifest or a registered transporter.

The preferred management for waste sorbent materials contaminated with brake or carburetor cleaners that are nonhazardous or only ignitable is to burn them at a burner recovering the energy or a municipal solid waste burner. A less desirable alternative is to send them to a municipal landfill. Before using either option, check with your hauler and the burner or landfill operator.

- **Empty Aerosol Containers**

If you use aerosols, containers are considered “empty” when there is no product remaining *and* there is no pressure in the can. Empty cans may be recycled or managed as an industrial solid waste. Check with your hauler to see if there are special handling requirements.

Occasionally aerosol cans malfunction before they are empty. Cans containing hazardous cleaners must be managed as hazardous waste.

Cans containing nonhazardous cleaners, but which are still under pressure, must be managed under MnDOT requirements as hazardous materials containers. For more information about MnDOT requirements, call the MnDOT hazardous materials number on page 6.

Cans that are not under pressure but contain **nonhazardous** liquid waste may still require special disposal. Depending upon where your solid waste is taken, they may or may not be able to be placed in your solid waste. Check with your hauler before placing any (except empty) aerosols in the solid waste.

Investigate using reusable, refillable containers that are charged with air to replace aerosols. Talk to your supplier or contact the Minnesota Technical Assistance Program (MnTAP) for more information.

MnDOT's Evaluation Tool — Sample

Table 4 shows how 3M High Power was ranked using MnDOT's evaluation tool. To calculate product scores, multiply the chemical score (column 2) by the percentage(s) of this chemical in the product to get the figures in columns 4 and 6. (A MSDS often gives a range rather than a single percentage — reflected on the table as Low % and High %.) Add the figures in each column and divide by 100 to get the weighted averages for the product formulation.

Table 4: Example of 3M High Power brake cleaner evaluated by tool

Column # 1	2	3	4	5	6
Formulation: 3M High Power	Score (S, from Table 1)	Low %	(S) x (%)	High %	(S) x (%)
d-Limonene	7				
Isopropyl Alcohol	13				
Heptane	26	40	1040	70	1820
Xylene	27	10	270	30	810
Acetone	30				
Methanol	32	1	32	10	320
1,1,1-Trichloroethane	34				
High flash P. Naphtha	35				
Ethyl Benzene	37	1	37	10	370
Hexane	41				
Methyl Ethyl Ketone	43				
Methyl Isobutyl Ketone	44				
Petroleum Naphtha	50				
Toluene	53				
Trichloroethylene	56				
Perchloroethylene	84				
Methylene Chloride	109				
	Totals		1379		3320
	Weighted Average (total / 100)		(Low) 13.79		(High) 33.20

For details of the evaluation process and calculations, contact MnDOT at the number given on page 6.

Do it Yourself!

Use this chart to calculate the scores for your cleaners.

- Find the chemicals in column 1 that are listed on your MSDS.
- Write the low and high percentages for each chemical in columns 3 and 5.
- Multiply the chemical score (S, column 2) by the low percentage (low%, column 3). Write the answer in column 4 ($S*\%_L$).
- Multiply the chemical score (S, column 2) by the high percentage (high %, column 5). Write the answer in column 6 ($S*\%_H$).
- Add the figures ($S*\%_L$) in column 4 and write in the Total. Add the figures in column 6 ($S*\%_H$) and write in the Total.
- Divide the Total of column 4 and the Total of column 6 by 100 to get the weighted averages for the product formulation.
- Compare these to the score ranges for the cleaners tested by MnDOT, Table 3, page 3.

Column # 1	2	3	4	5	6
Formulation:	Score (S from Table 1)	Low %	$S*\%_L$	High %	$S*\%_H$
d-Limonene	7				
Isopropyl Alcohol	13				
Heptane	26				
Xylene	27				
Acetone	30				
Methanol	32				
1,1,1-Trichloroethane	34				
High flash P. Naphtha	35				
Ethyl Benzene	37				
Hexane	41				
Methyl Ethyl Ketone	43				
Methyl Isobutyl Ketone	44				
Petroleum Naphtha	50				
Toluene	53				
Trichloroethylene	56				
Perchloroethylene	84				
Methylene Chloride	109				
	Totals				
	Weighted Average (total / 100)		(Low)		(High)

For More Information

Minnesota Pollution Control Agency		Metro County Hazardous Waste Offices	
Main	651/296-6300	Anoka	612/422-7093
Toll Free	800/657-3864	Carver	612/361-1800
Business Assistance Unit	651/297-8362	Dakota	612/891-7011
Regional		Hennepin	612/348-8100
Brainerd	218/828-2492	Ramsey	651/773-4466
Detroit Lakes	218/847-1519	Scott	612/496-8177
Duluth	218/723-4660	Washington	651/430-6655
Marshall	507/537-7146	MnDOT Evaluation Tool	651/770-5114
Rochester	507/285-7343	MnDOT Hazardous Mat'IRequirements	651/405-6060 800/4-SAFETY
Minnesota Tech Assistance Prgm			
Main	612/627-4646		