



Manual on

**Hydrocarbon
Analysis**

6th Edition

A. W. Drews, editor

Manual on Hydrocarbon Analysis: 6th Edition

A. W. Drews
editor

ASTM Manual Series: MNL3
ASTM Stock #: MNL3



100 Barr Harbor Drive, West Conshohocken, PA 19428-2959

Library of Congress Cataloging-in-Publication Data

Manual on hydrocarbon analysis—6th ed./A. W. Drews, editor
(ASTM manual series: MNL 3)

ASTM Stock #: MNL3

Includes bibliographical references and index

ISBN 0-8031-2080-X

1. Petroleum products—Analysis. 2. Hydrocarbons—Analysis.

I. Drews, A. W. II. Series.

TP691.M358 1998

665.5—dc21

98-25886

CIP

Copyright © 1998 by the AMERICAN SOCIETY FOR TESTING AND MATERIALS, West Conshohocken, PA. All rights reserved. This material may not be reproduced or copied, in whole or in part, in any printed, mechanical, electronic, film, or other distribution and storage media, without the written consent of the publisher.

Photocopy Rights

Authorization to photocopy items for internal, personal, or educational classroom use, or the internal, personal, or educational classroom use of specific clients, is granted by the American Society for Testing and Materials (ASTM) provided that the appropriate fee is paid to the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923; Tel: 508-750-8400; online: <http://www.copyright.com/>.

NOTE: This manual does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this manual to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

NOTE: The Society is not responsible, as a body, for the statements and opinions advanced in this publication.

Foreword

THIS SIXTH EDITION OF THE *Manual on Hydrocarbon Analysis*, sponsored by ASTM Committee D02 on Petroleum Products and Lubricants, has been expanded even further than the fifth edition. First appearing in 1963 as STP332, this manual was updated by Committee D02 in 1968, 1977, 1987, and 1992. In this 1998 edition, Part 2 has been expanded to include 26 additional ASTM test methods. Furthermore, the number of chapters has been increased from five to seven through the creation of a separate chapter, "Analysis of Kerosine, Diesel and Aviation Turbine Fuels," and a totally new chapter, "Analysis of Waxes." For additional information on the significance of tests, the reader is encouraged to consult the *Manual on Significance of Tests for Petroleum Products, 6th Edition*.

Methodology is changing quickly, requiring revisions to existing methods and the standardization of new ones. The impact of computerization and microprocessors cannot be overemphasized. Modern data-handling capabilities allow highly detailed compositional analyses to be performed that were once only a vision. Some of these resulting methods have been standardized; others will follow rapidly as experience is gained.

Industry and governmental requirements for accurate, more detailed data in a shorter time frame have resulted in substantial method changes. Rapid instrumental techniques, incorporating automatic sampling and on-line instrumentation, are replacing many of the time-honored empirical and, even, wet-chemical procedures. Yet many of the established techniques are still utilized and, thus, they are included in this manual along with the methods that are replacing them. It is exciting to speculate what further changes will occur before issuance of the next edition.

Publication of this manual would not have been possible without the efforts of the ASTM staff, the authors—N. G. Johansen, J. M. McCann, G. Hemighaus, T. M. Warne, A. J. Lubeck, A. D. Barker, C. H. Pfeiffer, the reviewers—S. E. Litka and N. D. Smith, and to L. A. Drews for collating, formatting, and reviewing the texts. I express my appreciation to all those who made this sixth edition a reality.

A. W. Drews, editor

Subcommittee D02.04 on Hydrocarbon Analysis

Purpose of Manual

THE PURPOSE OF THIS MANUAL is two-fold. The seven introductory chapters provide the analyst with a comprehensive overview of current practices and tests relating to the analysis of hydrocarbons. The accompanying collection of ASTM test methods furnishes a convenient reference within a single volume. It is hoped that this combination will provide the reader with a clearer understanding and appreciation of this diversified subject.

