Marine Fuels and Fuel Systems
What are we going to learn in this lesson?

• Describe the differences between gasoline and diesel fuels.
• Identify the components of a diesel fuel system and their function.
• Identify the components and operation of diesel fuel injection systems
• Identify the components and operation of gasoline fuel systems.
Reading Assignment:

• HBTW, pp. 26-32
Marine Fuels
Marine Fuels

- Gasoline
- Diesel
Gasoline

Review:

• Air and fuel enter the cylinder during the intake stroke

• A spark initiates combustion and the power stroke
Gasoline

- The octane number is a measure of a fuel's resistance to auto-ignition.
- The higher the octane number, the less likely a fuel is to auto-ignite.
Measuring Octane:

- Research Octane Number (RON)
- Motor Octane Number (MON)
- Road Octane Number (RdON)
Measuring Octane:

• RON is the most common test for measuring a fuel’s octane number.

• MON is another method for measuring a fuel’s octane number. MON is a better indicator of how a fuel behaves under load. MON is typically 8-10 points lower than RON for the same fuel.
Measuring Octane:

- RON is what is typically posted at the pump in Europe.

- RdON is what you typically see listed at the pump in North America.

- \( \text{RdON} = \frac{\text{RON} + \text{MON}}{2} \)

- Therefore the pump octane in North America (RdON) is typically 4-5 points lower than the pump octane posted in Europe (RON) for the same fuel.
Measuring Octane:

• Typical pump RONs in North America are 87, 89, and 91.

• It is possible too have and octane rating higher than 100. Racing fuels, AvGas and LPG all have RONs higher than 100.
Diesel

Review:

• Only air enters the cylinder during the intake stroke

• Fuel is injected into the hot, compressed air and auto-ignites, initiating combustion and the power stroke
Diesel

- The cetane number (CN) is a measure of a fuel’s resistance to auto-ignition.

- The higher the CN, the more likely a fuel is to auto-ignite.
Cetane Number

- CNs range from 0 to 100.

- Diesel engines typically run well on fuels with CNs from 40 to 55, with no significant performance or emissions advantages with CNs above 55.
Cetane Number

• In North America “Regular” diesel has a CN of 44-46. “Premium” diesel has a CN of 45-50.

• In Europe the minimum CN is 51 (as of 2000).
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Energy Content

• Diesel fuel contains more energy per gallon than gasoline

• Gasoline ~ 115,000 BTUs per US gallon

• Diesel ~ 130,000 BTUs per US gallon

• Diesel has about 13% more energy per gallon than gasoline