Types of Pumps

Dynamic and Positive Displacement
Types of pumps:

1. Dynamic (non-positive displacement) pumps:
   - Used for low pressure and high volume flow applications.
   - Cannot withstand high pressures, so cannot be used for fluid powerfield.
   - Maximum pressure limited to 250–300 psi.
   - Usually used for transporting fluid from one location to another.

   There are two types of dynamic pumps:
   - Centrifugal and the axial flow pumps.
     (Impeller) (propeller)

2. Positive Displacement Pumps:
   - Universally used for fluid power systems.
   - They eject a fixed amount of fluid into the hydraulic system per revolution.
   - Can overcome the pressure from mechanical loads as well as the resistance to flow due to friction.
Advantages:

a) High-pressure capability (up to 12000 psi)
b) Small compact size.
c) High volumetric efficiency.
d) Small changes in efficiency throughout the design pressure range.
e) Great flexibility of performance (can operate over a wide range of pressure requirements and speed changes).

Positive displacement types:

- Gear, Vane, Piston.

Vane + Piston can be either of fixed displacement or variable displacement.

1. Gear pump (Fixed displacement):
   a. External gear pump
   b. Internal gear pump
   c. Lobe pump
   d. Screw pump

2. Vane pump:
   a. Unbalanced Vane pump (Fixed or Variable)
   b. Balanced Vane pump (Fixed displacement only)
2. Piston Pumps: fixed or variable displacement.
   a. Axial design.
   b. Radial design

Dynamic Pumps: flow depends on head.

**Centrifugal**
- Impeller
- Impeller imparts centrifugal force
to cause pumping action.

**Axial**
- Propeller
- Axial flow created by rotating impeller
lobe pumps: it is a type of gear pump.

- both lobes are driven externally, so that they do not actually contact each other.
- its volumetric displacement is generally greater than that for other types of gear pumps.

screw pumps: axial flow positive displacement pump.

Three precision ground screws, meshing within a close-fitting housing, deliver non-pulsating flow, quietly and efficiently.

There are two idler rotors, are in rolling contact with the central power rotor, and are free to float in their respective housing bores on a hydrodynamic oil film.

Axial loading forces are balanced eliminating the need for thrust bearings.

500 psi @ 123 gpm
3000 psi @ 88 gpm