UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

AMERICAN SOCIETY FOR TESTING AND MATERIALS d/b/a/ ASTM INTERNATIONAL; NATIONAL FIRE PROTECTION ASSOCIATION, INC.; and AMERICAN SOCIETY OF HEATING, REFRIGERATING, AND AIR CONDITIONING ENGINEERS, Plaintiffs/ Counter-Defendants, v. PUBLIC.RESOURCE.ORG, INC., Defendant/ Counter-Plaintiff.	Case No. 1:13-cv-01215-TSC

DECLARATION OF JAMES S. THOMAS

I, James S. Thomas, declare as follows:

1. I am over the age of 18 years and am fully competent to testify to the matters stated in this Declaration.

2. This declaration is based on my personal knowledge. If called to do so, I would and could testify to the matters stated herein.

3. I am Vice President, Sales & Marketing for American Society for Testing and Materials ("ASTM").

4. ASTM offers training courses on the standards that it develops. ASTM offers several types of training: e-learning modules, in-person training hosted by ASTM in cities across the U.S., onsite training customized to various organizations or department needs, and webinars.

5. ASTM's training courses are targeted at specific industries and disciplines. For example, ASTM offers trainings for additive manufacturing, building and construction, coal, corrosion, environmental, metals, oxygen, petroleum, plastics, rubber, and textiles.

6. Within those broad categories, ASTM offers a variety of training courses to help users better utilize ASTM's standards.

7. ASTM includes its standards as reference materials with its training courses.

8. ASTM offers a variety of onsite or in-person training courses, including:

a. Since at least 1996, ASTM has offered an in-person training course on Diesel Fuels: Specifications and Test Methods. The course materials include: ASTM's D86, D975, D1266, D1552, D2622, D3120, D4177, and D4294. Attached as Exhibit 1 is a true and correct copy of the description of ASTM's Diesel Fuels: Specifications and Test Methods course available at https://www.astm.org/TRAIN/filtrexx40.cgi?-P+ID+28+traindetail.frm.

b. Since at least 1996, ASTM has offered an in-person training course on Gasoline: Specifications, Testing, and Technology. The course materials include ASTM's D86. Attached as Exhibit 2 is a true and correct copy of the description of ASTM's Gasoline: Specifications, Testing, and Technology available at https://www.astm.org/TRAIN/filtrexx40.cgi?-P+ID+4+traindetail.frm.

c. Since at least 1996, ASTM has offered a two-day, on-site training course on Textiles: Quality and Performance Standards. The course materials include ASTM's D5489. Attached as Exhibit 3 is a true and correct copy of the description of ASTM's Textiles course available at https://www.astm.org/TRAIN/filtrexx40.cgi?-P+ID+25+traindetail.frm.

d. Since at least 1997, ASTM has offered a three-day, in-person training course on Marine Fuels: Specifications, Testing, Purchase, and Use. The course materials include D1298, and D4294. Attached as Exhibit 4 is a true and correct copy of the description of ASTM's Marine Fuels course available at https://www.astm.org/TRAIN/filtrexx40.cgi?-P+ID+18+traindetail.frm.

e. ASTM's Fuels Technology course is a five-day, in-person training. The course materials include: ASTM D86, D975, D1298, and D4294. Attached as Exhibit 5 is a true and correct copy of the description of ASTM's Fuels Technology course available at https://www.astm.org/TRAIN/filtrexx40.cgi?-P+ID+392+traindetail.frm.

f. ASTM's Crude Oil: Sampling, Testing and Evaluation course is a three-day, in-person training. The course materials include: D1298, D2622, D4177, and D4294. Attached as Exhibit 6 is a true and correct copy of the description of ASTM's Crude Oil course available at https://www.astm.org/TRAIN/filtrexx40.cgi?-P+ID+51+traindetail.frm.

9. Similarly, ASTM includes its standards as reference material for its e-learning modules, including:

a. ASTM's #2 Diesel Fuel Certificate Program includes video demonstrations, checklists, presentations, data sheets and glossaries designed to address the 24 standards in the program, including D86, D1298, D2622, and D4294. Each of the 24 standards has its own learning module, and a copy of the standard is included in the price of the training. Attached as Exhibit 7 is a true and correct copy of the description of ASTM's #2 Diesel Fuel Certificate Program available at https://www.astm.org/TRAIN/train_136.htm.

b. ASTM's Petroleum Lab Technician Series is a series of e-learning courses. The training bundle includes a training module on ASTM's D611. The e-learning module includes ASTM D611 as reference material for the course. Attached as Exhibit 8 is a true and correct copy of the description of ASTM's Petroleum Lab Technician Series available at https://www.astm.org/TRAIN/train_226.htm.

c. ASTM's e-Learning module on ASTM E23 Standard Test Methods for Notched Bar impact testing of Metallic Materials, which includes a copy of ASTM E23. Attached as Exhibit 9 is a true and accurate copy of the description of ASTM's e-Learning module on E23 Standard Test Methods available at https://www.astm.org/TRAIN/filtrexx40.cgi?+-P+ID+224+traindetail.frm.

