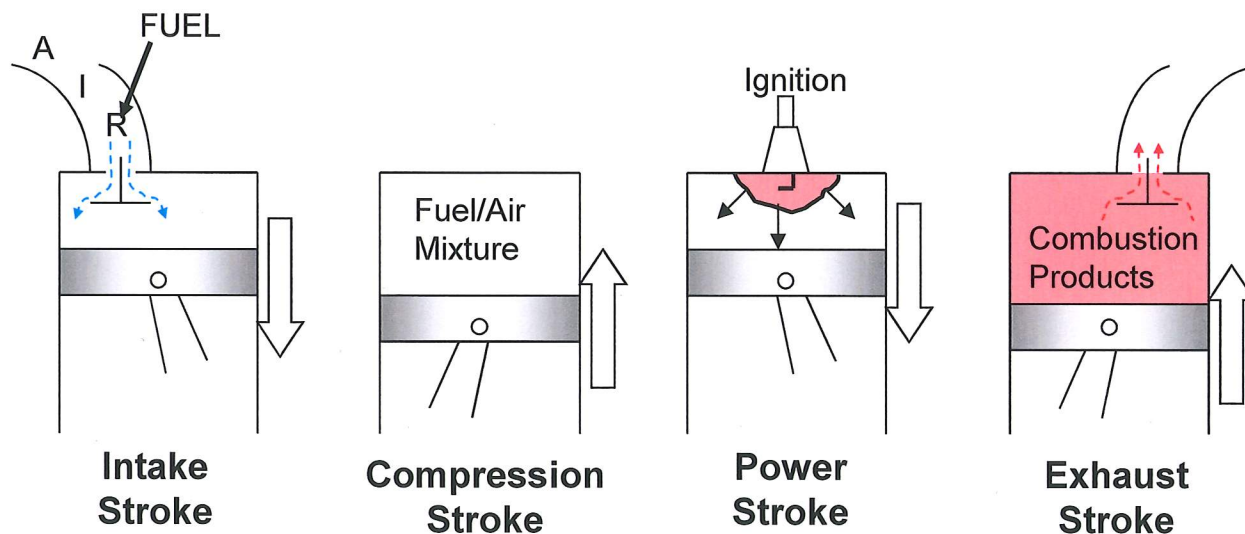
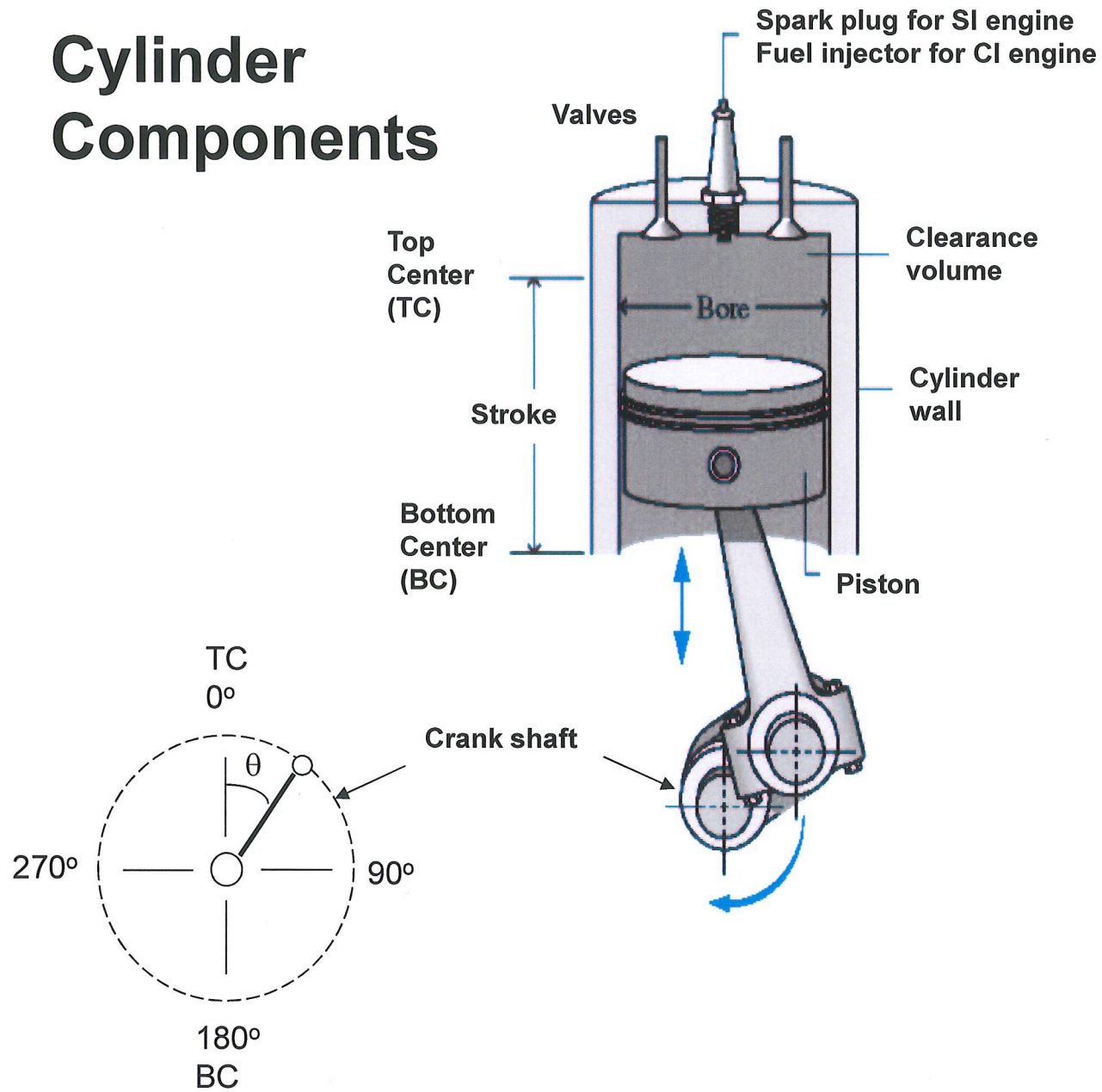


