NOT FOR PUBLICATION

INTERIM REPORT

OF THE

COMMITTEE ON INTERNATIONAL STANDARDS FOR MEASUREMENT OF LIQUID PETROLEUM FUELS

OF THE

NATIONAL PETROLEUM COUNCIL

April 15, 1947

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The Committee on International Standards for Measurement of Liquid Petroleum Fuels was appointed by the National Petroleum Council for the purpose of considering the adoption of international standards for the measurement of liquid fuels and fuels used for aviation and submits the following interim report.

After considerable discussion the resolutions listed below were presented and unanimously agreed upon by those present.

First, it is necessary to measure liquid petroleum products by volume. Measurement by weight is impracticable. (See Appendix A).

Second, there is no operating or mechanical difficulty in expressing volumes in terms of liters, provided an adequate changeover period is allowed. (See Appendix B).

Third, for commercial transactions, products shall be measured at or corrected to a temperature of 60°F (15.56°C).

Fourth, relative densities or specific gravities shall be expressed in terms of accurately defined scales involving comparison of the weights in vacuum of equal volumes of petroleum product and water, both at a temperature of 60°F (15.56°C).

Fifth, in commercial transactions, weights of quantities delivered shall be on a basis of weight in air rather than weight in vacuum; this to apply whether metric or other units are employed.

Sixth, the responsibility for preparation of working directions, tables and factors for converting weight and volume in any one system to units of weight and volume in any other system be assigned to Sub-Committee XV of Committee D-2 of the American Society for Testing Materials. It is recommended that this Sub-Com-

mittee collaborate with other organizations interested in international standardization, specifically the American Standards Association, the Institute of Petroleum and the United States Bureau of Standards.

Respectfully submitted,

W. W. White, Chairman

APPENDIX A

METERS FOR MEASURING LIQUIDS BY WEIGHT

Only two devices have been produced commercially for weighing liquids automatically. So far as these have been produced they have been designed for relatively large quantities. The accuracy for single measurements usually does not exceed plus or minus 1 to 2% which would not bring them within the seller's requirements of approximately 0.6% maximum variation. They are of bulky design and, in general, much more costly for a given capacity than the corresponding volumeters. There are a number of spring and weight counterpoised devices used in container filling in refineries but in common with the above commercial meters do not provide a continous flow through the system. In the case of filling containers this is no handicap since the period of no flow corresponds to the removal of a full container in the presentation of an empty one. The speed in an interrupted flow operation of this kind is too low for use in delivery of fluids such as gasoline to airplanes.

All of the weighing devices require a free surface in contact with the open air in order to make the measurement. Together with the pouring operation in filling the tanks of the weightometer this free service involves a loss of fluid by evaporation from all such volatile materials as gasoline. The amount delivered by the weightometer is always less than the amount received by it. This error may, in some cases, amount to more than 1%.

All of the weightometers are arranged so that they fill standard containers and they cannot deliver less than this amount. This is a serious handicap in filling a tank to capacity and the final charge might be less than the full tank discharge from the weightometer. Since all the weighing devices require freedom from shock and must be accurately leveled to weigh correctly, they are not suited to any portable form such as required for truck delivery. To substitute weightometers for the present volumeters would require an entire change of equipment for measurement.

METERS FOR MEASURING LIQUIDS BY VOLUME

The volumeters have had a very large commercial development in at least five basic designs and have had a long period of improvement due to the great quantity used. These meters are used by millions having had their start in water measurement. As a result, they are now produced with a normal operating accuracy of plus or minus 0.3 to 0.4%, which brings them within government seller's requirements. They are fully equipped with recording or registering apparatus. Since the quantity produced is very large, the cost has been very greatly reduced below that of any possible competing weightometer. The flow is continous through the meter without interruptions and, therefore, very high rates of delivery can easily be attained and it is possible to stop delivery at any point without limitation, as occurs in the case of the weightometer.

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APPENDIX B

CONVERTING U. S. GALLON METERS

AND

IMPERIAL GALLON METERS TO LITERS

It is a simple field operation to convert meters either from U. S. gallons or Imperial gallons to liters, by removing the existing gears, counters and face plates and installing new gears, counters and face plates. The average cost of converting meters from a gallon to a liter basis is approximately $70.00 each. This would apply to meters manufactured by the following companies:

Smith	Erie
Neptune	Bowser
Pittsburgh	Granberg
Brodie	

However, to date, the only meter accepted worldwide is the Brodie Co. meter.

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