

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION R 91

PETROLEUM MEASUREMENT TABLES

*Annex 1
to ISO Recommendation
R 91-1970 — Petroleum measurement tables —
Tables based on a reference temperature of 20°C.*

2nd EDITION

February 1970

This second edition supersedes the first edition

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BRIEF HISTORY

The ISO Recommendation R 91, *Petroleum measurement tables*, was drawn up by Technical Committee ISO/TC 28, *Petroleum products*, the Secretariat of which is held by the American National Standards Institute (ANSI).

Work on this question led to the adoption of Draft ISO Recommendation No. 103, which was circulated to all ISO Member Bodies for enquiry in November 1957. It was approved by 22 Member Bodies. Four Member Bodies opposed the approval of the Draft (Czechoslovakia, France, Romania, U.S.S.R.).

This Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in February 1959, to accept it as an ISO RECOMMENDATION.

BRIEF HISTORY RELATING TO THE 2nd EDITION

A few amendments to ISO Recommendation R 91 having become necessary, a second edition of that ISO Recommendation was prepared by Technical Committee ISO/TC 28, and a Draft ISO Recommendation (No. 1384) adopted to this effect.

These amendments being of minor importance, the Draft ISO Recommendation, after having been approved by the (P) Members of ISO/TC 28, was submitted direct to the ISO Council, in accordance with Clause F.7.1 of the Directives for the technical work of ISO.

The ISO Council then decided, in February 1970, to accept this Draft ISO Recommendation as a second edition of ISO Recommendation R 91-1959.

This edition (2nd edition) cancels and replaces the first edition of ISO Recommendation R 91-1959.

PETROLEUM MEASUREMENT TABLES

The International Organization for Standardization (ISO) recommends the use, for international trade, of the

ASTM-IP Petroleum Measurement Tables

which were developed jointly by

- (a) the American Society for Testing and Materials (ASTM) – U.S.A., and
- (b) the Institute of Petroleum (IP) – United Kingdom,

and which have been published

- (a) in the U.S.A., under the references

ASTM D 1250-56
USAS Z11.83-1956

- (b) in the United Kingdom, under the references

IP 200/52
BSI Handbook No. 15 (British Edition)
BSI Handbook No. 16 (Metric Edition)

(The publications referred to above are reprinted from time to time incorporating any corrections required in the tables. Users of the tables should ensure that they have the most recent reprint).

NOTES

1. For the convenience of the user, the tables are available in three companion volumes called :
 - (a) the American Edition*,
 - (b) the British Edition*,
 - (c) the Metric Edition*.
2. The American Edition contains petroleum measurement tables used in U.S.A. oil measurement practice. The British Edition contains petroleum measurement tables used in British oil measurement practice. The Metric Edition contains petroleum measurement tables in metric units.
3. Each edition contains tables which permit accurate conversion of measurements from one system to another; hence there are some tables that are common to the three editions. A complete list of the tables to which this ISO Recommendation relates is given in the Annex.
4. The abridged tables 7, 25 and 55 are intended for use when less precision is required than that afforded by tables 6, 24 and 54 respectively. They should only be used in international trade with the explicit agreement of the contracting parties.

* The three editions may be purchased from the publishers, the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pa. 19103, U.S.A., or from the Institute of Petroleum, 61, New Cavendish Street, London W1 M 8 AR, England, and from any national standards organization.

5. It will be noticed that the names used in the titles, appearing in the Annex, and in the tables to designate quantities and units differ in certain cases from the names adopted by ISO to designate these quantities and units.

The Table below gives the correspondence between the names used in the ASTM-IP Petroleum Measurement Tables and those adopted by ISO in the following ISO Recommendations :

ISO/R 31, Part I, *Basic quantities and units of the SI and quantities and units of space and time* (2nd edition, December 1965);

ISO/R 31, Part III, *Quantities and units of mechanics* (1st edition, December 1960).

Names used in the ASTM-IP Petroleum Measurement Tables*	Names, abbreviations and symbols adopted by ISO	References	
		ISO Recommendation R 31 Part	Item No.
Specific Gravity	relative density (of the liquid in relation to water) (d)	III	3-3.1
Density	density (mass density) (ρ)	III	3-2.1
U.S. Gallon	gallon (US), gal (US)	I	1-5.k
Barrel	barrel (US)	I	1-5.o
Liter, litre	litre (l)	I	1-5.b
Pound	pound (avoirdupois) (lb)	III	3-1.h
Short Ton	short ton (sh tn)	III	3-1.o
Long Ton	ton	III	3-1.m
Water Ton	equivalent to 224 gallons (UK)		
Metric Ton	tonne (t)	III	3-1.c
Imperial Gallon	gallon (UK), gal (UK)	I	1-5.f
Cubic Foot	cubic foot (ft ³)	I	1-5.d
Kilogram	kilogramme (kg)	I	0-2

* The names are arranged in the order in which they appear in the titles reproduced in the Annex.

