

tiveness was: soap, built nonionic and built alkyl aryl sulfonate, and loralkyl sodium sulfate. Ordinarily, solution concentration-water hardness curves would be developed for complete evaluation, but the scope of this work precluded this procedure.

The test variation for the five laboratory methods was of the same degree. The practical conventional washer test gave coefficients of variation roughly triple those for the laboratory methods. This difference is largely attributable to poorer test control of conditions such as degree and kind of soil of the test load. Even though different test washing machines were used, it appears that adjustment of factors such as wash time and ratio of fabric to solution might provide closer correlation between methods.

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Notes on the Determination of Photometric Colors

SEVERAL points concerning the determination of photometric colors have arisen as more and more spectrophotometers come into use and more and more operators use the method. In some instances the Model B instruments seem to be giving on refined oils results which are somewhat higher than those obtained on the instruments used by the Color Committee in the original work on which the equation for calculating photometric color was based. In other instances extremely good checks between Lovibond colors and photometric colors are obtained. There does not seem to be any tangible trouble at low color levels. Photometric colors well below Lovibond red values can be and have been obtained. Even negative photometric colors are encountered. In extremely green oils the green correction ($-56.4D_{670}$) can be greater than the combined values at 460, 550, and 620 millimicrons. Photometric colors using the present calculation are of course meaningless on very green oils. Lovibond red values however are equally meaningless.

Anomalous results obtained by some operators are directly traceable to faulty Lovibond red readings. Many uncalibrated sets of Lovibond type are in use

as well as many Wesson or Stevenson Colorimeters which are in bad repair and poor optical balance. Faulty spectrophotometers, faulty calibration standards, poor techniques, samples which are not clear, and cuvettes which are of the wrong type or which are dirty or etched, all are factors in affecting the individual's ideas on how well his laboratory checks Lovibond and photometric colors.

In determining photometric colors many wrong conclusions can be avoided if the method is followed carefully. Some of the points to observe are:

1. Calibrate the spectrophotometer between 25° and 30°C.
2. Check the instrument at all indicated wavelengths. If the specifications cannot be met by proper adjustment, the instrument should be returned to the factory.
3. The cylindrical cuvettes must be type B and must check not only each other but must check the Coleman CCl₄ standard. Cuvettes should be kept free from dirt and free from scratches.
4. The oil samples must be clear. If the oil is not clear when filtered through paper, 0.5 gm. of diatomaceous earth in 300 gms. of oil should be used to insure clarity.
5. Voltages to the spectrophotometer must be controlled to the point where fluctuation in readings does not occur.
6. Care in calculating photometric color is essential.

R. C. STILLMAN.