10. Unlike ASTM, ASTM's competitors typically cannot and do not provide copies of ASTM's standards to their customers, at least in part because ASTM's competitors are prohibited from reproducing ASTM's standards without acquiring a license from ASTM. As a result, ASTM's ability to offer excerpts or copies of its standards with its training courses gives ASTM an advantage over its competitors.

11. If ASTM was unable to fund its standard development through the sale of its copyrighted standards, ASTM could not fund its standards development mission. The revenues associated with ASTM's training program could not compensate for the loss of such revenue to fund the cost of ASTM's standard development expenses.

12. ASTM provides free, read-only access to view incorporated standards online in its Reading Room. ASTM views this information as educational and central to its overall mission.

13. However, the provision of this free resource does not compete with ASTM's sale of ASTM's standards because the standards available in the Reading Room are carefully restricted to prevent download or copying.

14. Although industry professionals and tradespeople who purchase ASTM's standards to use in the course of their work might reference the ASTM's Reading Room, it is not a substitute for purchasing a copy.

15. Rather, ASTM's Reading Room serves as an opportunity for ASTM to promote its products and service offerings, including the sale of its standards and training modules.

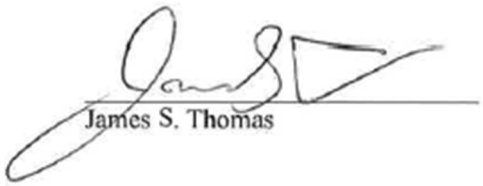
16. By providing unrestricted, downloadable PDF and HTML copies of ASTM's standards, Public Resource directly competes with ASTM's sale of its individual standards, volume sales, and other educational resources.

17. The harm resulting from Public Resource's posting and dissemination of such unrestricted copies of ASTM's works for free is not limited to the exact version of the ASTM work Public Resource copies. For many users, prior versions of ASTM's works may be a perfect or near perfect substitute that interferes with the market for the current version of ASTM's standards.

* * *

I declare under the penalty of perjury under the laws of the United States of America that the foregoing is true and correct pursuant to 28 U.S.C. § 1746.

Dated: October 4, 2019



James S. Thomas

EXHIBIT 1

Diesel Fuels: Specifications and Test Methods

Early Bird Fee: $1,395.00

Price: $1,550.00

Register Online:

In order to register, please enter the number of attendees in the appropriate box below and click add attendees.

New Orleans, LA

12/3/2019 - 12/5/2019

Royal Sonesta New Orleans
300 Bourbon Street
New Orleans, LA 70130

504-586-0300

Number of Attendees

ADD ATTENDEES

Las Vegas, NV

3/24/2020 - 3/26/2020

Number of Attendees

ADD ATTENDEES

Detroit, MI

4/28/2020 - 4/30/2020

Number of Attendees

ADD ATTENDEES

Early Bird Discount

ASTM automatically applies a discount of 10% when participants register 60 days prior to the start of the class.
After the early bird period expires, registrations are subject to standard pricing.

About the Course

This course covers a wide range of diesel fuel issues including specifications (ASTM D975 and other standards), test methods, sampling and quality control, distribution, current issues and alternate fuels like biodiesel.

There will be extensive discussion of diesel fuel lubricity, low temperature operability, and sulfur content. Participants will gain an understanding of the interconnection of diesel fuel with other fuels and the impacts of quality requirements on refinery production and product availability.

Learning Outcomes

By the end of this course you will be able to:

- Discuss the significance of the requirements
- Interpret product inspections
- Describe the impact of product quality on diesel engine applications
- Discuss current fuel issues and challenges.

Who Should Attend

Anyone needing an understanding of diesel fuel specifications, test methods, sampling, quality control and current diesel fuel issues. The course is appropriate for a wide-range of people, including: laboratory technicians, laboratory managers, refinery engineers, blending operators, pipeline operators, quality assurance personnel, new staff in fuels-related positions, alternative fuel producers, state regulatory officials, researchers, marketers, environmental scientists, and even lawyers and administrators involved with diesel fuels.

