

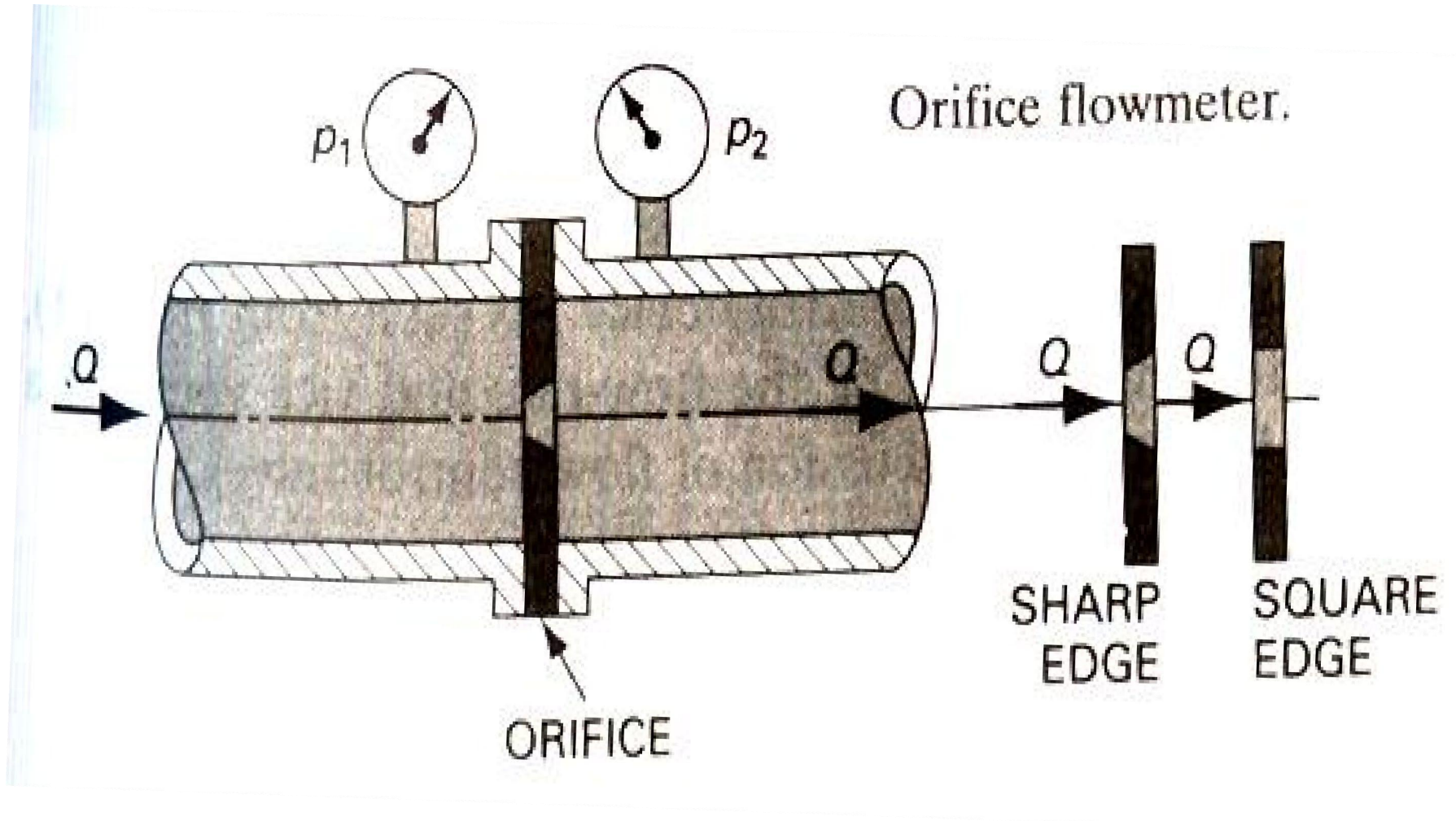


Unit II

- **FLOW CONTROL VALVE**



Flow control valve

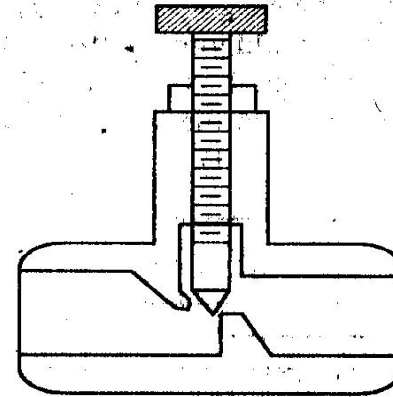
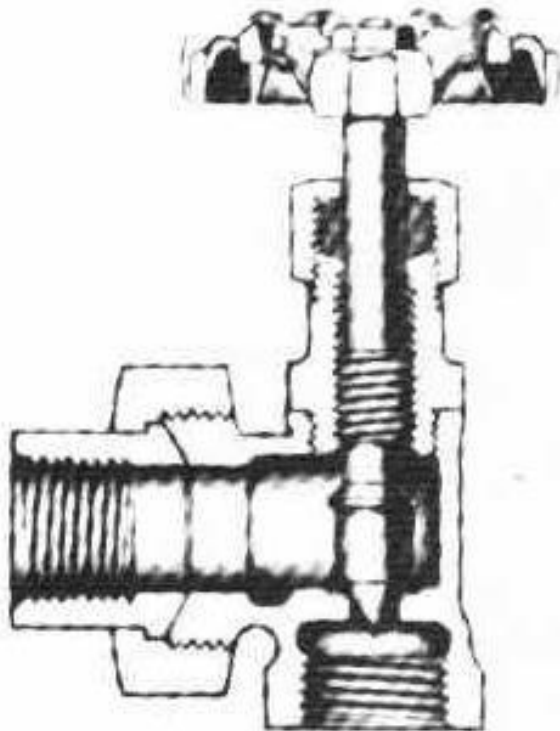




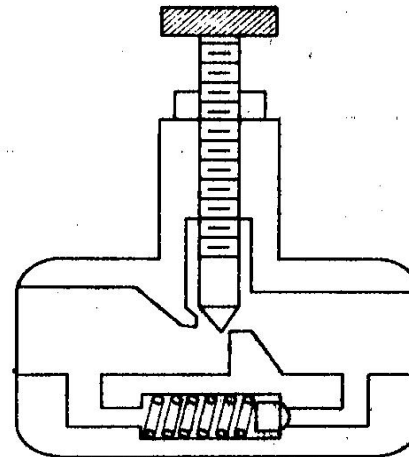
- Flow control valves are used to regulate the speed of hydraulic cylinders and motors controlling the flow rate to these actuators.
- They may be as simple as a fixed orifice or an adjustable needle valve.
- Needle valves are designed to give fine control of flow in small-diameter piping.
- The stem has several color rings, which, in conjunction with a numbered knob, permits reading of a given valve opening as shown.
- Charts are available that allow quick determination of the controlled flow rate for given valve settings and pressure drops.
- A locknut prevents unwanted changes in flow.