# Four Stroke SI Engine

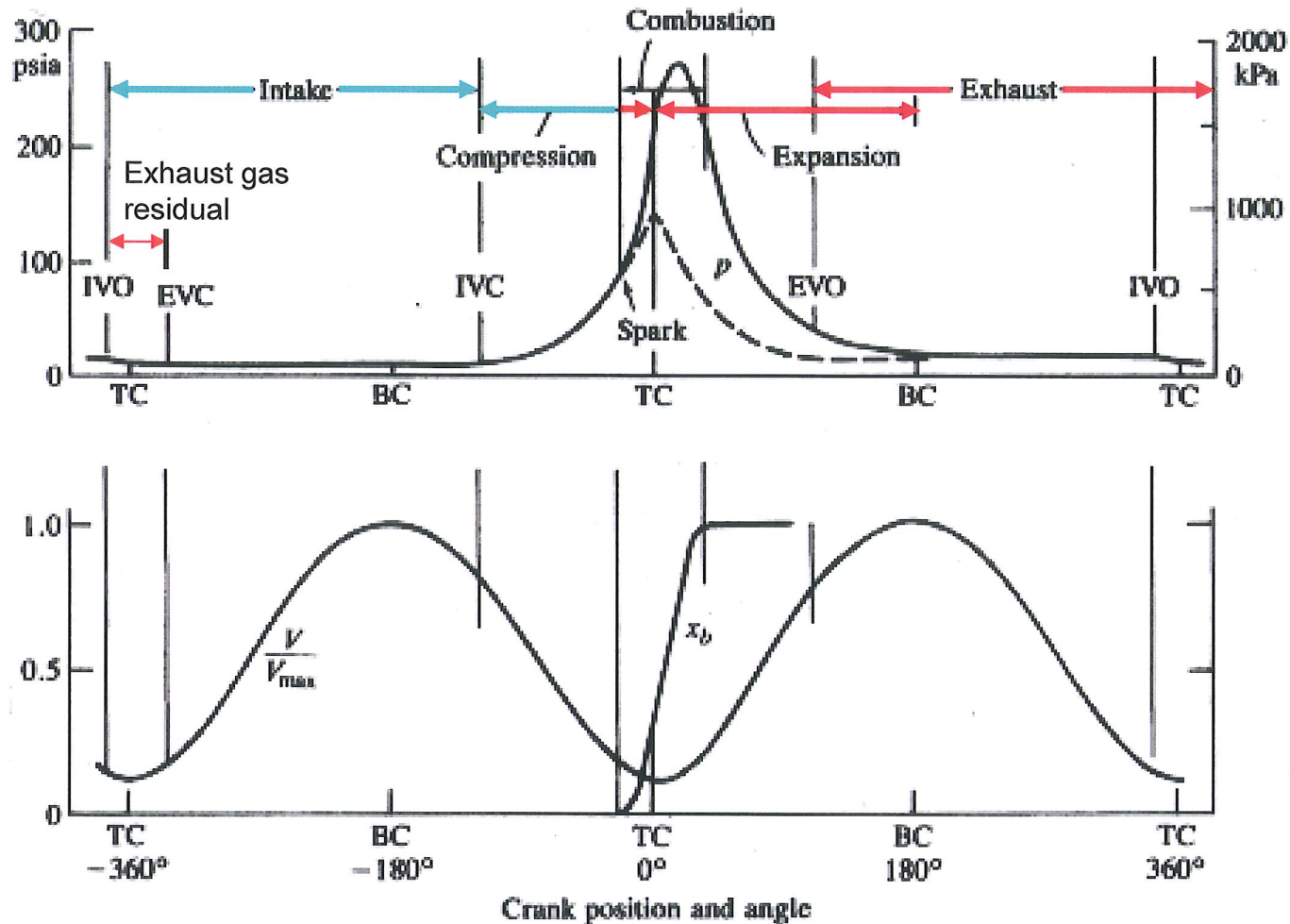
- Stroke 1: Fuel-air mixture introduced into cylinder through intake valve
- Stroke 2: Fuel-air mixture compressed
- Stroke 3: Combustion (~constant volume) occurs and product gases expand doing work
- Stroke 4: Product gases pushed out of the cylinder through the exhaust valve



# Cylinder Components



# Four-Stroke SI Engine



IVO - intake valve opens, IVC – intake valve closes

EVO – exhaust valve opens, EVC – exhaust valve opens

$X_b$  – burned gas mole fraction

# Power Regulation (Throttling)

An IC engine is basically an air engine, the more air you get into the cylinder, the more fuel you can burn, the more power you get out. The initial pressure in the cylinder is roughly equal to the pressure in the intake manifold.

Pressure in the intake manifold is varied by opening and closing the throttle plate to change the pressure drop. Maximum air flow (and power) achieved at wide-open-throttle (WOT). Minimum air flow at idle

