

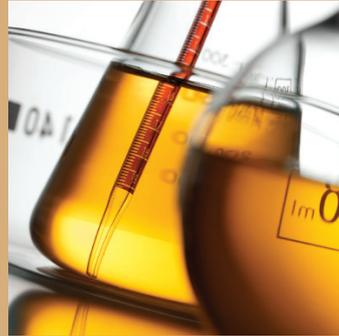


ASTM INTERNATIONAL
Manual

Significance of Tests for Petroleum Products

9th Edition

Salvatore J. Rand, Ph.D.
Allen W. Verstuyft, Ph.D.





Salvatore J. Rand, Ph.D., and Allen W. Verstuyft, Ph.D., Editors

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Foreword

THIS PUBLICATION, *Significance of Tests for Petroleum Products: 9th Edition*, was sponsored by ASTM Committee D02 on Petroleum Products and Lubricants. The editors are Salvatore J. Rand, Ph.D., Consultant, North Fort Myers, Florida, and Allen W. Verstuyft, Ph.D., Al Verstuyft Consulting, LLC, Napa, California. This is the ninth edition of Manual 1 in the ASTM International manual series.

From Sal, to Thomas, Theresa, Amanda, Sarah, Michelle, Timothy, Steven, Paul, and Lucas

From Al, to Kate, Joanne and Amy

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Acknowledgments

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Monica Siperko, who have given us significant behind-the-scenes guidance and assistance from the outset of this venture. We also wish to thank Sara Welliver of J&J Editorial, LLC, in North Carolina, who was responsible for this logistically challenging project of assembling the 24 chapters and guiding the authors involved in this publication. Ms. Welliver, Mrs. Dernoga, and Mrs. Siperko were timely and extremely responsive to the continual and numerous requests of the editors. Finally, we would like to extend our sincerest appreciation to the industrial and governmental employers of all those involved in this publication. They ultimately make it possible for us to produce manuals such as this for the benefit of those who develop and use petroleum standards worldwide.



Dr. Salvatore J. Rand, an independent petroleum industry consultant, has been an ASTM International member for over thirty years. He was recently honored with ASTM's most prodigious award, the William T. Cavanaugh Memorial Award. He was recognized for his contributions to the promotion of, leadership in, and education about petroleum standards worldwide.

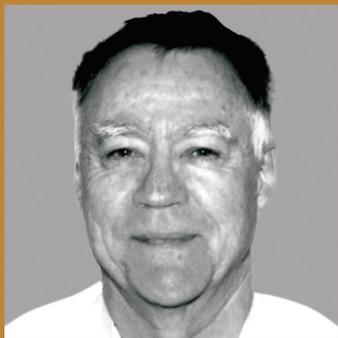
Rand serves on Committee D02 on Petroleum Products, Liquid Fuels, and Lubricants and several of its subcommittees. He is also a member at large of the executive subcommittee. During his tenure on D02 he has been vice chairman of the committee, the chair of Subcommittee D02.05 on Properties of Fuels, Petroleum Coke and Carbon Material, Secretary of Subcommittee D02.05 on Color and Reactivity, and has been particularly involved in developing standards in these areas. He has also been a member of ASTM's Committee on Technical Committee Operations (COTCO).

Rand has been recognized with the ASTM Award of Merit in 2009; a Service Award from the ASTM Committee on Technical Committee Operations in 2008; the Lowrie B. Sargent Jr Award in 2006; the George V. Dyroff Award of Honorary Committee D02 Membership in 2004; and the Committee D02 Sydney D. Andrews Scroll of Achievement in 2003. In 2010, Rand received the Charles B. Dudley Award for Manual 1, *Significance of Tests for Petroleum Products: 8th Edition*, which has become ASTM's best selling Manual.

For many years, Rand has been teaching two ASTM training courses that he developed: Gasoline: Specifications, Testing and Technology, and Fuels Technology. He has presented these courses in many cities throughout the world, and he has also made many varied presentations globally on ASTM fuels specifications and standardization procedures.

Professionally, prior to his retirement from industry and forming his consultancy, Rand directed the Fuels Test Laboratory which analyzed both liquid and gaseous fuels, at the Texaco Research and Development Center in Beacon, New York. He provided technical information and services to Texaco installations worldwide on fuel distribution, marketing and operations; as well as laboratory inspection, auditing, and personnel training both within Texaco and external to the company. He also served as an adjunct professor in the graduate school of chemistry at the University of St. Joseph.

Rand, who is the author of a number of research technical publications, is a 60-year member of the American Chemical Society, where he is a past chairman of its Mid-Hudson Section. He holds a Ph.D in Physical Chemistry and Physics from Rensselaer Polytechnic Institute, and a B.S in Chemistry and Philosophy from Fordham University.



Dr. Al Verstuylt, an independent petroleum industry consultant, has been an ASTM International member for over twenty years. Is a member of D02 on Petroleum Products, Liquid Fuels, and Lubricants and several of its subcommittees, including Subcommittees D02.03 on Elemental Analysis, D02.04 Hydrocarbons and D02.94 on Quality Assurance and Statistics. He is also a member of D19 on Water and D34 on Waste.

Al has been or is currently a member of the American Petroleum Industry (API) Test Methods Task Force and Environmental Monitoring Task Force; Western State Petroleum Association (WSPA) Test Methods Task Force (Petroleum Fuels); American Chemical Society (ACS), Committee on Reagent Chemicals and the California Section ChemOlympiad Coordinator.

Al was the Global Laboratory Coordinator at the Chevron Energy Technology Company in Richmond, CA. He provided petroleum and environmental analysis and chemistry consulting with expertise in turning complex chemical analysis data into information for decisions.

He is recognized in petroleum and environmental laboratory business for improving technical soundness and defensibility of data and operations; as well as laboratory auditing, and personnel training both within Chevron and external to the company. He as a Visiting Research Scientist at Burner Engineering Laboratory of Sandia-Livermore National Laboratory.

With Dr. Sal Rand, Al coedited "Fuel Specifications: What They Are, Why We Have Them and How They Are Used" ASTM Manual 69 (2016). He is the coauthor of a number of research technical publications, is a 48-year member of the American Chemical Society, where he was a past chairman of its California Section. He holds a Ph.D. Inorganic/Organometallic Chemistry from University of Nevada at Reno, and a B.S. Chemistry in Santa Clara University, and was Postdoctoral Associate in Physical Organic Chemistry at the University of Utah.

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