Modern Automotive Technology
Chapter 39
Cooling System Fundamentals
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Learning Objectives

- Summarize the functions of a cooling system
- Explain the operation and construction of major cooling system parts and assemblies
- Compare cooling system designs
- Explain the importance of antifreeze
- Discuss safety procedures when working on a cooling system
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- A 50/50 mixture of antifreeze and water protects the cooling system to –34°F
- The radiator cap usually maintains 12-16 PSI, raising the boiling point of coolant to 250-260°F
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1. Coolant is forced through the engine and other system parts by the WATER PUMP

2. The RADIATOR transfers engine coolant heat to outside air
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- The basic parts of a cooling system are:
- Water Pump
- Radiator Hoses
- Radiator
- Cooling Fan
- Thermostat
- Radiator Cap
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3. Coolant flow and engine operating temperature are controlled by the THERMOSTAT.

4. ANTIFREEZE is mixed with water to produce engine coolant.
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A: When the coolant is cold, the thermostat stays closed due to spring tension — the water pump circulates coolant in the engine, but not through the radiator.

B: When the coolant is hot the thermostats opens, allowing coolant to pass through the radiator.
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5. The BYPASS VALVE permits coolant circulation through the engine when the thermostat is closed.

6. The fan or THERMO SWITCH is a temperature sensitive switch that controls fan motor operation.
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A. Inlet from Radiator
B. Sealed Bearings
C. Fan Hub
D. Pump Shaft
E. Housing
F. Impeller
G. Outlet to Water Jackets
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7. The engine is connected to the radiator by the RADIATOR HOSES
8. The FAN draws air through the radiator
A molded hose is manufactured in a special shape, with bends to clear other engine or cooling system parts.

A flexible hose has an accordian shape and can be bent into different angles.
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9. A disc with fan-like blades inside the water pump that spins and produces pressure and flow is known as the WATER PUMP IMPELLER.

10. The center section of the radiator made up of tubes and cooling fins is called the CORE.
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- The cooling system quickly increase the temperature of a cold engine, removes excess heat from the engine and maintains constant engine temperature
- Never remove the radiator cap until the engine cools down
- Used coolant must be removed by a certified recycling company, and never poured down the drain
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