



### Practical Experiment Instruction Sheet

EXPERIMENT TITLE : **Determination of Flash Point and Fire Point by Pensky-Martens Closed Cup Apparatus**

EXPERIMENT NO. : 10 MIT(T)/BSH/Engg. Chemistry Lab/ Engg. Chemistry /Manual No

Class: F.Y. BTech.

DEPARTMENT: Basic Sciences & Humanity

LABORATORY : Engg. Chemistry

Location:-

PART:

PAGE:

**Aim:- Determination of Flash Point and Fire Point by Pensky-Martens Closed Cup Apparatus**

**Apparatus:-** Pensky-Martens Closed Cup Tester, test cup

**Chemicals :** Oil sample

**Theory:-** The flash point temperature is one measure of the tendency of the test specimen to form a flammable mixture with air under controlled laboratory conditions. It is only one of a number of properties which must be considered in assessing the overall flammability hazard of a material. Flash point is used in shipping and safety regulations to define *flammable* and *combustible* materials. One should consult the particular regulation involved for precise definitions of these classifications.

These test methods cover the determination of the flash point of petroleum products in the temperature range from 40 °C to 370 °C by a manual Pensky-Martens closed-cup apparatus or an automated Pensky-Martens closed-cup apparatus, and the determination of the flash point of biodiesel in the temperature range of 60 °C to 190 °C by an automated Pensky-Martens closed cup apparatus.

Flash point is defined as the lowest temperature of a liquid at which its vapours will form a combustible mixture with air. It is a convenient and reliable classification of the flammability of many substances, there are three main categories;

Extremely flammable: Flash point below 0oC

Highly flammable: Flash point below 21oC

Flammable: Flash point below 55oC

A sample of specified volume is introduced to the test cup which is maintained at the test temperature. After a specified time, a test flame is applied and the presence or absence of a flash observed.

**Procedure:-**

1. Ensure that the sample container is filled to the volume capacity requirement specified.
2. Fill the test cup with the test specimen to the filling mark inside of the test cup. Place the test cover on the test cup and place the assembly into the apparatus. Be sure the locating or locking device is properly engaged.

3. Light the test flame and switch on the electric igniter and adjust the intensity in accordance with the manufacturer's instructions.
4. Apply the heat at such a rate that the temperature, as indicated by the temperature measuring device, increases 5 to 6°C /min.
5. Turn the stirring device at 90 to 120 rpm, stirring in a downward direction.
6. When the ignition source is a test flame, the application of the test flame may cause a blue halo or an enlarged flame prior to the actual flash point. This is not a flash and shall be ignored.
7. When a flash point is detected on the first application, the test shall be discontinued, the result discarded, and the test repeated with a fresh test specimen.
8. When the apparatus has cooled down to a safe handling temperature, less than 55°C (130°F), remove the test cover and the test cup and clean the apparatus as recommended by the manufacturer.

**Observation Table :**

Sr. No.	Temperature °C	Flash observed (Yes/ No)
1		
2		
3		
4		
5		

**Result:**

1. Flash point of given lubricant oil is found to be – \_\_\_\_\_ °C.
2. Fire point of given lubricant oil is found to be – \_\_\_\_\_ °C.