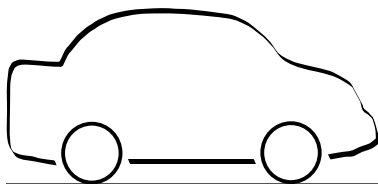


LUBRICATION SYSTEM



THINK SAFETY

Prolonged exposure to used oil has been shown to cause cancer in laboratory animals. Wear disposable gloves when changing oil so your skin will not be exposed to this hazard.

Objectives

After reading the *Auto Upkeep* text and completing the following activities, you will be able to:

- Define the purpose of engine oil.
- Explain oil service and viscosity ratings.
- Discuss the advantages and disadvantages of synthetic oils.
- Discuss the importance of oil filters.
- Change the oil and filter on a vehicle.

Summary

Engine oil lubricates, cools, cleans, and seals engine components. While engine oil is a vital component to the longevity of an engine and may seem extremely complex, it is not very difficult to service. When purchasing oil look for the SAE, API, and other ratings that meet the manufacturer's recommended requirements. Oil filters are used to remove contaminants from the engine oil and should be changed at oil change intervals. Synthetic oils are becoming more popular and accepted due to stringent engine tolerances. Always check your owner's manual for oil recommendations and change intervals.



Web Exploring

Key Terms/Internet Search Words

Use a search engine to investigate any of the following terms or phrases. Summarize your findings in a research paper.

- AC Delco Oil Filters
- American Petroleum Institute
- Castrol
- Champ Filters
- European Automotive Manufacturer's Association
- Exxon-Mobil
- Fram Oil Filters
- Hastings Oil Filters
- Havoline
- How to Change Oil on an Automobile
- International Lubrication Standardization Approval Committee
- Motorcraft Oil Filters
- Oil Recycling
- Oil Viscosity
- Pennzoil
- Phillips 66
- Society of Automotive Engineers
- Valvoline
- Wix Oil Filters

Name _____ Class _____ Date ____ / ____ / ____ Score _____

Study Questions - Lubrication System

1. What does oil do within an engine?

2. How does engine oil get dirty?

3. What does API stand for and what does it rate?

4. What does SAE stand for and what does it rate?

5. What is a common price for a quart of conventional oil?

6. Why is it not recommended to overfill the engine with oil?

7. What is one advantage and one disadvantage of synthetic oils?

8. How often should the oil and filter be changed?

9. What does an oil filter do?

10. Which oil is more viscous, 5W30 or 20W50?

Name _____ Class _____ Date ____ / ____ / ____ Score _____

Oil and Filter Change Activity

Objective

Upon completion of this activity, you will be able to safely change the oil and filter on a vehicle.

Connections to NATEF General Service Technician Tasks

Engine Repair

- Perform oil and filter change.

Tools

Safety glasses, basic hand tools, wrench for oil plug, oil filter wrench, oil drain pan, funnel, wheel chocks, jack with jack stands, or drive-on ramps with jack stands, or an automotive lift


Supplies

Shop rags, disposable gloves, correct type and amount of oil, oil filter


Cautions

Hot oil can cause burns. Prolonged contact with used oil may cause skin cancer.

Directions

Check off the boxes ☐ when completed. When you see a hand  next to the task, write the information in the activity journal. If you have any questions during the duration of this activity, stop and ask the instructor (if available) for assistance.

Procedure

-  Identify the oil viscosity and quantity needed for the vehicle.
- ☐ Warm the engine 5 to 10 minutes to loosen the contaminants and to thin the oil for draining.
- ☐ Shut off the engine and remove the key from the ignition.
- ☐ Put on eye protection and disposable gloves.

- ☐ Raise the end of the vehicle where the engine is located with a jack and support with jack stands (or use an automotive lift or drive-on ramps with jack stands).



- ☐ Apply the parking brake.
- ☐ Chock the wheels on the opposite end of the vehicle.
- ☐ Locate the drain plug on the oil pan and position the oil drain pan to catch the oil.



- ☐ Use the correct size wrench to loosen the oil drain plug. Turn counter-clockwise.
- ☐ Keep a steady inward pressure on the plug to avoid the hot oil from running down your arm. Use a shop rag to protect your hand if the oil is extremely hot or allow it to cool some.



66 AUTO UPKEEP WORKBOOK

- ☐ Make sure the oil will hit the oil drain pan.



- ☐ While the oil is draining, use an oil filter wrench to loosen the oil filter.