ANNEX

NAMES OF TABLES CONTAINED IN THE ASTM-IP PETROLEUM MEASUREMENT TABLES

Table No.	Title	Edition in which Table appears		
		American	British	Metric
1	Interrelation of Units of Measurement	X	X	X
2	Temperature Conversions	X	X	X
3	API Gravity at 60 °F to Specific Gravity 60/60 °F and to Density at 15 °C	X	X	X
4	U.S. Gallons at 60 °F and Barrels at 60 °F to Liters at 15 °C against API Gravity at 60 °F	X		
5	Reduction of Observed API Gravity to API Gravity at 60 °F	X		
6	Reduction of Volume to 60 °F against API Gravity at 60 °F	X		
7*	Reduction of Volume to 60 °F against API Gravity at 60 °F (Abridged Table)	X		
8	Pounds per U.S. Gallon at 60 °F and U.S. Gallons at 60 °F per Pound against API Gravity at 60 °F	X		
9	Short Tons per 1000 U.S. Gallons at 60 °F and per Barrel at 60 °F against API Gravity at 60 °F	X		
10	U.S. Gallons at 60 °F and Barrels at 60 °F per Short Ton against API Gravity at 60 °F	X		
11	Long Tons per 1000 U.S. Gallons at 60 °F and per Barrel at 60 °F against API Gravity at 60 °F	X		

* See Note 4, page 3.

NAMES OF TABLES CONTAINED IN THE ASTM-IP PETROLEUM MEASUREMENT TABLES (continued)

Table No.	Title	Edition in which Table appears		
		American	British	Metric
12	U.S. Gallons at 60 °F and Barrels at 60 °F per Long Ton against API Gravity at 60 °F	X		
13	Metric Tons per 1000 U.S. Gallons at 60 °F and per Barrel at 60 °F against API Gravity at 60 °F	X		
14	Liters at 15 °C per Short Ton and per Long Ton against API Gravity at 60 °F	X		
21	Specific Gravity 60/60 °F to Density at 15 °C and to API Gravity at 60 °F	X	X	X
22	U.S. Gallons at 60 °F, Barrels at 60 °F, and Imperial Gallons at 60 °F to liters at 15 °C against Specific Gravity 60/60 °F	X	X	
23	Reduction of Observed Specific Gravity to Specific Gravity 60/60 °F	X	X	
24	Reduction of Volume to 60 °F against Specific Gravity 60/60 °F	X	X	
25*	Reduction of Volume to 60 °F against Specific Gravity 60/60 °F (Abridged Table)	X	X	
26	Pounds per U.S. Gallon at 60 °F and U.S. Gallons at 60 °F per Pound against Specific Gravity 60/60 °F	X	X	
27	Short Tons per 1000 U.S. Gallons at 60 °F and per Barrel at 60 °F against Specific Gravity 60/60 °F	X		
28	U.S. Gallons at 60 °F and Barrels at 60 °F per Short Ton against Specific Gravity 60/60 °F	X		
29	Long Tons per 1000 U.S. Gallons at 60 °F and per Barrel at 60 °F against Specific Gravity 60/60 °F	X	X	

* See Note 4, page 3.

NAMES OF TABLES CONTAINED IN THE ASTM-IP PETROLEUM MEASUREMENT TABLES (continued)

Table No.	Title	Edition in which Table appears		
		American	British	Metric
30	U.S. Gallons at 60 °F and Barrels at 60 °F per Long Ton against Specific Gravity 60/60 °F	X	X	
31	Litres at 15 °C per Short Ton and per Long Ton against Specific Gravity 60/60 °F	X	X	
33	Specific gravity reduction to 60/60 °F for liquefied petroleum gases and natural gasoline	X		
34	Reduction of volume to 60 °F against specific gravity 60/60 °F for liquefied petroleum gases	X		
36	Pounds per Imperial Gallon at 60 °F against Specific Gravity 60/60 °F		X	
37	Long Tons per 1000 Imperial Gallons at 60 °F against Specific Gravity 60/60 °F		X	
38	Imperial Gallons at 60 °F per Long Ton against Specific Gravity 60/60 °F		X	
39	Long Tons per 1000 Cubic Feet at 60 °F against Specific Gravity 60/60 °F		X	
40	Long Tons per Water Ton at 60 °F against Specific Gravity 60/60 °F		X	
41	Metric Tons per 1000 Imperial Gallons at 60 °F against Specific Gravity 60/60 °F		X	
51	Density at 15°C to API Gravity at 60°F and to Specific Gravity 60/60°F		X	X
52	U.S. Gallons at 60 °F and Imperial Gallons at 60 °F per Litre at 15 °C, Barrels at 60 °F per 1000 Litres at 15 °C against Density at 15 °C		X	X
53	Reduction of Observed Density at 15 °C			X
54	Reduction of Volume to 15 °C against Density at 15 °C			X