Equipment I: Piping, Valves, & Actuators
Actuators

Course Objectives

1. Define and describe an actuator and its purpose in a chemical process.
2. Describe the function, operation of pneumatic, electric, and hydraulic actuators.
3. Describe the relationship of a controller to an automated actuator.
4. Describe the function of torque switches.
5. Describe the functions of limit switches.
6. Describe the functions of a position indicator.
7. Describe the purpose, function, operation, components, typical application, and P&ID symbol for the following actuators:
    a. Pneumatic diaphragm actuator
    b. Pneumatic piston actuator
    c. Pneumatic double design actuator
    d. Pneumatic rotary vane actuator
    e. Electric solenoid actuator
    f. Electric motor-operated actuator
    g. Hydraulic single-acting actuator
    i. Hydraulic double-acting actuator
8. Describe the chemical operator's role in actuator operations including performance problems and typical procedures.

Key Terms (Define the following)

actuator - _____

_____

control loop - _____

_____

control valve - _____

_____

positioner - _____

_____

position indicator - _____

_____

Questions

1. List the different types of actuators.

   _____

   _____

   _____

2. An automated actuator combined with a throttle valve body is often called a _____ .

3. A _____ is a group of instruments which act together to control a process variable.

4. List some common problems for each type of actuator.

   Pneumatic

   _____

   _____

   _____

   Electric

   _____

   _____

   Hydraulic

   _____

   _____

   _____