


Automotive Engines Theory and Servicing
Ninth Edition

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Chapter 2
Environmental and
Hazardous Materials



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OBJECTIVES (1 OF 2)

2.1 Identify hazardous waste materials in accordance with federal and state laws.

2.2 Discuss asbestos hazards and asbestos handling guidelines

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OBJECTIVES (2 OF 2)

2.3 Explain the storage and disposal of break fluid, used oil, coolants, lead-acid batteries, used tires, and air-conditioning refrigerant oil.

2.4 Explain the characteristics of hazardous solvents, fuel safety and storage, and airbag handling.

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HAZARDOUS WASTE

- What is the definition of hazardous waste?
- What is PPE? What are some examples and why is it important?

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FEDERAL AND STATE LAWS

- Occupational Safety and Health Act
- EPA
- Right-to-know Laws
- Resource Conservation And Recovery Act (RCRA)
- Clean Air Act

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FIGURE 2-1 Safety Data Sheets (SDS) should be readily available for use by anyone in the area who may come into contact with hazardous materials.



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ASBESTOS HAZARDS

- Asbestos OSHA Standards
- Asbestos Handling Guidelines
 - HEPA Vacuum
 - Solvent Spray
 - Disposal of Brake Dust and Brake Shoe



FIGURE 2-3 All brakes should be moistened with water or solvent to help prevent brake dust from becoming airborne.

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USED BRAKE FLUID (1 OF 2)

- Collect brake fluid in a container clearly marked to indicate that it is designated for that purpose.
- If the waste brake fluid is hazardous, be sure to manage it appropriately and use only an authorized waste receiver for its disposal.
- If the waste brake fluid is nonhazardous, determine from your local solid waste collection provider what should be done for its proper disposal.

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USED BRAKE FLUID (2 OF 2)

- Do not mix brake fluid with used engine oil.
- Do not pour brake fluid down drains or onto the ground.
- Recycle brake fluid through a registered recycler.

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USED OIL

- Storage and disposal of used oil
 - Keep used oil storage drums in good condition
 - Never store used oil in anything other than tanks and storage containers
 - Used oil filter disposal regulations

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FIGURE 2-4 A typical aboveground oil storage tank.



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SOLVENTS

- What are the effects of chemical poisoning?
- Hazardous solvents and regulatory status
- Use solvents
 - What are the requirements?

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FIGURE 2-6 Typical fireproof flammable storage cabinet.



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FIGURE 2-7 Using a water-based cleaning system helps reduce the hazards from using strong chemicals.



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COOLANT DISPOSAL

- Coolant should be disposed of in one of the following ways:
 - Coolant should be recycled either onsite or offsite.
 - Used coolant should be stored in a sealed and labeled container.
 - Used coolant can often be disposed of into municipal sewers with a permit.

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FIGURE 2-8 Used antifreeze coolant should be kept separate and stored in a leakproof container until it can be recycled or disposed of according to federal, state, and local laws. Note that the storage barrel is placed inside another container to catch any coolant that may spill out of the inside barrel.



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LEAD-ACID BATTERY WASTE

- Battery Disposal
 - What are the rules?
- Battery Handling and Storage

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FUEL SAFETY AND STORAGE

- Gasoline is a very explosive liquid and vapors are dangerous.
- Some basic rules apply to diesel fuel and gasoline storage. What are they?

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FIGURE 2-9 This red gasoline container holds about 30 gallons of gasoline and is used to fill vehicles used for training.



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AIRBAG HANDLING (1 OF 2)

- Airbag safety should include the following precautions.
 - Disarm the airbag(s) if you will be working in the area where a discharged bag could make contact with any part of your body.
 - If disposing of an airbag, the usual procedure is to deploy the airbag using a 12 volt power supply, such as a jump-start box, using long wires to connect to the module to ensure a safe deployment.

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AIRBAG HANDLING (2 OF 2)

- Do not expose an airbag to extreme heat or fire.
- Always carry an airbag pointing away from your body.
- Place an airbag module facing upward.
- Always follow the manufacturer's recommended procedure for airbag disposal or recycling
- Wear protective gloves if handling a deployed airbag.
- Always wash your hands or body well if exposed to a deployed airbag.

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USED TIRE DISPOSAL (1 OF 2)

- Used tires should be disposed of in one of the following ways.
 - Used tires can be reused until the end of their useful life.
 - Tires can be retreaded.
 - Tires can be recycled or shredded for use in asphalt.
 - Derimmed tires can be sent to a landfill

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USED TIRE DISPOSAL (2 OF 2)

- Used tires should be disposed of in one of the following ways.
 - Tires can be burned in cement kilns or other power plants where the smoke can be controlled.
 - A registered scrap tire handler should be used to transport tires for disposal or recycling.

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AIR-CONDITIONING REFRIGERANT OIL DISPOSAL

- Air-conditioning refrigerant oil contains dissolved refrigerant and is therefore considered to be hazardous waste.
- This oil must be kept separated from other waste oil or the entire amount of oil must be treated as hazardous.
- Used refrigerant oil must be sent to a licensed hazardous waste disposal company for recycling or disposal.

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FIGURE 2-10 Air-conditioning refrigerant oil must be kept separated from other oils because it contains traces of refrigerant and must be treated as hazardous waste.



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SUMMARY (1 OF 2)

- Hazardous materials include common automotive chemicals, liquids, and lubricants, especially those whose ingredients contain chlor or fluor in their name.
- Right-to-know laws require that all workers have access to material safety data sheets (MSDS).
- Asbestos fibers should be avoided and removed according to current laws and regulations.

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SUMMARY (2 OF 2)

- Used engine oil contains metals worn from parts and should be handled and disposed of properly.
- Solvents represent a serious health risk and should be avoided as much as possible.
- Coolant should be disposed of properly or recycled.
- Batteries are considered to be hazardous waste and should be discarded to a recycling facility.

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