

$$\text{Wt. of Whole Tar per cigarette} - \frac{\text{Average wt. of tar in aliquot}}{\text{No. of Cigts. Smoked}} \times \frac{\text{Total Volume of Solution}}{\text{Volume of the Aliquots}}$$

For the specific procedure outlined above, the formula reduces to:

$$\begin{aligned} \text{Wt. of Whole Tar / 1 Cigarette} &- \frac{\text{Average Wt. of Tar in 2 cc. aliquot}}{15} \times \frac{100}{2} \\ &- \frac{10 (\text{Average Wt. of Tar in 2 cc. aliquot})}{3} \end{aligned}$$

BS:F

B.J. STERLING

EP

100171657

C O P Y

10th October, 1957.

DETERMINATION OF THE WEIGHT OF WHOLE TAR

Procedure:

Weigh 300-400 cigarettes conditioned at 69°F and 60% relative humidity individually on a Baird-Tatlock Balance to the nearest 5 milligrams, and record the weights in the form of a frequency distribution. Calculate the average weight and express it to the nearest 5 milligrams.

Select 60 cigarettes in a 40 milligram range centred about the average weight. Divide these sixty cigarettes into groups of 15 by selection according to a table of a random distribution of numbers.

Mark the cigarettes at the 23 mm. mark with a light pencil and smoke the cigarettes in groups of 15 on one of the 5 unit smoking machines to a 23 millimetre butt length. Collect the smoke in spiral traps surrounded by dry ice. Have the moisture content of the cigarettes determined at the time of smoking from another batch of the same type of cigarettes similarly conditioned.

Wash out the spiral traps with methylene chloride-methanol (8.5 : 1.5) into 100 ml. beakers, using as little solvent as absolutely necessary to effect a complete removal of the smoke condensate. If possible, try to keep the volume of the solvent below 50 ml.

Filter the solutions through 9 cm. No. 1 Whatman filter papers golded into a flute form and set in long stemmed funnels, directly into 100 ml. volumetric flasks. Ensure that all tar is washed out of the beakers and filter papers. Make up the volumes to 100 ml. (after the solution has reached room temp.) with the methylene chloride-methanol solvent and then remove two 2 cc. aliquots from each solution into tared 2 ml. weighing bottles. Suspend them approximately 1/8" above the surface of the Lindberg Hot Plate and evaporate to near dryness with a stream of air blowing gently over them (from a fan). The temperature of the Hot Plate, as recorded by a thermometer whose bulb is approximately 1/8" above the surface, should not exceed 35°C. When it appears that all of the solvent has been evaporated off, transfer the weighing bottles to a vacuum dessicator. Evacuate the dessicator and weigh and dry the flasks alternately until they have achieved constant weight (Plus or minus 0.1 mg.)

The weight of whole tar obtained per cigarette may be calculated as follows:

100171658