

## Experiment No.12 : Steam emulsification number

### I Practical Significance

The subject of emulsification is of greatest importance in connection with high-speed engines and steam turbines. More or less water is sure to find its way into the oil from leaky stuffing boxes or cooling coils, and thus all the conditions are present for the formation of an emulsion of oil and water. It is preferential to use oil with lower emulsification number.

### II Relevant Program Outcomes (POs) and PSOs

PO1 Basic knowledge  
PO3 Experiments and practice  
PO4 Engineering tools

### III Relevant Course Outcomes

f) Use relevant engineering materials in industry.

### IV Practical Learning Outcome

Determine the steam emulsification number of given lubricating oil.

### V Practical Skills

1. Measurement skill
2. Assembling of setup

### VI Relevant Affective domain related Outcomes

Maintain tools and equipments

### VII Minimum Theoretical Background

The time in seconds in which oil and water emulsion separates out in distinct layers is called steam emulsion number. It is the property of oils to get intimately mixed with water, forming a mixture, called emulsion. Certain oils form emulsions with water easily. Emulsions have a tendency to collect dirt, grit, foreign matter etc., thereby causing abrasion and wearing out of the lubricated parts of the machinery. If lubricating oil form emulsion with water, it should be breaks off quickly. A good lubricant should possess low steam emulsion.

### VIII Circuit diagram / Experimental set-up / Work Situation

NA

### IX Resources required

Sr. No.	Name of resource	Specification	Quantity	Remark
1	Test tube	30 ml	10	
2	Rubber Tube		05	
3	steamer		05	
4	Water			

Sr. No.	Name of resource	Specification	Quantity	Remark
5	Lubricating oil	Gear oil, Engine oil, Vegetable oil	As per requirement	
6	Stop watch		05	
7	Gas burner		05	
8	Test tube stand		05	
9	Pinch duct		05	

#### X Procedure (Step wise)

1. Take 5 ml of oil in test tube
2. Pass steam around 5 ml at 100<sup>o</sup>c
3. Close the test tube with stopper.
4. Shake the test tube for 1 minute.
5. Keep the test tube in test tube stand without disturbing and start the stop watch.
6. Note the time in second when the oil and water is separate out in distinct layers.

#### XI Precautions

1. Each tube should be shaken vigorously and for same time.
2. The time should be recorded carefully.

#### XII Actual procedure followed

- (A) Take 5ml of oil in test tube pass steam around 5ml at 100<sup>o</sup>c
- (B) Pass steam around 5ml at 100<sup>o</sup>c close the test tube for 1 min.
- (C) Shake the test tube.

#### XIII Resources used (with major specifications)

Lubricating oil, Stop watch, gas burner, test tube stand, pinch duct.

#### XIV Precautions followed

Each tube should be shaken

#### XV Observations

Sr. No	Oil Sample	Volume of oil	Volume of steam	Separation Time In second
1	A	5ml	5ml	30
2	B	5ml	5ml	35
3	C	5ml	5ml	40



**XVI Results**

- a) Emulsion Time for Lubricant A ..... 30  
 b) Emulsion Time for Lubricant B ..... 35  
 c) Emulsion Time for Lubricant C ..... 40

**XVII Interpretation of results**

Lubricant A has low Emulsion number than  
 lubricant B & lubricant C

**XVIII Conclusions and Recommendations (if any)**

Lubricant A is good lubricating oil.

**XIX Practical Related Questions**

- a) Explain good lubricating oil possess a low steam emulsion.  
 b) Is it possible to get an emulsion by mixing two miscible liquids?

**XX References / Suggestions for further Reading**

Sr. No.	Title of Book	Author	Publication
1	Engineering Chemistry	Jain and Jain	Dhanpat Rai and sons; New Delhi, 2015, ISBN : 9352160002
2	Engineering Chemistry	Dara, S. S.	S.Chand. Publication, New Delhi, 2013, ISBN: 8121997658
3	Applied Chemistry: Theory and Practice	O. P. Vermani, A. K. Narula	New age International. Publication, New Delhi, 2005, ISBN: 8122408141
4	Practical Chemistry	Dr.N.K.Verma	Laxmi publication New Delhi 81-7008-594-2
5	Engineering Chemistry	Shashi Chawla	S.Chand. Publication, New Delhi, 2013, ISBN: 1234567155036
	Engineering Chemistry	Shashi Chawla	S.Chand. Publication, New Delhi, 2013, ISBN: 1234567155036

**XXI Assessment Scheme****Process related assessment scheme**

Sr. No.	Process related	Weightage(60%)
1	Process for operation of stop watch	20%
2	Process for adding steam in lubricant	20%
3	Process for shaking of tubes	10%
4	Process for producing steam	10%

Product related assessment scheme

Sr. No.	Product related	Weightage(40%)
1.	Identification of SEN	40%

List of Student Team Members

1. ....
2. ....
3. ....
4. ....

Marks Obtained			Dated Signature of Teacher
Process Related (15)	Product Related (10)	Total (25)	
14	09	23	<i>[Signature]</i>

[Space to Write Answers]

Q1 — ?

The time in second in which oil of water emulsion separated in distinct layer could steam emulsion number (SEN) a good lubricant should have low SEN the quicker oil separate out from emulsion the lower is steam emulsion number and the better oil is for most purpose.

Q.2 — ?

No, By adding two miscible liquid i.e homogenous liquid are mixing with each other there is no emulsion form.