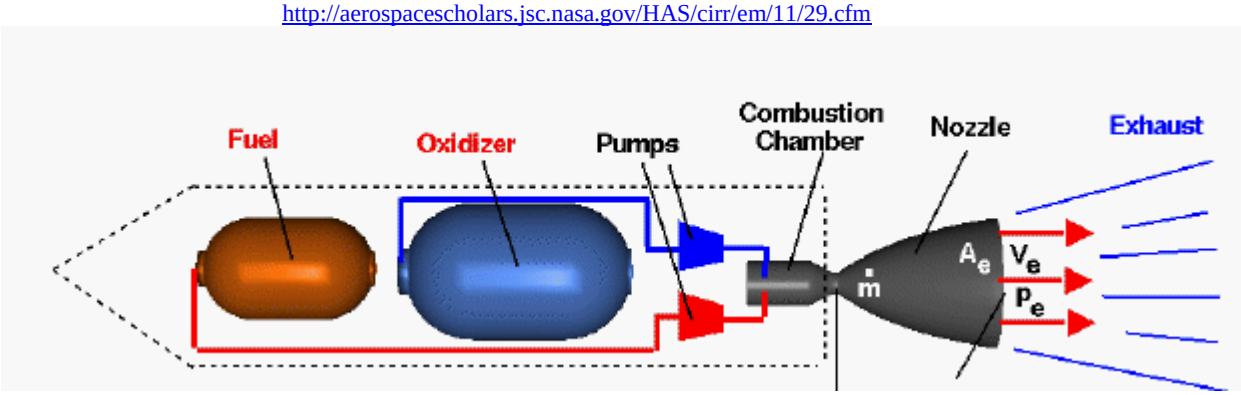
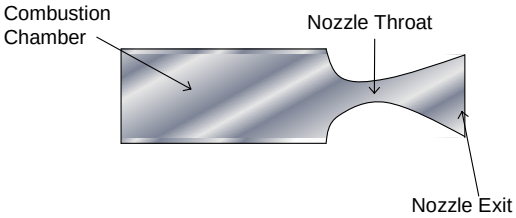
The F1 engine from the Saturn 5 rocket
Picture courtesy of NASA Johnson Space Center
http://aerospacescholars.jsc.nasa.gov/HAS/cirr/em/11/29.cfm



Liquid Rocket Thrust
Picture courtesy of NASA Glenn Research Center
http://www.grc.nasa.gov/WWW/K-12/airplane/rockth.html



Rocket Schematic
Drawn by: L.Y.C, PE/NASA/JSC 9/2004

In rocket science, heat transfer issues must be addressed. Use the above pictures to become familiar with the basic design of a rocket. The heat from the inside of the throat wall travels to the outside of the throat wall by **conduction**.

1. An experimental rocket's combustion thrust chamber has an outside (cool) wall temperature of 135° C at the nozzle throat, with a 4500° C chamber temperature. The heat transfer rate through the throat wall is measured to be 2 X 10^7 W/m^2. The liquid-cooled throat wall is made of 0.3 cm thick stainless steel with k=26 W/m°C. Assume the

coolant's surface area is equal to the hot gas's surface area. Calculate the inner or hot wall's temperature at the throat using the given information.