Contents

INTRODUCTORY INFORMATION

Introduction	3
Table 1—Summary of Product Types Produced from Petroleum	4
Table 2—Summary of ASTM Test Methods (by subject)	5
Table 3—Number of Isomeric Paraffins	11
Table 4—Summary of Hydrocarbon Types in Petroleum Fractions	11

PART 1—DISCUSSION OF ANALYSES BY PRODUCT TYPE

1 Analysis of C₅ and Lighter Hydrocarbons by N. G. Johansen	15
Introduction	15
Current Practices	15
Future Trends	16
2 Analysis of Gasoline and Other Light Distillate Fuels by J. M. McCann	18
Introduction	18
Current Practices	18
Future Trends	20
3 Analysis of Kerosine, Diesel, and Aviation Turbine Fuel by G. Hemighaus	22
Introduction	22
Current Practices	22
Future Trends	23
4 Analysis of Viscous Oils by T. M. Warne	25
Introduction	25
Current Practices	25
Future Trends	30
5 Analysis of Waxes by A. D. Barker	31
Introduction	31
Current Practices	31
Future Trends	32
6 Analysis of Crude Oils by A. J. Lubeck	34
Introduction	34
Current Practices	35
Future Trends	39
7 Analysis of Aromatic Hydrocarbons by C. H. Pfeiffer	41
Introduction	41
Current Practices	41
Future Trends	42

PART 2—ASTM TEST METHODS

The test methods in this section are arranged in alphanumeric sequence. The page numbers apply only to this manual and not to the standard documents as they appear in the annual *ASTM Book of Standards*. See Table 2 for a list of test methods by subject. The following is a list of all test methods included in Part 2. It includes all test methods referenced in the seven chapters except as indicated in the chapters. It does not include all of the test methods cited in Table 2.

D5	Test Method for Penetration of Bituminous Materials	47
D36	Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus)	50
D56	Test Method for Flash Point by Tag Closed Tester	54
D86	Test Method for Distillation of Petroleum Products at Atmospheric Pressure	64
D87	Test Method for Melting Point of Petroleum Wax (Cooling Curve)	77
D96	Test Method for Water and Sediment in Crude Oil by Centrifuge Method (Field Procedure)	80
D97	Test Method for Pour Point of Petroleum Oils	87
D127	Test Method for Drop Melting Point of Petroleum Wax Including Petrolatum	95
D130	Test Method for Detection of Copper Corrosion from Petroleum Products by the Copper Strip Tarnish Test	97
D189	Test Method for Conradson Carbon Residue of Petroleum Products	103
D287	Test Method for API Gravity of Crude Petroleum and Petroleum Products (Hydrometer Method)	109
D323	Test Method for Vapor Pressure of Petroleum Products (Reid Method)	112
D341	Viscosity-Temperature Charts for Liquid Petroleum Products	120
D445	Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity)	126
D447	Test Method for Distillation of Plant Spray Oils	134
D473	Test Method for Sediment in Crude Oils and Fuels Oils by the Extraction Method	137
D482	Test Method for Ash from Petroleum Products	141
D524	Test Method for Ramsbottom Carbon Residue of Petroleum Products	144
D611	Test Methods for Aniline Point and Mixed Aniline Point of Petroleum Products and Hydrocarbon Solvents	152
D664	Test Method for Acid Number of Petroleum Products by Potentiometric Titration	159
D721	Test Method for Oil Content of Petroleum Waxes	166
D848	Test Method for Acid Wash Color of Industrial Aromatic Hydrocarbons	172
D849	Test Method for Copper Strip Corrosion of Industrial Aromatic Hydrocarbons	175
D850	Test Method for Distillation of Industrial Aromatic Hydrocarbons and Related Materials	177
D852	Test Method for Solidification Point of Benzene	182
D853	Test Method for Hydrogen Sulfide and Sulfur Dioxide Content (Qualitative) of Industrial Aromatic Hydrocarbons	184
D972	Test Method for Evaporation Loss of Lubricating Greases and Oils	186
D976	Test Method for Calculated Cetane Index of Distillate Fuels	190
D1078	Test Method for Distillation Range of Volatile Organic Liquids	193
D1133	Test Method for Kauri-Butanol Value of Hydrocarbon Solvents	200
D1142	Test Method for Water Vapor Content of Gaseous Fuels by Measurement of Dew-Point Temperature	202
D1159	Test Method for Bromine Number of Petroleum Distillates and Commercial Aliphatic Olefins by Electrometric Titration	213
D1160	Test Method for Distillation of Petroleum Products at Reduced Pressure	222
D1209	Test Method for Color of Clear Liquids (Platinum-Cobalt Scale)	240
D1218	Test Method for Refractive Index and Refractive Dispersion of Hydrocarbon Liquids	243
D1250	Guide for Petroleum Measurement Tables	247
D1265	Practice for Sampling Liquefied Petroleum (LP) Gases (Manual Method)	249
D1298	Practice for Density, Relative Density (Specific Gravity) or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method	252
D1319	Test Method for Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption	257
D1322	Test Method for Smoke Point of Aviation Turbine Fuels	263
D1492	Test Method for Bromine Index of Aromatic Hydrocarbons by Coulometric Titration	269
D1552	Test Method for Sulfur in Petroleum Products (High-Temperature Method)	272
D1685	Test Method for Traces of Thiophene in Benzene by Spectrophotometry	277
D1747	Test Method for Refractive Index of Viscous Materials	280
D1840	Test Method for Naphthalene Hydrocarbons in Aviation Turbine Fuels by Ultra Violet Spectrophotometry	284

