



Chapter 6

ENGINE COOLING SYSTEMS

Learning Objectives

As a result of this chapter, you will be able to:

1. State the purpose of a diesel engine jacket water cooling system.
2. Identify the major components of a typical diesel engine jacket water cooling system and describe the operation of each.
3. State the purpose and describe operation of the jacket water keep warm and circulation system as commonly used on nuclear application diesels.

Learning Objectives (continued)

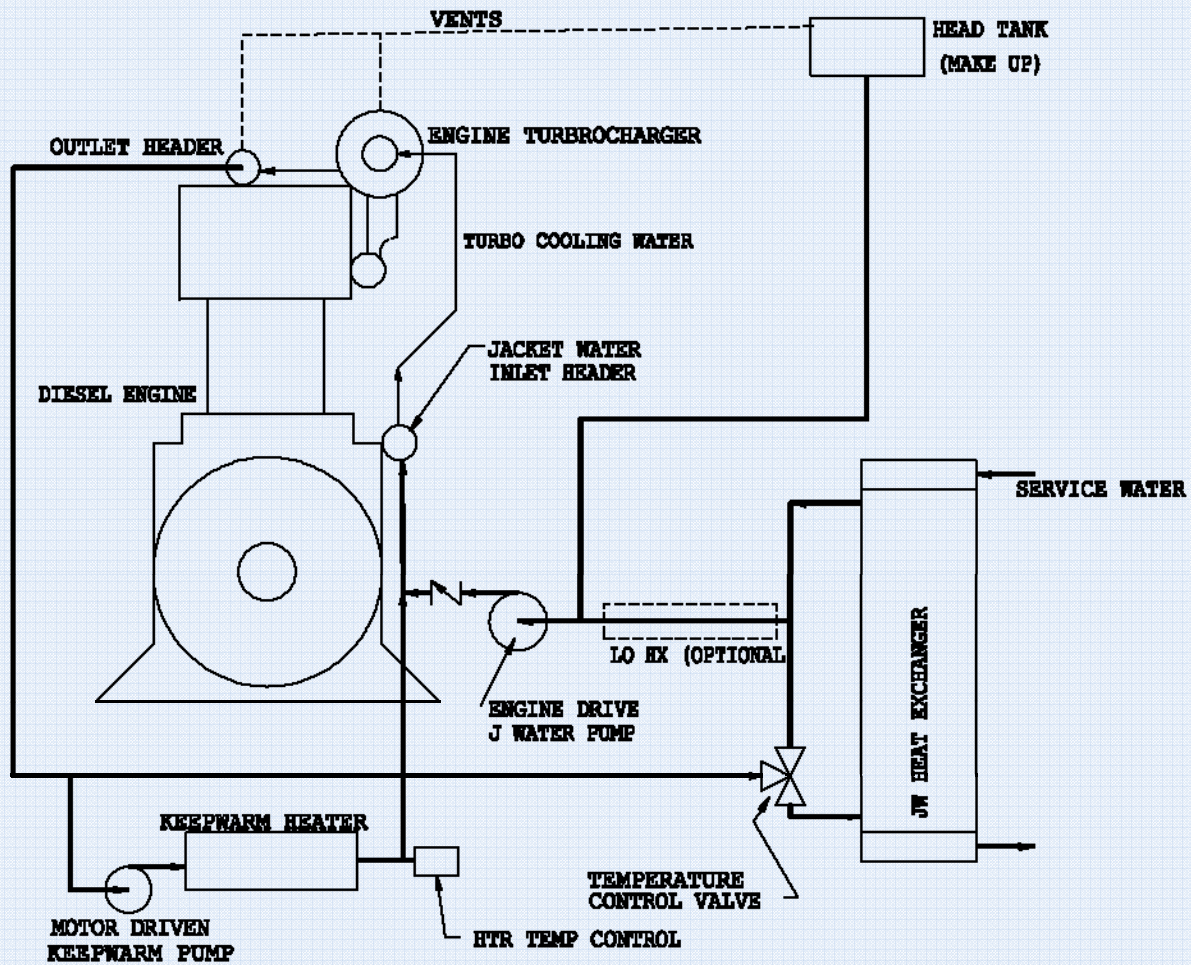
4. State the purpose of a diesel engine intercooler (aftercooler) water cooling system. Identify the major components and describe the operation of each.
5. Identify other cooling requirements, such as engine room cooling.

