

No. 54—(Spiritine)..... (a) 10568
 (b) 10546

Mean = 10557 calories per gram at constant volume.

No. 55—(Genuine turpentine).. (a) 10813
 (b) 10788

Mean = 10801 calories per gram at constant volume.

The comparatively small differences shown make it very doubtful whether useful indications could be obtained. It may be possible at some future time to further investigate this subject.

The following is an attempt to define oil of turpentine on the basis of the work just recorded. The definition must be regarded as provisional, and subject to correction and amplification.

Oil of turpentine is a liquid, *colourless* in thin layers, and having a *yellow-red* tint, equivalent to about 1 unit of yellow and 0.1 unit of red (Lovibond scale) when viewed in a column 2 dm. long. *Clear*, but made decidedly opaque by shaking with 0.1 per cent water, and giving an *opaque distillate* of one-tenth volume, which settles clear in a few hours. *Odour* peculiar and characteristic, quite distinct from that of gasoline, rosin oil or acetone, and capable of disguising these odours to the extent of 10 per cent admixture. *Density* between 0.860 and 0.880, (usually about 0.870)—but samples which have been long exposed to air may have a higher density. The *first fraction* of one-tenth volume, has a density between 0.856 and 0.870 (usually about 0.860). The *residual tenth* should not exceed 0.900. The *Boiling point* should lie between 154° and 158° C., and nine-tenths should distil below 180° C. The *fixed residue*, on evaporating over boiling water in a 4 inch, hemispherical dish, should not exceed 2 per cent. The *viscosity*, at 20° C., should be nearly 1.230 (water = 1.000)—McGill viscosimeter. *Flash point* should be about 32° C.—(Abel instrument.)—Should *dissolve* completely in an equal volume of glacial acetic acid, and the first fraction should similarly dissolve. A *saturated solution* of asphaltum should not be rendered translucent by dilution to ten volumes. (This test is best made by comparison with a sample of known purity.) The *optical activity* of the first fraction should increase in a + direction by oxidation. The *refractive index* at 20° C. should lie between 1.4667 and 1.4722. That of the first fraction should not exceed 1.4700. Moistened iodide of starch paper should become blue when suspended over turpentine exposed to air. *Free Bromine* in solution (*see* Section 17) should be decolorized. *Strong sulphuric acid* should polymerize and char the sample at a boiling temperature. A *rise of temperature* (*see* Sec. 18), should result on mixing with sulphuric acid.

NOTE.—I may mention that an investigation is now being carried on with a view to utilizing the specific heat of oil of turpentine as a means of determining its purity. There is a sufficient difference between the specific heat of oil of turpentine and that of hydrocarbons of the paraffin series, to make this determination available, if a sufficiently simple and yet accurate apparatus could be devised for carrying it out.

A. MCGILL