D1945	Test Method for Analysis of Natural Gas by Gas Chromatography	287
D1946	Practice for Analysis of Reformed Gas by Gas Chromatography	302
D1988	Test Method for Mercaptans in Natural Gas Using Length-of-Stain Detector Tubes	307
D2007	Test Method for Characteristic Groups in Rubber Extender and Processing Oils and Other Petroleum-Derived Oils by Clay-Gel Absorption Chromatographic Method	311
D2158	Test Method for Residues in Liquefied Petroleum (LP) Gases	318
D2163	Test Method for Analysis of Liquefied Petroleum (LP) Gases and Propene Concentrates by Gas Chromatography	322
D2171	Test Method for Viscosity of Asphalts by Vacuum Capillary Viscometer	327
D2306	Test Method for C ₈ Aromatic Hydrocarbon Analysis by Gas Chromatography	334
D2360	Test Method for Trace Impurities in Monocyclic Aromatic Hydrocarbons by Gas Chromatography	337
D2386	Test Method for Freezing Point of Aviation Fuels	342
D2425	Test Method for Hydrocarbon Types in Middle Distillates by Mass Spectrometry	346
D2426	Test Method for Butadiene Dimer and Styrene in Butadiene Concentrates by Gas Chromatography	352
D2500	Test Method for Cloud Point of Petroleum Oils	355
D2501	Test Method for Calculation of Viscosity-Gravity Constant (VGC) of Petroleum Oils	358
D2502	Test Method for Estimation of Molecular Weight (Relative Molecular Mass) of Petroleum Oils from Viscosity Measurements	361
D2503	Test Method for Relative Molecular Mass (Molecular Weight) of Hydrocarbons by Thermoelectric Measurement of Vapor Pressure	365
D2504	Test Method for Noncondensable Gases in C ₂ and Lighter Hydrocarbon Products by Gas Chromatography	368
D2505	Test Method for Ethylene, Other Hydrocarbons, and Carbon Dioxide in High-Purity Ethylene by Gas Chromatography	373
D2549	Test Method for Separation of Representative Aromatics and Nonaromatics Fractions of High Boiling Oils by Elution Chromatography	379
D2593	Test Method for Butadiene Purity and Hydrocarbon Impurities by Gas Chromatography	385
D2597	Test Method for Analysis of Demethanized Hydrocarbon Liquid Mixtures Containing Nitrogen and Carbon Dioxide by Gas Chromatography	392
D2622	Test Method for Sulfur in Petroleum Products by X-Ray Spectrometry	402
D2650	Test Method for Chemical Composition of Gases by Mass Spectrometry	406
D2710	Test Method for Bromine Index of Petroleum Hydrocarbons by Electrometric Titration	413
D2712	Test Method for Hydrocarbon Traces in Propylene Concentrates by Gas Chromatography	420
D2784	Test Method for Sulfur in Liquefied Petroleum Gases (Oxy-Hydrogen Burner or Lamp)	426
D2786	Test Method for Hydrocarbon Types Analysis of Gas-Oil Saturates Fractions by High Ionizing Voltage Mass Spectrometry	432
D2878	Test Method for Estimating Apparent Vapor Pressures and Molecular Weights of Lubricating Oils	439
D2887	Test Method for Boiling Range Distribution of Petroleum Fractions by Gas Chromatography	444
D2892	Test Method for Distillation of Crude Petroleum (15-Theoretical Plate Column)	455
D3054	Test Method for Purity and Benzene Content of Cyclohexane by Gas Chromatography	484
D3120	Test Method for Trace Quantities of Sulfur in Light Liquid Petroleum Hydrocarbons by Oxidative Microcoulometry	488
D3205	Test Method for Viscosity of Asphalt with Cone and Plate Viscometer	494
D3227	Test Method for Mercaptan Sulfur in Gasoline, Kerosine, Aviation Turbine, and Distillate Fuels (Potentiometric Method)	498
D3230	Test Method for Salts in Crude Oil (Electrometric Method)	503
D3235	Test Method for Solvent Extractables in Petroleum Waxes	508
D3239	Test Method for Aromatic Types Analysis of Gas-Oil Aromatic Fractions by High Ionizing Voltage Mass Spectrometry	514
D3241	Test Method for Thermal Oxidation Stability of Aviation Turbine Fuels (JFTOT Procedure)	527
D3246	Test Method for Sulfur in Petroleum Gas by Oxidative Microcoulometry	538
D3279	Test Method for Heptane Insolubles	545
D3524	Test Method for Diesel Fuel Diluent in Used Diesel Engine Oils by Gas Chromatography	548
D3606	Test Method for the Determination of Benzene and Toluene in Finished Motor and Aviation Gasoline by Gas Chromatography	552
D3700	Practice for Containing Hydrocarbon Fluid Samples Using a Floating Piston Cylinder	559
D3701	Test Method for Hydrogen Content of Aviation Turbine Fuels by Low Resolution Nuclear Magnetic Resonance Spectrometry	563

