



FLASH POINT AND FIRE POINT

FLASH POINT

- The **flash point** of a volatile material is the lowest temperature at which it can vaporize to form an ignitable mixture in air. Measuring a flash point requires an ignition source. At the flash point, the vapor may cease to burn when the source of ignition is removed.



FIRE POINT

- The **fire point** of a fuel is the temperature at which the vapour produced by that given fuel will continue to burn for at least 5 seconds after ignition by an open flame. At the flash point, a lower temperature, a substance will ignite briefly, but vapor might not be produced at a rate to sustain the fire.



PENSKY MARTENS APPARATUS

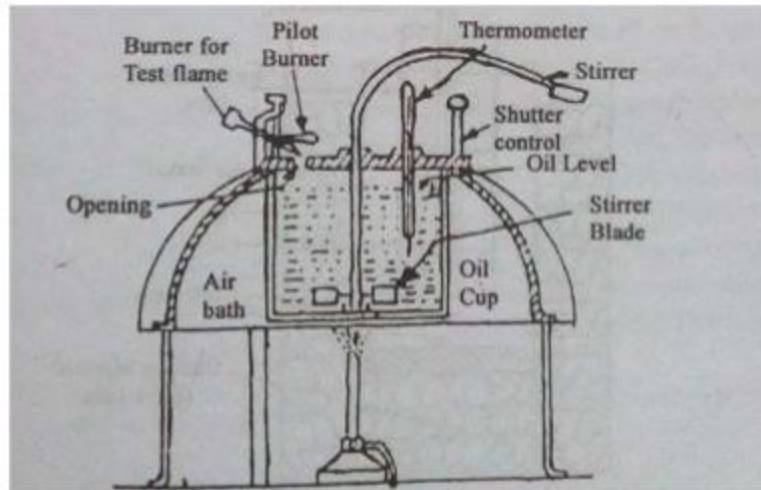


SPECIFICATIONS OF PENSKY MARTENS APPARATUS

Application range	Up to +405°C
Ignition	Gas and electric
Heating and Stirring	According to method
Cooling	Built in forced air
Safety	Overheat protection automatic shut off, fire extinguishing system, password
Dimension	230 mm x 410 mm x 460 mm (W x D x H)
Weight	14kg
Power supply	115/230 V, 50/60 Hz, 1000W



PENSKY MARTEN APPARATUS



DETERMINATION

- The flash and fire are most commonly determined by pensky martens apparatus which is essentially consists of
- 1. **Oil cup** – it consists of a cup of brass which is about 5 cm deep and 5.5 cm in diameter. The lid of cup is provided with four opening of standard size. One of which is used for thermometer, second for a stirrer having two blades, third is for introducing test flame and fourth is for admission of air. The level to which oil is to be filled is marked inside the cup.



- 2. **Shutter** – it is provided at the top of cup. By moving the shutter, opening in the lid opens and flame is dripped into this opening, thereby bringing the flame over the oil surface.
- 3. **Flame Exposure Device**- it is a small flame connected to the shutters by a lever mechanism.
- 4. **Air Bath**- oil cup is supported by its flange over an air bath, which is heated electrically or a gas burner.
- 5. **Pilot Burner** – when test flame is introduced in the opening , it gets extinguished, but when the flame is returned to its original position , it is automatically lighted by the pilot burner.



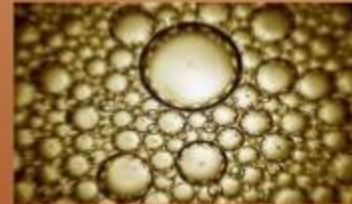
WORKING

- Oil cup and other parts of the apparatus are cleaned thoroughly. The oil sample is filled up to mark in the oil cup. It is then covered and positioned properly in the stove. The thermometer is inserted in the sample. The apparatus is inserted homogeneously through the air-bath by the burner. The stirrer is worked with the rate of 2 revolutions per second. Heating is regulated so as to increase the oil temperature by about 5°F per minute. At every 2°F rise of temperature, a test flame is introduced for a moment by the help of a shutter. When a distinct flash appears inside the cup, the temperature reading on the thermometer is the flash point. The procedure is continued as before until the oil vapour catches fire, which stays at least for 5 seconds. This is the fire point of the oil sample.



EMULSIFICATION NUMBER

- ✓ **Emulsification** is the property of a lubricant due to which the lubricating oil get mixed with water to form an emulsion.
- Generally emulsion are the product of two immiscible liquids.
- For example, a mixture of water and oil.
- ✓ **Process to calculate emulsification number**
 - First of all 20 ml of oil is taken in test tube. Then Steam of 100°C is passed through it so that temperature rises to 90°C and volume become 40 ml.
 - Then tube is placed in a bath to maintained its temp. at 90°C. and then time in second is noted, when layer of water and oil are distinctly separated.
 - then the Time Taken in second is known as steam emulsion number.



(Emulsion)

DIFFERENCE BETWEEN O/W AND W/O EMULSIONS

Oil in water emulsion (o/w)

- ▶ Water is the dispersion medium and oil is the dispersed phase.
- ▶ Water soluble drugs are more quickly released from o/w emulsions.
- ▶ They are preferred for formulations meant for internal use as bitter taste of oils can be masked.
- ▶ They are non greasy and easily removable from the skin surface.
- ▶ They are used externally to provide cooling effect e.g. vanishing cream
- ▶ O/W emulsions give a positive conductivity test as water is the external phase which is a good conductor of electricity.

Water in oil emulsion (w/o)

- ▶ Oil is the dispersion medium and water is the dispersed phase.
- ▶ Oil soluble drugs are more quickly released from w/o emulsions .
- ▶ They are preferred for formulations meant for external use like creams.
- ▶ They are greasy and not water washable.
- ▶ They are used externally to prevent evaporation of moisture from the surface of skin e.g. Cold cream.
- ▶ W/O emulsions do not give a positive conductivity test as oil is the external phase which is a poor conductor of electricity.

Emulsion number

- Emulsification is the property to get mixed with water easily
- A good lubricating oil should:
 - form such an emulsion with water which breaks easily (property is called demulsification)
 - have lower demulsification number
- Quicker the oil separates out from the emulsion formed, better is the lubricating oil

Neutralization Number

- ✓ The neutralization number is an indication of acidic and basic impurities in the lubricating oil.
- ✓ As we know Determination of acidity is more common and is expressed in term of acid value or acid number.
- ✓ In Fact, the acid number greater than 0.1 is usually taken as an indication of oxidation of the oil.
- ✓ The source of acidity in oil may be:-
 - a) Products of oxidation of oil.
 - b) Contamination of oil by SO_2 from combustion of the fuel.

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