LUBRICATION SYSTEM
Purpose of Lubrication System

- **Lubricate**

Reduces *Friction* by creating a thin *film* (*Clearance*) between moving parts (*Bearings and journals*).
Purpose of Lubrication System

- **Seals**

  The oil helps form a gastight seal between piston rings and cylinder walls *(Reduces Blow-By)*

Internal oil leak (blow-by) will result in *BLUE SMOKE* at the tale pipe.
Purpose of Lubrication System

- **Cleans**

As it circulates through the engine, the oil picks up metal particles and carbon, and brings them back down to the pan.
Purpose of Lubrication System

• **Cools**

Picks up heat when moving through the engine and then drops into the cooler oil pan, giving up some of this heat.
Purpose of Lubrication System

• Absorbs shock

When heavy loads are imposed on the bearings, the oil helps to cushion the load.

• Absorbs Contaminants

The additives in oil helps in absorbing the contaminants that enter the lubrication system.
Viscosity is a measure of oil’s resistance to flow.

• A low viscosity oil is thin and flows easily

• A high viscosity oil is thick and flows slowly.

• As oil heats up it becomes more viscous (Becomes thin)
VISCOSITY

• If the oil is too thin (*has very low viscosity*) it will be forced out from between the moving parts, resulting in rapid wear.

• If the oil is too thick (*has very high viscosity*) it will flow very slowly to engine parts, especially when the engine and the oil are cold, resulting in rapid wear.

**Viscosity Index** is the measure of how much the viscosity of an oil changes with temperature. (20 W)

Viscosity number is set by **SAE (Society of Automotive Engineers)**
VISCOSITY

• **Single viscosity oils** SAE 5W, SAE 10W (Winter) and SAE 20, SAE30 ... (Summer)

• **Multiple viscosity oils** SAE 10W-30. This means that the oil is same as SAE 10W when cold and SAE30 when hot.

The higher the number the higher the viscosity(*thickness*) of oil.
Properties of oil

- **Corrosion and Rust Inhibitor:** Displaces water from metal surfaces, to prevent corrosion.

- **Foaming Resistance:** Rotating crankshaft tends to cause bubbles (Foam) in the oil and bubbles in oil will reduce the effectiveness of oil to lubricate.

- **Synthetic Oils:** Made by chemical process and do not necessarily come from petroleum.
Service Rating of Oil

SA, SB, SC, SD,.....SJ

SA and SB oils are not recommended for use in today’s Automobile engines.
Parts

**Oil Pumps** Driven by camshaft, crankshaft (*Rarely rebuild by an auto technician*)

- Rotor Pump (*Two star shaped rotors pumps the oil*)

- Gear oil Pump
Parts

Oil Pan

Stores the oil and helps in cooling the oil

Pan gasket splits if over tightened.
Parts

**Pressure Relief Valve** to prevent the buildup of high Pressure *(Causes the oil filter to bulge, but not a common problem).*

Good oil pressure is 40-60 psi
Parts

Oil Pressure Indicator
• Light or a Gauge

The light turns on or gauge reads low when the pressure drops below 10psi.

• Good oil pressure is 40-60 psi.

Common causes of low oil pressure are:
• Low oil level
• Worn out pump

Low oil pressure Safety system will shuts down the car by cutting the ignition System (Spark).
Parts

**Oil Filter** filters the oil

Some particles are too small for the filter **Element (paper in the filter)** to trap.
Parts

Oil Galleries

Deliver the oil to top end and returning it To the oil pan.
Parts

Positive Crankcase ventilation Valve

- Pollution prevention
- Blow-by back into the intake
- Prevent sludge in the engine.
**Parts**

**Oil Pressure sending unit** electrically sends the signal to the Light or Gauge mounted on the dash.

If the wires get shorted the light will come on or the gauge will read high.
OIL CHANGE

- Every 5000Km
- 3 months

Ignoring regular oil change intervals will shorten engine life and performance.
Good Luck on the Test!
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