Test Procedure for

IODINE NUMBER OF OILS AND FATTY ACIDS

TxDOT Designation: Tex-809-B

Effective Date: August 1999

1. SCOPE

1.1 Use this method to determine the iodine number of normal and conjugated drying oils and fatty acids used in or recovered from organic coating materials.

1.2 The values given in parentheses (if provided) are not standard and may not be exact mathematical conversions. Use each system of units separately. Combining values from the two systems may result in nonconformance with the standard.

2. DEFINITIONS

2.1 *Iodine Number*—Iodine number is a measure of the unsaturation of fats and oils. Express in terms of the number of centigrams of iodine absorbed per gram of sample (percentage by weight of iodine absorbed).

3. APPARATUS

3.1 *Iodine flasks,* 250 mL (8.5 fl. oz.)

3.2 *Micro-beaker,* 1 mL.

3.3 *Pipettes,* 20 mL (0.68 fl. oz.) and 25 mL (0.85 fl. oz.)

3.4 *Buret,* 50 mL (1.7 fl. oz.)

3.5 *Analytical balance,* Class A in accordance with Tex-901-K.

4. MATERIALS

4.1 *Deionized water.*

4.2 *Chloroform,* ACS Reagent Grade.

4.3 *Iodine monochloride (Wijs) solution,* ACS Reagent Grade.

4.4 *Potassium iodide solution,* 150 g KI (ACS Reagent Grade) dissolved in deionized water and diluted to 1 L (1 qt.)

4.5 *Starch solution,* 10 g soluble starch (ACS Reagent Grade) dissolved in deionized water and diluted to 1 L (1 qt.)

4.6 *Aqueous sodium thiosulfate standard solution,* 0.1 N, ($Na_2S_2O_3$).

5. PROCEDURE

5.1 Label one 250 mL (8.5 fl. oz.) iodine flask "BLANK" and the other "SAMPLE."

5.2 Pipette 20 mL (0.68 fl. oz.) of chloroform into each flask.

5.3 Analytically weigh 0.3 g of the sample, to the nearest 0.1 mg, into the 1 mL (0.03 fl. oz.) micro-beaker.

5.4 Place the micro-beaker in the iodine flask marked "SAMPLE" and disperse in the chloroform.

5.5 Pipette 25 mL (0.85 fl. oz.) of iodine monochloride (Wijs) solution into both the iodine flasks marked "BLANK" and "SAMPLE."

5.6 Disperse.

5.7 Place both flasks in the dark for 1 hour.

5.8 After 1 hour, fill the 50 mL (1.7 fl. oz.) buret with previously standardized 0.1 N sodium thiosulfate solution.

5.9 Remove the flask marked "BLANK" from the dark.

5.10 Add 20 mL (0.68 fl. oz.) of potassium iodide solution to the flask and titrate the solution to a straw yellow color with the standardized sodium thiosulfate solution, shaking vigorously while titrating.

5.11 Add 2 mL (0.08 fl. oz.) of starch solution to the flask. The resultant solution should be dark purple.

5.12 Continue titrating with sodium thiosulfate, adding it drop by drop and shaking the flask vigorously, until achieving a clear and colorless solution.

5.13 Record the volume of 0.1 N standardized sodium thiosulfate solution used in the titration.

5.14 Repeat Sections 5.8–5.13 for the iodine flask marked "SAMPLE."

5.15 Calculate the iodine number using the equation under Section 6.

6. CALCULATIONS

6.1 Calculate the iodine number:

$$\text{Iodine Number} = \frac{(B - S) \cdot N \cdot 104.5}{\text{SW} \cdot \text{NVM}}$$

Where:

B = mL (fl. oz.) of sodium thiosulfate used in titration of "BLANK" sample (Section 5.8)

S = mL (fl. oz.) of sodium thiosulfate used in titration of "SAMPLE" sample (Section 5.10)

N = normality of sodium thiosulfate solution used in titration of "BLANK" and "SAMPLE" samples

SW = weight of oil acids or oil sample used (Section 5.3)

NVM = percent nonvolatile matter of oil acids or oil sample used, %.