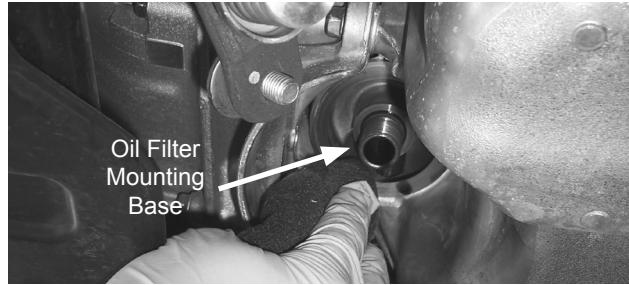


- ☐ Finish removing the oil filter by hand. Set the oil filter in the oil drain pan so the oil can drain out of it.



- ☐ Make certain the old oil filter gasket comes off with the old filter. If it is stuck on the oil filter mounting base, remove and discard it.

- ☐ Wipe off the oil filter mounting base and the area around the oil drain plug.



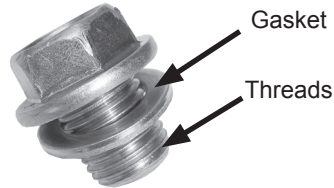
- ☐ Put a thin film of clean oil on the new oil filter-mounting gasket. This oil helps to seal the gasket. A dry gasket may tear when the filter is installed causing leaks.



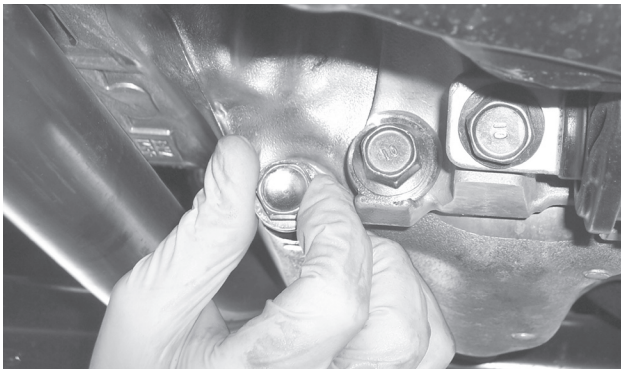
- ☐ Read the instructions on the filter. Install the oil filter by rotating it clockwise by hand. Once the gasket contacts the engine, tighten it according to the instructions - usually 1/2 to 1 full turn. A filter wrench may be necessary. Do not over tighten.



- ❑ Prior to reinstalling the drain plug, wipe off its threads and the sealing surface with a shop rag. Make certain that the plug's threads and gasket are in good condition before reinstalling. Replace if necessary.



- ❑ Install the drain plug by hand and temporarily tighten finger tight. Do not cross-thread the plug. Tighten the plug with the correct size of wrench until it is snug. Do not over tighten. If unsure how tight to get the plug, consult the owner's or service manual for torque specifications. Over tightening can cause thread damage, while under tightening may result in oil leakage.



- ❑ If you are in a school laboratory setting, have the instructor inspect the oil plug and filter.
- ❑ Lower the vehicle if you used a jack and jack stands method or an automotive lift.
- ❑ Locate and remove the oil filler cap. It is usually located on the valve cover.



- ❑ Using a funnel, pour the correct amount and type of oil into the filler opening. (Make sure the API and SAE ratings match what is listed in your owner's manual.)



- ❑ Start the engine and check for leaks. Extra attention should be given to the oil filter gasket and drain plug gasket. The oil pressure warning light may stay on for up to 5 seconds. If the light stays on longer than 5 seconds, shut the engine off and check for leaks. After about 30 seconds, shut off the engine. This amount of time is ample to circulate the oil throughout the engine and to fill the oil filter. If you used drive-on ramps, remove the safety jack stands and chocks, and then carefully back down the ramps.
- ❑ Let the engine sit for a couple of minutes to ensure a proper reading. Be sure the car is on level ground.
- ❑ Check the oil level on the dipstick and correct if necessary. Do not overfill.



68 AUTO UPKEEP WORKBOOK

- ☐ Recycle your old oil and filter. Do not throw away in the garbage. Take them to the proper recycling facilities.



- ☐ If you are in a school laboratory setting, have the instructor check the oil level before closing the hood.

- ☐ Clean and put away all tools and supplies.
- ☐ Clean up any oil spills with floor dry.
- ☐ Wash your hands thoroughly.
- ☐ Fill out and place an oil change sticker in the vehicle.
- ☐ Update the vehicle's maintenance record log book.



Activity Journal

1. What oil viscosity rating is required for your vehicle's engine?

2. What is the oil capacity for your vehicle's engine?

3. What SAE rating did your owner's manual recommend?

4. What API rating did your owner's manual recommend?

5. Why should the engine be warm when changing the oil?

6. Why did you put a thin film of oil on the new oil filter gasket?

7. What is the oil change maintenance interval recommended by the vehicle manufacturer?

8. What was the condition of the old oil?

9. Name two locations that recycle used oil.
