

PETROLEUM REFINING AND PETROCHEMICAL LAB

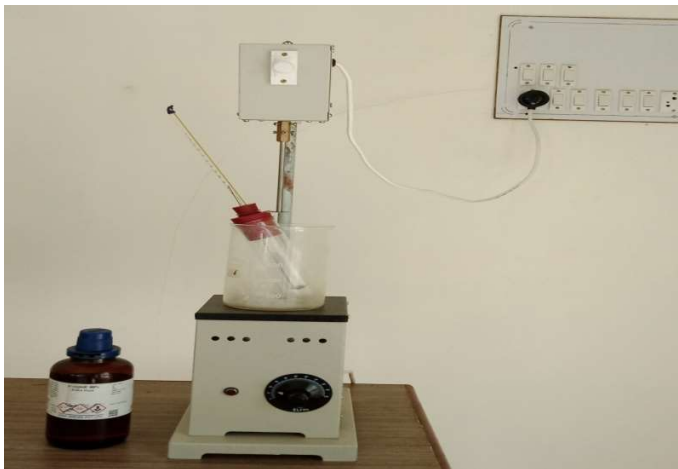
Overview

Petroleum testing is most commonly used in the petroleum industry, to test product, product components and petroleum byproducts of crude oil, fuel, natural gas, shale oil, and upstream oil and gas. Other petroleum testing applications: Instruments exist to test all aspects of petroleum – everything from viscosity, to flash point, ability to reduce friction, and different measurements of physical properties, purity, behavior and stability.

Petroleum testing is also used to test other formats of petroleum such as wax-based products. Other applications of petroleum testing include food product testing and environmental monitoring of petroleum in soil and water.

The following apparatus are available in petroleum and petrochemical lab.

ANILINE POINT APPARATUS (U-Tube Method)



The Aniline point of oil is the lowest temperature at which the oil is completely miscible with an equal volume of aniline.

Aniline being an aromatic compound freely mixes with aromatic so a low aniline point indicates low diesel index (because of high percentage of aromatics). Significance: High aniline point indicates that the fuel is highly paraffinic and hence has a high Diesel index and very good ignition quality.

CLOUD & POUR POINT



Cloud point is the temperature at which a cloud or haze of wax crystal appears at the bottom of the test jar when the oil is cooled under prescribed condition.

When the oil is cooled at a specific rate, the temp at which it becomes cloudy in appearance is formed as cloud point. This is due to the separation of the wax crystals present in dissolved form in it. It gives a rough idea of the temp above which the oil can be safely handled without any fear. The cloud point is not so important for lubricating oil, but, it is imp for the fuel oil.

SOFTENING POINT APPARATUS (Ring & Ball)



Softening point is the temperature at which the substance attains a particular degree of softening under specified condition of the test.

PENETRATION INDEX APPARATUS



The penetration of a bituminous material is the distance in tenths of a mm, that a standard needle would penetrate vertically, into a sample of the material under standard conditions of temperature load and time.

REDWOOD VISCOMETER



Viscosity is a measure of internal friction or flow resistance of a fluid. Absolute viscosity is defined as the force required to move one square meter of plane surface at the rate of 1m/s relative to a second plane surface, paralalled to the first and separated 1 m from it by a layer of liquid. The unit of viscosity is Pa/s. the kinematic viscosity is defined as the ratio of absolute viscosity to the density.

ENGLER'S VISCOMETER



The Engler's viscometer consist of a water bath and oil bath, both provided with two thermometers inside them. There is an ebonite valve stick, which is located at center of oil bath to flow of oil through the orifice. A heater with regulator is fixed for heating purpose.

The viscosity of given oil sample is determined as the time of flow in Engler's seconds. The viscosity of a fluid is the resistance offered to shear under laminar condition.

SMOKE POINT APPARATUS



Smoke point is the maximum flame height in mm at which the sample burns without smoke. Smoke point is related with the aromatic content of the liquid and it is inversely proportional to the aromatic content. Smoke point is used to determination of smoking tendency. Smoking tendency is proportional to the aromatic content and is given by $\text{Smoking tendency} = 320/\text{smoke point in mm}$.

FLASH POINT & FIRE POINT



The apparatus is used to determine the flash and fire point of petroleum products. The flash point is a descriptive characteristic that is used to distinguish between flammable fuels, such as petrol (gasoline in the US), and combustible fuels, such as diesel. It is also used to characterize the fire hazards of fuels. The fire point is the temperature at which lubricant combustion will be sustained. The flash and fire points are useful in determining a lubricant's volatility and fire resistance. The flash point can be used to determine the transportation and storage temperature requirements for lubricants.