The course is especially suitable for those new to fuels, in both hands-on positions and professional, supervisory or managerial roles in:

- Petroleum companies
- Pipeline and terminal operation
- Petroleum testing laboratories
- Federal, state / provincial and local regulatory agencies
- Fuel marketers and purchasing department
- Engine and fuel injection / fuel system manufacturers
- Environmental companies
- Consumer groups
- Attorneys involved in petroleum-related litigation

A technical or scientific background is not required.

Course Description

Registration: 8:00-8:30 AM on the first day
Class: 8:30 AM-4:30 PM on the first two days. Following lunch on the third day the class will tour a testing laboratory if possible.

Day 1

- Crude oil to petroleum products
- Diesel fuel specifications
- Diesel fuel test methods: lubricity, low temperature operability, sulfur

Day 2

- Diesel fuel - additional requirements
- Chemistry & refining
- Diesel Fuel Additives
- On-Highway / Off-highway / locomotive / marine / heating oil
- Alternative diesel fuels including paraffinic diesel and biodiesel
- Diesel fuel & diesel engine issues

Day 3

- Key ASTM Guide
- Static electricity & microbial contamination
- Storage & handling
- Sampling practices
- Quality Assurance / Quality Control / Repeatability / Reproducibility
- Recent diesel fuel issues
- Tour of a testing facility, OEM site or terminal operation, as possible.

Referenced Documents

D56, D86, D93, D130, D445, D482, D524, D613, D975, D976, D1266, D1319, D1552, D1796, D2274, D2500, D2622, D2624, D2709, D2880, D2887, D3120, D3828, D4057, D4177, D4294, D4306, D4308, D4539, D4737, D4865, D5453, D5771, D5772, D5773, D5854, D6079, D6217, D6371, D6468, D6469, D6751, D6890, D7039, D7170, D7371, D7467, D7501, D7619, D7688, E39

Fee Includes

- Referenced ASTM standards and course notes
- Transportation to and from tour site
- Coffee breaks
- Course Completion Certificate with 2.1 Continuing Education Units (CEUs)

About the Instructor

Andy Pickard has worked in fuels and lubricants for more than 45 years. He has been a member of ASTM International for 35 years, participating in test method developments and product specification committees (diesel fuel and other middle distillate fuels, biodiesel, gasoline, ethanol, LPG, aviation fuels, and heavy fuel oils). Following academic training in chemistry with a doctorate in organometallic chemistry, he spent 10 years with Imperial Oil (Exxon Mobil in Canada) and 24 years with Petro-Canada. A good part of that time was spent working between refineries, distribution, marketers and customers on fuel issues. He is now a consultant on fuels and technology support, and continues to participate in both ASTM and CGSB (Canadian General Standards Board) fuel standard developments.

About Sponsoring Committee

ASTM is one of the world's largest voluntary standards development organizations. ASTM standards have grown to be among the world's most widely used and accepted documents. The 82-volume *Annual Book of ASTM Standards* (available online, print, and CD-ROM) contain over 12,000 standards written by 34,000 members on our 140 technical committees. The standard referenced in this course was developed by Committee D02 on Petroleum Products, Liquid Fuels, and Lubricants. For information on Committee D02, contact Alyson Fick at (610) 832-9710 or go to our D02 technical committee page.

ASTM Membership

Attend this course and receive a FREE 1-year membership to ASTM International and Committee D02 on Petroleum Products and Lubricants. (Applies to new members only and may not be used to renew existing memberships.)

Attention: Professional Engineers

If your state has a continuing education requirement for license renewal, ASTM training courses and ASTM membership can help you meet that requirement.

On-Site Training Available

ASTM can bring this course to your site! This on-site training at your facility will be tailored to meet the specific needs of your organization. For more information, please contact sales here or call 1-877-909-ASTM.

How Learning Will Be Assessed

Learning will be assessed through discussions. Participants are expected to ask questions if an issue is unclear to them.

Attendee Praise

Praise from recent attendees of the course:

"This was a great course. The instructor made it very easy to follow."

"It was a great training."

"I really enjoyed the class. Lots of information presented in a clear and concise manner."

"Excellent course. Will suggest this course to future diesel blenders in my organisation."

"It was all valuable information."

"Very informative and useful training. Thank you!"

Related Courses

You may also be interested in these related courses:

Live Courses

- EPA Tier III SQC Readiness Workshop
- Statistics in ASTM Standard Test Method Development, Application, and Quality Assurance

Online Courses

- ASTM Petroleum Lab Technician Series

EXHIBIT 2

Gasoline: Specifications, Testing, and Technology

Price: $1,550.00

Register Online:

In order to register, please enter the number of attendees in the appropriate box below and click add attendees.