viii CONTENTS

D3710	Test Method for Boiling Range Distribution of Gasoline and Gasoline Fractions by Gas Chromatography	567
D3760	Test Method for Analysis of Isopropyl Benzene (Cumene) by Gas Chromatography	578
D3797	Test Method for Analysis of <i>o</i> -Xylene by Gas Chromatography	582
D3798	Test Method for Analysis of <i>p</i> -Xylene by Gas Chromatography	586
D3961	Test Method for Trace Quantities of Sulfur in Liquid Aromatic Hydrocarbons by Oxidative Microcoulometry	590
D4006	Test Method for Water in Crude Oil by Distillation	596
D4007	Test Method for Water and Sediment in Crude Oil by the Centrifuge Method (Laboratory Procedure)	606
D4045	Test Method for Sulfur in Petroleum Products by Hydrogenolysis and Rateometric Colorimetry	617
D4052	Test Method for Density and Relative Density of Liquids by Digital Density Meter	621
D4053	Test Method for Benzene in Motor and Aviation Gasoline by Infrared Spectroscopy	625
D4057	Practice for Manual Sampling of Petroleum and Petroleum Products	628
D4177	Practice for Automatic Sampling of Petroleum and Petroleum Products	646
D4291	Test Method for Trace Ethylene Glycol in Used Engine Oil	670
D4294	Test Method for Sulfur in Petroleum Products by Energy-Dispersive X-Ray Fluorescence Spectroscopy	673
D4307	Practice for Preparation of Liquid Blends for Use as Analytical Standards	676
D4367	Test Method for Benzene in Hydrocarbon Solvents by Gas Chromatography	679
D4377	Test Method for Water in Crude Oils by Potentiometric Karl Fischer Titration	684
D4419	Test Method for Measurement of Transition Temperatures of Petroleum Waxes by Differential Scanning Calorimetry	688
D4423	Test Method for Determination of Carbonyls in C ₄ Hydrocarbons	691
D4424	Test Method for Butylene Analysis by Gas Chromatography	694
D4492	Test Method for Analysis of Benzene by Gas Chromatography	696
D4530	Test Method for Determination of Carbon Residue (Micro Method)	700
D4534	Test Method for Benzene Content of Cyclic Products by Gas Chromatography	705
D4628	Test Method for Analysis of Barium, Calcium, Magnesium and Zinc in Unused Lubricating Oils by Atomic Absorption	708
D4629	Test Method for Trace Nitrogen in Liquid Petroleum Hydrocarbons by Syringe/Inlet Oxidative Combustion and Chemiluminescence Detection	712
D4735	Test Method for Determination of Trace Thiophene in Refined Benzene by Gas Chromatography	716
D4737	Test Method for Calculated Cetane Index by Four Variable Equation	720
D4808	Test Method for Hydrogen Content of Light Distillates, Middle Distillates, Gas Oils, and Residua by Low Resolution Nuclear Magnetic Resonance Spectroscopy	723
D4810	Test Method for Hydrogen Sulfide in Natural Gas Using Length-of-Stain Detector Tubes	728
D4815	Test Method for Determination of MTBE, ETBE, TAME, DIPE, <i>tertiary</i> -Amyl Alcohol and C ₁ to C ₄ Alcohols in Gasoline by Gas Chromatography	731
D4864	Test Method for Determination of Traces of Methanol in Propylene Concentrates by Gas Chromatography	739
D4888	Test Method for Water Vapor in Natural Gas Using Length-of-Stain Detector Tubes	744
D4927	Test Method for Elemental Analysis of Lubricant and Additive Components—Barium, Calcium, Phosphorus, Sulfur and Zinc by Wavelength-Dispersive X-Ray Fluorescence Spectroscopy	747
D4928	Test Method for Water in Crude Oils by Coulometric Karl Fischer Titration	753
D4929	Test Method for Determination of Organic Chloride Content in Crude Oil	760
D4951	Test Method for Determination of Additive Elements in Lubricating Oils by Inductively Coupled Plasma Atomic Emission Spectrometry	766
D4953	Test Method for Vapor Pressure of Gasoline and Gasoline-Oxygenate Blends (Dry Method)	771
D5002	Test Method for Density and Relative Density of Crude Oils by Digital Density Analyzer	778
D5060	Test Method for Determining Impurities in High-Purity Ethylbenzene by Gas Chromatography	783
D5134	Test Method for Detailed Analysis of Petroleum Naphthas Through Nonane by Capillary Gas Chromatography	786
D5135	Test Method for Analysis of Styrene by Capillary Gas Chromatography	797
D5185	Test Method for Determination of Additive Elements, Wear Metals, and Contaminants in Used Lubricating Oils and Determination of Selected Elements in Base Oils by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES)	800
D5186	Test Method for the Determination of the Aromatic Content and Polynuclear Aromatic Content of Diesel Fuels and Aviation Turbine Fuels by Supercritical Fluid Chromatography	806
D5190	Test Method for Vapor Pressure of Petroleum Products (Automatic Method)	811
D5191	Test Method for Vapor Pressure of Petroleum Products (Mini Method)	816