Engine cooling water system functions to:

- Remove approximately 25 to 30% of engine heat input via the jacket water and intercooler systems.
- Dissipate cooling water heat by either or both
 - air-cooled radiators
 - shell and tube heat exchangers cooled by service water

Cooling water system temperature controls function to:

- Keep shutdown engine warm to enhance startup.
- Keep the operating engine hot for improved efficiency but cool enough to prevent overheating of critical parts.
- Enhance engine turbocharging by cooling turbo-compressed intake combustion air.



JACKET WATER COOLING SYSTEM WITH KEEPWARM

Figure 6-1 Jacket Water Cooling System with Keepwarm

Engine cooling system components

- Liquid coolant
- Jacket water pump
- Thermostatic control valve
- Expansion tank or Standpipe
- Jacket water heat exchanger
- Keep-warm systems

NOTE: Engine manufacturers typically do not establish a cooling water specification, but recommend a good water specialist be used to determine water requirements based on local water conditions.

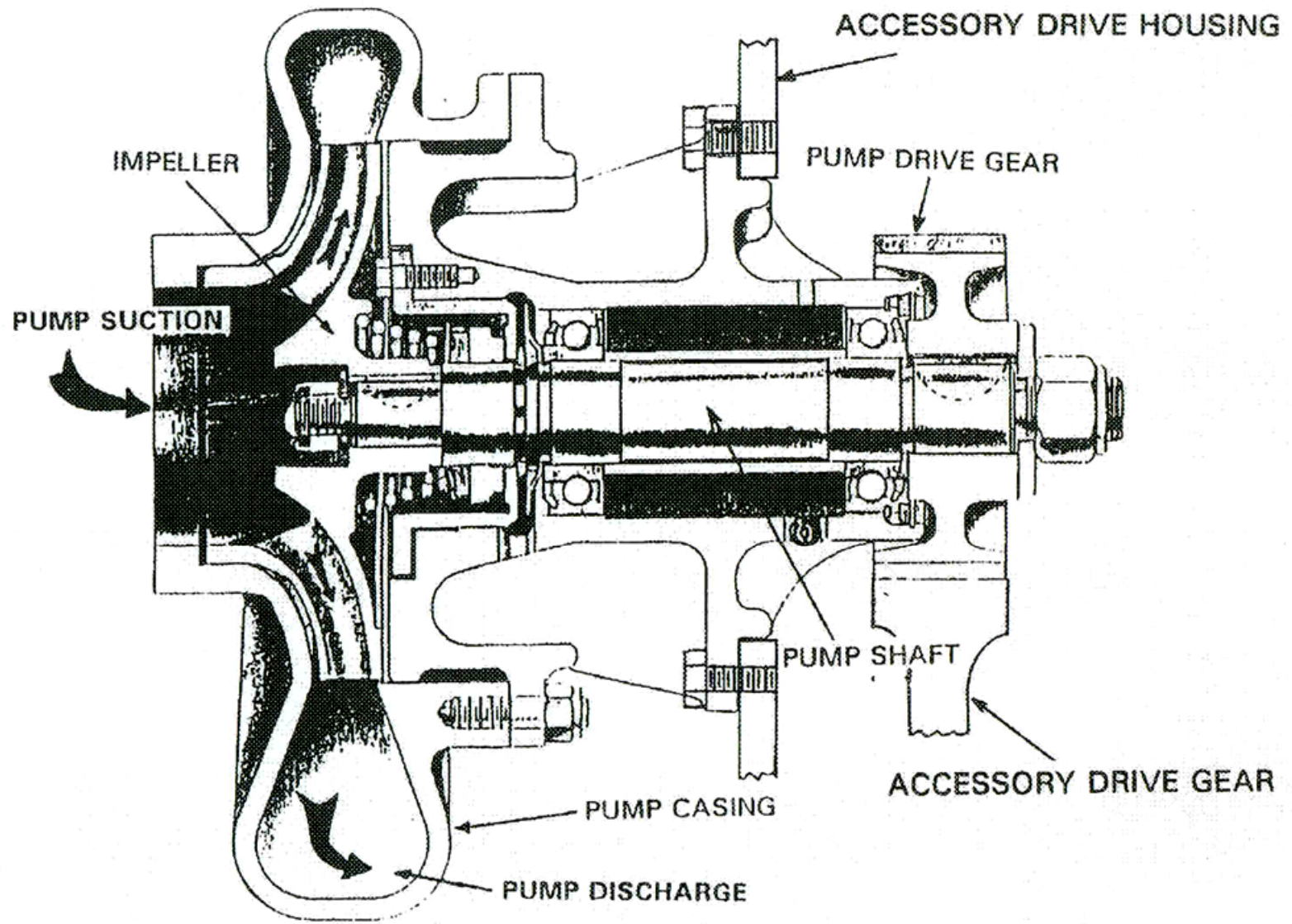


Figure 6-2 Jacket Water Pump

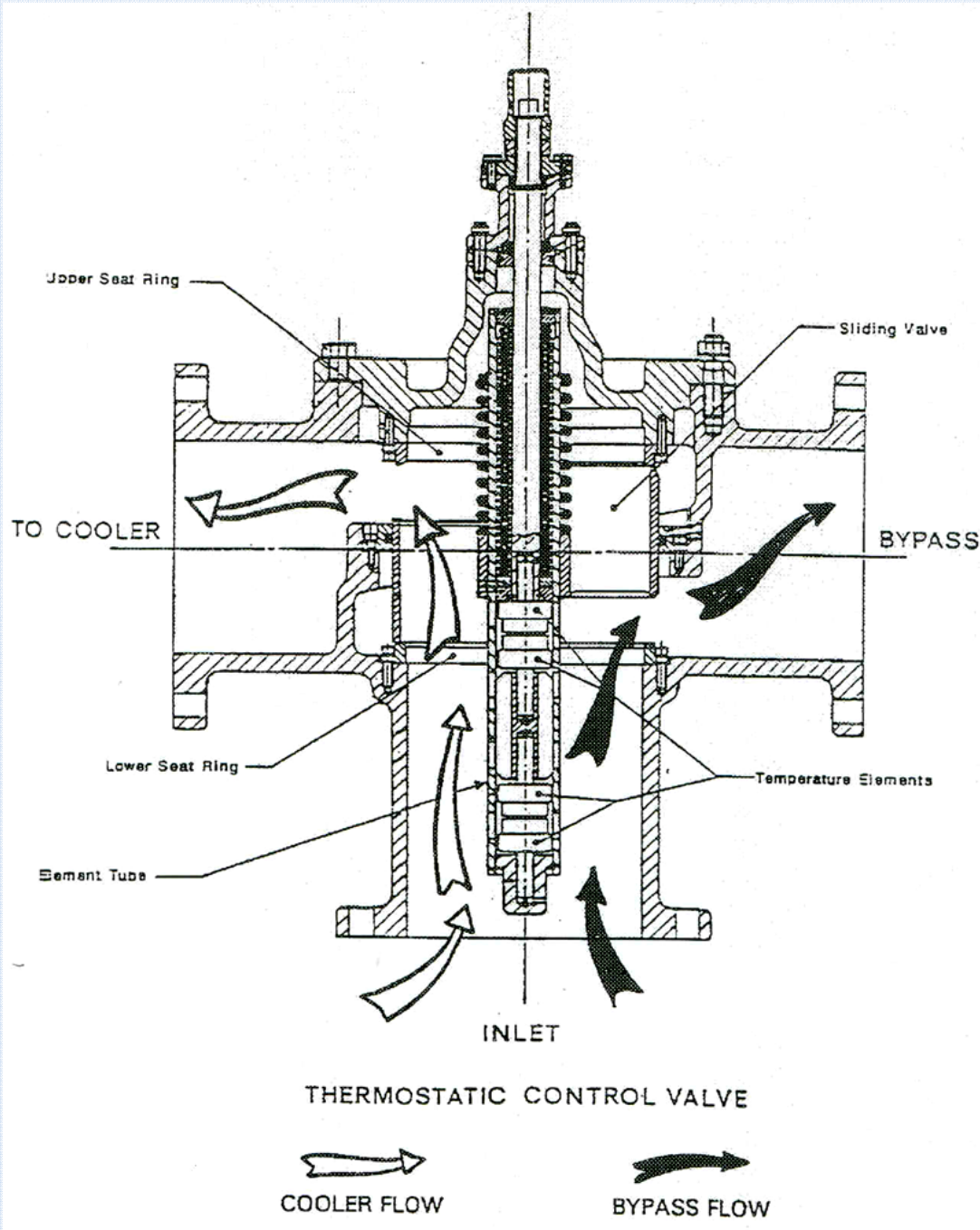
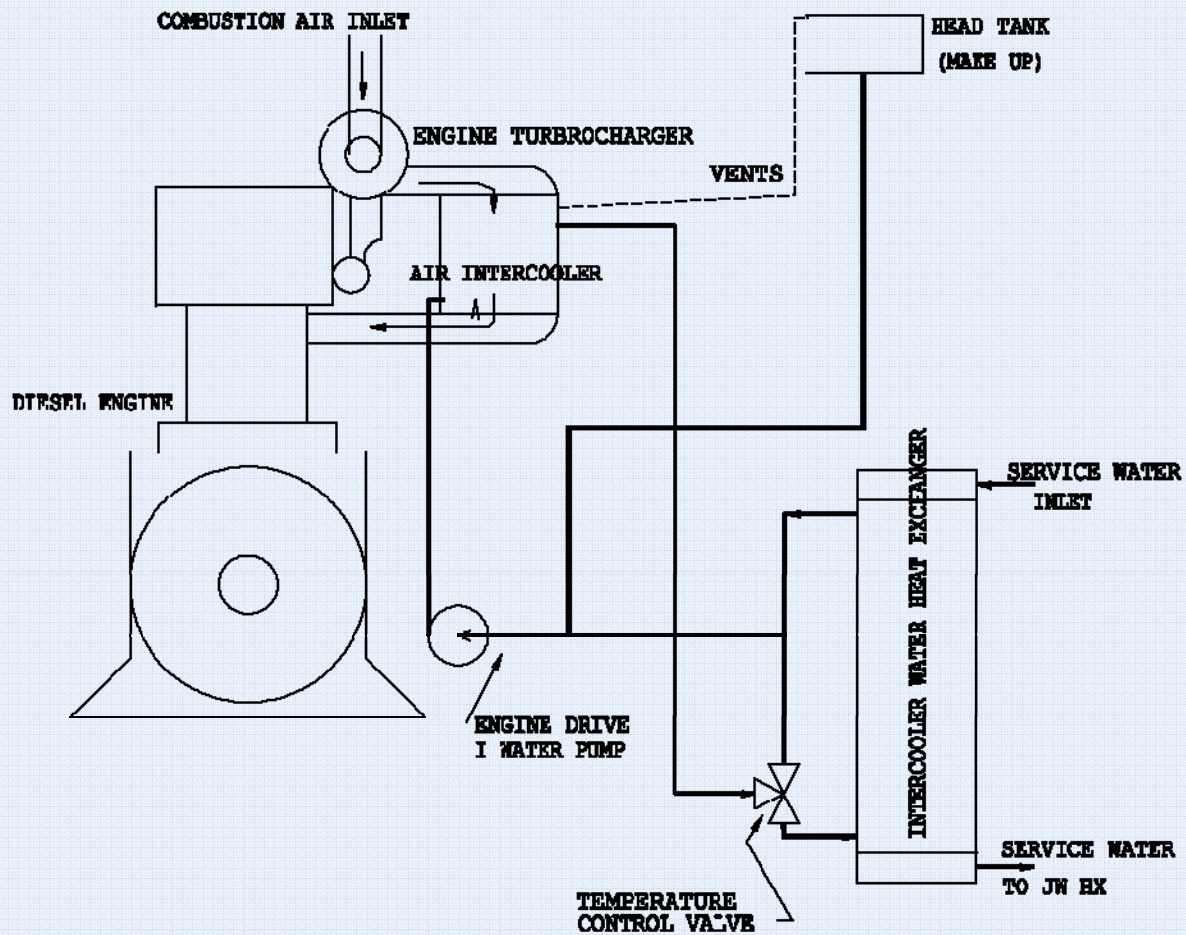


Figure 6-3

**Thermostatic
Control Valve**



INTERCOOLER WATER COOLING SYSTEM

Figure 6-4 Intercooler Water Cooling System

Engine Intercooling Water System Components

- Liquid coolant
- Air Intercooler (Engine Mounted)
- Intercooler water pump
- Thermostatic control valve (different function)
- Expansion tank or Standpipe (may be shared with JW water system).
- Intercooler water heat exchanger
- Keep-warm systems (may be shared)

EDG room cooling functions to:

Remove waste heat from the engine, generator, components, and EDG room to ensure that temperature inside the room does not exceed 122°F. This is accomplished by thermostatically controlled vents, fans, room coolers, etc.

END OF CHAPTER 6

