

॥ नमस्ते ॥

HYDRAULIC FLUID



Hydraulic Fluid

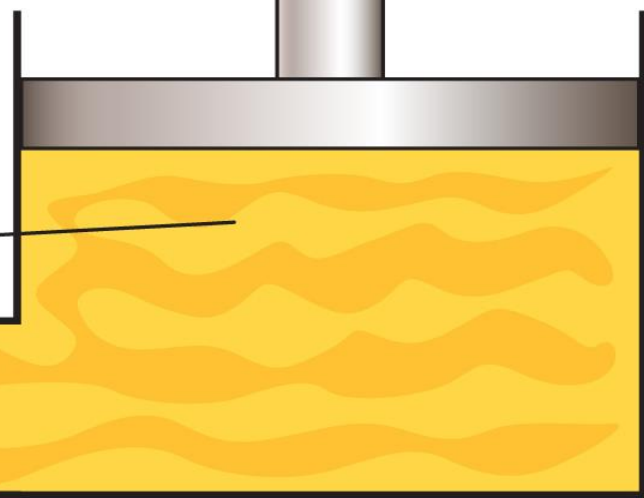
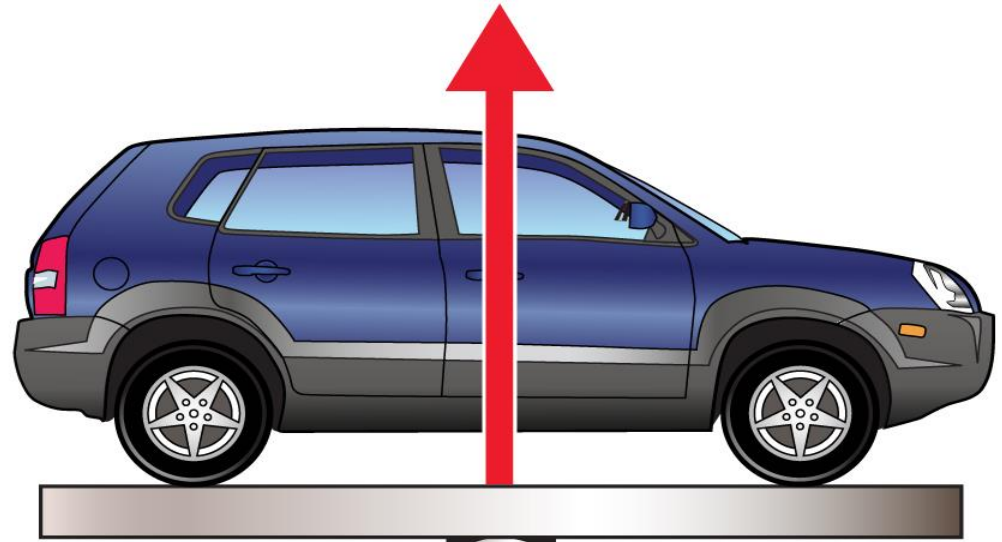
- ① **Function:-** Hydraulic system liquids are used primarily to transmit and distribute forces to various units to be actuated.
- ② Fluid is the medium via which a hydraulic system transmits its energy and, theoretically, practically any fluid could be utilized. However, given the operating pressure (3000 to 5000 psi) that most aircraft hydraulic systems generate in combination with the environmental conditions and strict safety criteria under which the system must operate

Pascal's Law

- **Pascal's law** is a law about the physics of a fluid. It says that if pressure is exerted on a non compressible fluid in an enclosed vessel, this pressure will be distributed evenly throughout the fluid.

second force is 10 times original force

$$F_2 = P_2 A_2 = 10 \times F_1$$

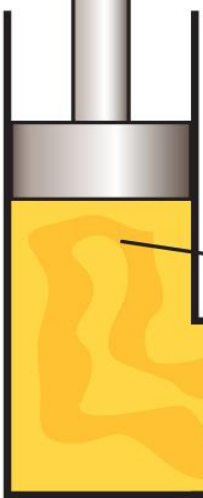
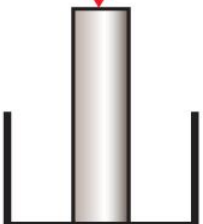


area A_2
($A_1 \times 10$)

area A_1

fluid

original force
 $F_1 = P_1 A_1$



$$P_1 = \frac{F_1}{A_1}$$

Pascal's principle
 $P_1 = P_2$

$$P_2 = \frac{F_2}{A_2}$$

Hydraulic Fluid Properties

- ① **VISCOSITY**
- ① **CHEMICAL STABILITY**
- ① **FLASH POINT**
- ① **FIRE POINT**

VISCOSITY

- ⦿ Viscosity is internal resistance to flow.
- ⦿ (For the Liquid)Viscosity increases as temperature decreases.
- ⦿ (For the Gas/Air)Viscosity increases as temperature Increases.
- ⦿ The Saybolt viscometer measures the viscosity.
- ⦿ **Adequate (Low) Viscosity needed for hydraulic fluid.**

High viscosity
Honey



Low viscosity
Water



CHEMICAL STABILITY

- It is the liquid's ability to resist oxidation and deterioration for long periods.
- If Hydraulic fluid is chemically unstable then The liquid usually becomes darker in color, higher in viscosity, and acids are formed.
- So Hydraulic fluid Must be **CHEMICAL STABIE**

FLASH POINT

- ⦿ Flash point is the temperature at which a liquid gives off vapor in sufficient quantity to ignite momentarily or flash when a flame is applied.
- ⦿ A high flash point is desirable for hydraulic liquids because it indicates good resistance to combustion and a low degree of evaporation at normal temperatures.

FIRE POINT

- Fire point is the temperature at which a substance gives off vapor in sufficient quantity to ignite and continue to burn when exposed to a spark or flame.
- Like flash point, a high fire point is required of desirable hydraulic liquids.

Thermal Capacity/Conductivity.

- Hydraulic fluid acts as a system coolant. The fluid must be able to readily absorb and release heat.

Lubricant Properties.

- The hydraulic fluid acts as a lubricant for the pumps, actuators and motors within the system. The fluid should have anti-corrosion properties and be thermally stable.

Temperature Resistance

- Aircraft hydraulic systems must work efficiently over a broad temperature spectrum. The fluid used must flow easily at very low temperatures but must also maintain adequate viscosity at high temperatures. The ideal hydraulic fluid will have a very low freezing point and a very high boiling point.

If a foreigner gives birth on a plane while flying over the United States, the baby is automatically a U.S. citizen.



Today's Amazing Fact???????

Any Questions?????



धन्यवाद

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