

What are Hydraulics?

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Worldwide, hydraulics constitute a \$45-50 billion market and is growing steadily.

About Hydraulics

- A hydraulics system is based on the simple **principle of Pascal's law**, named for the 17th century French scientist Blaise Pascal.
- The law states that when pressure is **applied to an incompressible fluid**, it is transmitted equally in all directions throughout the fluid. (Pressure here is simply the amount of force per unit area).

Working of Hydraulics System

- In a hydraulic system, pressure is **created by applying force to a fluid**. And because it is subsequently transmitted equally in all directions, a small force applied over a small area can create a much larger force over a larger area.

- A small force applied at one end can be used to generate a much larger force at the other end just by having a larger area of contact.
- There's no need to change the pressure. This is perhaps the simplest use of hydraulics. There are many more actions that a hydraulic system can perform than just lifting.
- **Parts of a hydraulic system:** Pumps, Pipes, Valves, Linear actuators or rotary actuators, Tank (with filters) and Sensors or switches

Applications of Hydraulics

- They can be used for both **mobile equipment** — cranes, excavators, etc. which move on wheels or tracks — and **static applications** such as a hydraulic press, moulding machines, windmills,
- They are equipped with **sensors to track movement**, temperature, pressure, flow, oil contamination.

Advantages of Hydraulics

- Hydraulics have many advantages over mechanical methods of transmitting energy.
- The principal ones are **smooth movements, high power to weight ratio**, better heat dissipation, smooth controls, and **higher precision**.

Source: TH

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