D5194	Test Method for Trace Chloride in Liquid Aromatic Hydrocarbons	821
D5234	Guide for Analysis of Ethylene Product	824
D5236	Test Method for Distillation of Heavy Hydrocarbon Mixtures (Vacuum Potstill Method)	826
D5273	Guide for Analysis of Propylene Concentrates	842
D5274	Guide for Analysis of 1,3-Butadiene Product	845
D5287	Practice for Automatic Sampling of Gaseous Fuels	847
D5291	Test Method for Instrumental Determination of Carbon, Hydrogen, and Nitrogen in Petroleum Products and Lubricants	852
D5292	Test Method for Aromatic Carbon Content of Hydrocarbon Oils by High Resolution Nuclear Magnetic Resonance Spectroscopy	857
D5303	Test Method for Trace Carbonyl Sulfide in Propylene by Gas Chromatography	864
D5307	Test Method for Determination of the Boiling Range Distribution of Crude Petroleum by Gas Chromatography	870
D5384	Test Method for Chlorine in Used Petroleum Products (Field Test Kit Method)	877
D5386	Test Method for Color of Liquids Using Tristimulus Colorimetry	880
D5442	Test Method for Analysis of Petroleum Waxes by Gas Chromatography	883
D5443	Test Method for Paraffin, Naphthene and Aromatic Hydrocarbon Type Analysis in Petroleum Distillates Through 200°C by Multi-Dimensional Gas Chromatography	890
D5453	Test Method for Determination of Total Sulfur in Light Hydrocarbons, Motor Fuels, and Oils by Ultraviolet Fluorescence	900
D5454	Test Method for Water Vapor Content of Gaseous Fuels Using Electronic Moisture Analyzers	906
D5482	Test Method for Vapor Pressure of Petroleum Products (Mini Method-Atmospheric)	908
D5503	Practice for Natural Gas Sample-Handling and Conditioning Systems for Pipeline Instrumentation	912
D5504	Test Method for Determination of Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatography and Chemiluminescence	917
D5580	Test Method for Determination of Benzene, Toluene, Ethylbenzene, <i>p/m</i> -Xylene, <i>o</i> -Xylene, C ₉ and Heavier Aromatics, and Total Aromatics in Finished Gasoline by Gas Chromatography	922
D5599	Test Method for Determination of Oxygenates in Gasoline by Gas Chromatography and Oxygen Selective Flame Ionization Detection	931
D5622	Test Method for the Determination of Total Oxygen in Gasoline and Methanol Fuels by Reductive Pyrolysis	939
D5623	Test Method for Sulfur Compounds in Light Petroleum Liquids by Gas Chromatography and Sulfur Selective Detection	943
D5708	Test Method for Determination of Nickel, Vanadium, and Iron in Crude Oils and Residual Fuels by Inductively Coupled Plasma (ICP) Atomic Emission Spectrometry	948
D5713	Test Method for Analysis of High Purity Benzene for Cyclohexane Feedstock by Capillary Gas Chromatography	953
D5762	Test Method for Nitrogen in Petroleum and Petroleum Products by Boat-Inlet Chemiluminescence	956
D5769	Test Method for Determination of Benzene, Toluene and Total Aromatics in Finished Gasoline by Gas Chromatography/Mass Spectrometry	961
D5776	Test Method for Bromine Index of Aromatic Hydrocarbons by Electrometric Titration	972
D5799	Test Method for Determination of Peroxides in Butadiene	975
D5808	Test Method for Determining Organic Chloride in Aromatic Hydrocarbons and Related Chemicals by Microcoulometry	977
D5842	Practice for Sampling and Handling of Fuels for Volatility Measurement	981
D5845	Test Method for the Determination of MTBE, ETBE, TAME, DIPE, Methanol, Ethanol and <i>tert</i> -Butanol in Gasoline by Infrared Spectroscopy	988
D5853	Test Method for Pour Point of Crude Oils	993
D5863	Test Method for Determination of Nickel, Vanadium, Iron, and Sodium in Crude Oils and Residual Fuels by Flame Atomic Absorption Spectrometry	1000
D5917	Test Method for Trace Impurities in Monocyclic Aromatic Hydrocarbons by Gas Chromatography and External Calibration	1005
D5986	Test Method for the Determination of Oxygenates, Benzene, Toluene, C ₈ -C ₁₂ Aromatics and Total Aromatics in Finished Gasolines by Gas Chromatography/Fourier Transform Infrared Spectroscopy (GC/FTIR)	1011
D6069	Test Method for Trace Nitrogen in Aromatic Hydrocarbons by Oxidative Combustion and Reduced Pressure Chemiluminescence Detection	1025
D6144	Test Method for Analysis of AMS (α -Methylstyrene) by Gas Chromatography	1030
D6159	Test Method for Determination of Hydrocarbon Impurities in Ethylene by Gas Chromatography	1034

