

# **Total Base Number Determination**

Procedure No. 817/4..9/T1401

## **1.0 SCOPE**

- 1.1 This method is used to determine the titratable alkalinity of highly alkaline oil-soluble sulfonates used as engine oil additives. This method is also adaptable to other similar alkaline engine oil additives. This method is an adaptation of the ASTM Method.D974-12 and is especially suited for laboratories having limited facilities.

## **2.0 APPARATUS**

- 2.1 250 ml Erlenmeyer Flask
- 2.2 Hot Plate
- 2.3 50 ml Burettes graduate in 1/10 ml.
- 2.4 Protective gloves

## **3.0 REAGENTS**

- 3.1 Distilled Water
- 3.2 99% refined grade isopropyl Alcohol
- 3.3 Phenolphthalein (0.4% in 91% Alcohol)
- 3.4 N/10 HCl
- 3.5 N/10 NaOH
- 3.6 Heptane, Reagent Grade

## **4.0 PROCEDURE**

- 4.1 To a tared 250ml Erlenmeyer Flask, weigh 0.50 - 0.60 grams of sample. Record weight on work sheet (Note A).
- 4.2 Effect solubility by the addition of 2-4 ml of Heptane (WARNING – See Note 1 and Note 2)
- 4.3 Add 50 ml 0.10N HCl to flask, Record volume used on work sheet. ( Note B )

## Total Base Number Determination

Procedure No. 817/4..9/T1401

- 4.4 Add 10 ml 99% isopropyl alcohol and 40 ml distilled H<sub>2</sub>O and 6-7 drops of phenolphthalein to flask. Add a few glass beads.
- 4.5 Place the flask on a hot plate for a sufficient period of time to distill the Heptane (approximately 5-10 minutes) . After heating, stopper the flask and cool contents by running cold water over the stopper flask.
- 4.6 Back Titrate to a permanent pink end point using 0.10N NaOH. Record the volume and normality on work sheet.

### **5.0** **CALCULATIONS**

$$\frac{[(\text{mls. HCl} \times N \text{ HCl}) - (\text{mls NaOH} \times N \text{ NaOH})]}{\text{Sample weight}} \times 56.1 = \text{Base Number}$$

#### **Notes:**

**Note A:** For low base number products, increase sample size to 2.0 - 2.5 grams.

**Note B:** For low base number products utilize 25 mls of 0.10N HCl.

**Note 1:** **WARNING. Heptane is a flammable liquid and fire hazard. Refer to the MSDS for full precautionary information.**

**Note 2:** **WARNING. Protective gloves should always be worn when working with chemicals.**