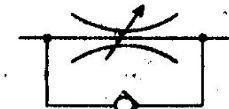
Needle Valve



(a) Needle Valve



(b) Needle Valve with Integral Check Valve



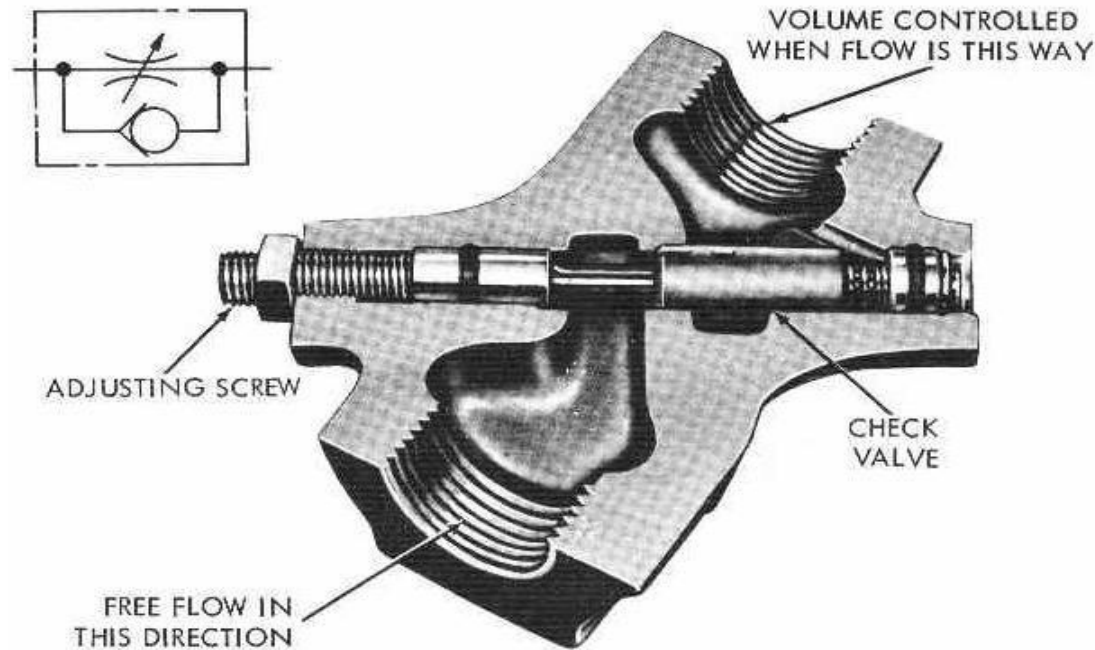
← Free flow

→ Controlled flow



Nonpressure-compensated

- It is used where system pressures are relatively constant and motoring speeds are not too critical.
- They work on the principle that the flow through an orifice will be constant if the pressure drop remains constant



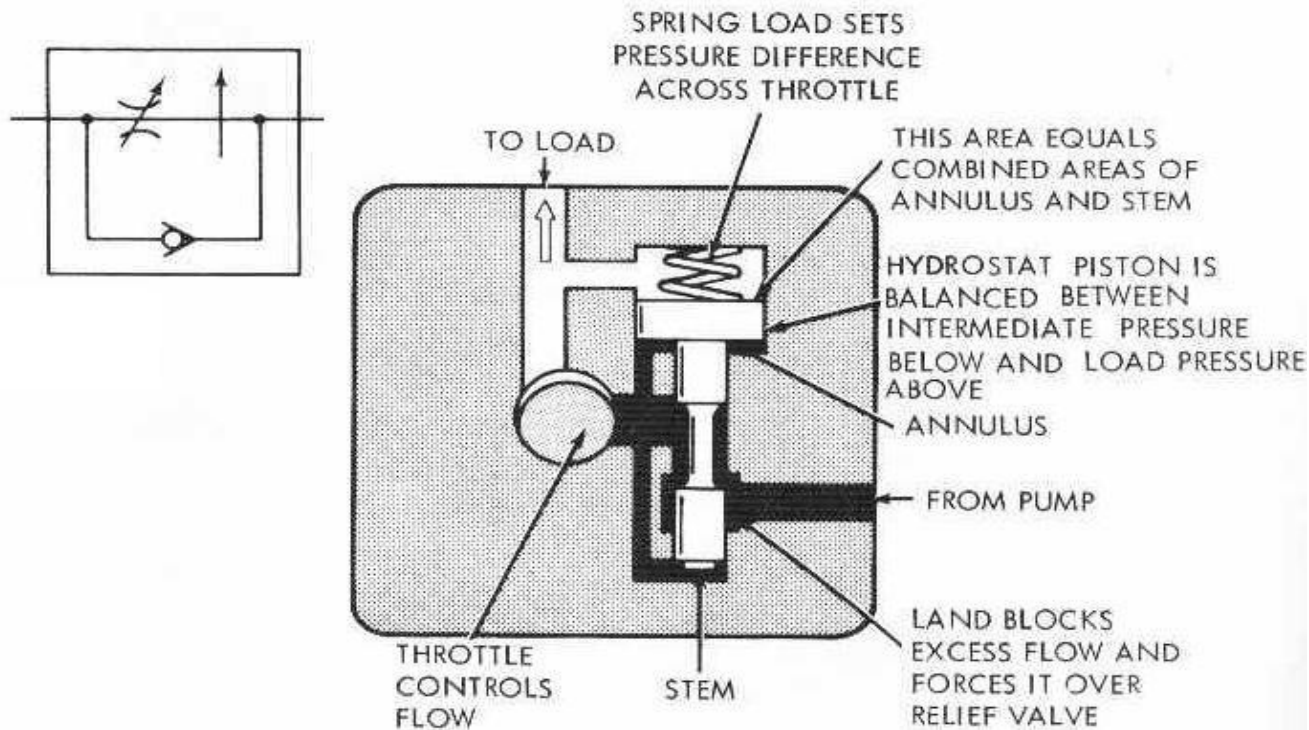
Noncompensated flow control valve.



Pressure-compensated

- If the load on an actuator changes significantly, system pressure will change appreciably.
- Thus, the flow rate through a nonpressure-compensated valve will change for the same flow rate setting.
- The orifice area setting determines the flow rate to be controlled. The hydrostat is held normally open by a light spring.
- However, it starts to close as inlet pressure increases and overcomes the light spring force.
- This closes the opening through the hydrostat and thereby blocks off all flow in excess of the throttle setting.

- As a result, the only oil that will pass through the valve is that amount which 20 psi can force through the throttle.
- Flow exceeding this amount can be used by other parts of the circuit or return to the tank via the pressure relief valve.



Operation of pressure-compensated flow control valve.