x CONTENTS

D6160	Test Method for Determination of Polychlorinated Biphenyls (PCBs) in Waste Materials by Gas Chromatography	1039
D6212	Test Method for Total Sulfur in Aromatic Compounds by Hydrogenolysis and Rateometric Colorimetry	1054

ABOUT THE EDITOR

A L B E R T W . D R E W S

Since retirement in 1994 from the UOP Research Center in Des Plaines, IL, Albert W. Drews has served as a consultant for AC Analytical Controls. Mr. Drews started working for UOP in 1960 following his graduation from Elmhurst College (IL) with a B.S. degree in chemistry. He held the positions of Supervisor of the Gas Chromatography Laboratory, Manager of the Analytical Laboratories and Manager of Method Development. His career has focused on the analytical analysis of petroleum products and catalysts, with an emphasis on gas chromatography and physical testing.

Mr. Drews has been associated with ASTM activities for 38 years with active membership in Committee D02 on Petroleum Products and Lubricants since 1976. He has served as author of numerous methods and practices, editor, subcommittee chairman, first vice-chairman of Committee D02 and as a member of the Committee on Standards. Drews has been honored with numerous ASTM awards including the Committee D02 Scroll of Achievement, the Award of Excellence, Honorary D02 Membership, the Lowrie B. Sargent, Jr. Medal, and the ASTM Award of Merit.

Drews continues his active participation in Committee D02 while enjoying the benefits of retirement.