West Conshohocken, PA

11/19/2019 - 11/21/2019

ASTM Headquarters
100 Barr Harbor Drive
West Conshohocken, PA 19428

610-832-9686

Number of Attendees

ADD ATTENDEES

Early Bird Discount

ASTM automatically applies a discount of 10% when participants register 60 days prior to the start of the class.
After the early bird period expires, registrations are subject to standard pricing.

About the Course

This extensive 3-day class provides broad coverage of the specifications, testing and technology related to gasoline. You'll learn about the different types and components of gasoline, ways to enhance octane, the various types of volatility, the purpose of sampling, and the stages of drivability. The course covers specifications related to gasoline, discusses gasoline additives, oxygenates, the refining process, the quality and distribution of fuels, and much more.

The class is taught in a participatory atmosphere. In addition to the course workbook, you will also receive a copy of ASTM's manual on *Significance of Tests for Petroleum Products*, as well as copies of various ASTM standards.

Learning Outcomes

By the end of this course you will be able to:

- Recall how gasoline and compositional variables affect engine performance
- Recall how to interpret test data to determine if gasoline meets required specifications and regulations
- Recall how to use octane blending equations and calculate volatility parameters
- Define how quality is maintained throughout the distribution system
- Discuss gasohol and other ethanol mixtures in gasoline
- Discuss reformulated gasoline, and the requirements mandated by the 1990 amendments to the Clean Air Act.

Who Should Attend

A scientific background is not required for this course. It is intended for:

- Petroleum company employees
- Federal, state, and local regulatory personnel
- Laboratory supervisors
- Fuel marketing personnel
- Pipeline company employees
- Engine mfg. and testing personnel
- Attorneys involved in fuels regulatory activity
- Anyone involved in the purchase, sale, operations, or distribution of gasoline.

Course Description

Registration: 7:30 AM-8:00 AM on first day
Class: 8:00 am-4:00 pm on the first two days. Following lunch on the third day, the class will tour a lab.

Day 1

- Gasoline Composition, Chemistry, Production, Blending, and Specs
- Octane Measurements and Enhancers
- CRC Vehicle Satisfaction Programs
- Octane Requirement Increase Altitude and Climatic Adjustments Phase Separation and Water Tolerance Importance of Volatility
- Vapor Pressure and Vapor Liquid Ratio
- Distillation
- ASTM Volatility Classes
- Cold and Hot Starting and Drivability
- CRC Drivability Programs
- Drivability Indices
- Evaporative and Exhaust Emissions
- Impact of Volatility Regulations

Day 2

- Additives and Their Chemistry
- Oxidation and Corrosion Inhibitors
- Metal Deactivators
- Engine Deposit Control Additives
- Oxygenates
- Chemistry of Alcohols and Ethers
- Effects of Ethanol and Other Oxygenates
- Effects on Volatility and Emissions
- Water Sensitivity
- CRC Oxygenate Drivability Programs Materials Compatibility
- Reformulated Gasoline Requirements
- Gasoline Distribution

Day 3

- Clean Air Act and 1991 Amendments
- Reformulated Gasoline
- EPA Testing Requirements
- Regulatory Issues
- Ozone Depletion
- Carbon Monoxide Reduction
- Maintenance of Quality
- Tour of a Fuel Testing Laboratory

ASTM Standards Referenced

Test Methods

- D86 Distillation of Petroleum Products
- D130 Detection of Copper Corrosion from Petroleum Products by Copper Strip Tarnish Test
- D381 Existent Gum in Fuels by Jet Evaporation
- D525 Oxidation Stability of Gasoline
- D1319 Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption
- D3606 Benzene and Toluene in Finished Motor and Aviation Gasoline by Gas Chromatography
- D4057 Standard Practice for Manual Sampling of Petroleum and Petroleum Products
- D4806 Standard Specification for Denatured Fuel Ethanol for Blending with Gasolines for Use as Automotive Spark-Ignition Engine Fuel
- D4814 Standard Specification for Automotive Spark-Ignition Engine Fuel
- D4815 Determination of MTBE, ETBE, TAME, DIPE, tertiary-Amyl Alcohol and C1 to C4 Alcohols in Gasoline by Gas Chromatography
- D5798 Standard Specification for Ethanol Fuel Blends for Flexible-Fuel Automotive Spark-Ignition Engines

Manuals

- Significance of Tests for Petroleum Products

Fee Includes

- All referenced ASTM standards and course notes
- Transportation to and from tour site
- Coffee breaks
- Course Completion Certificate with 2.1 Continuing Education Units (CEUs)

About the Instructor

Salvatore J. Rand is an ASTM Fellow and a consultant in motor and aviation fuel technology. He is vice-chairman of ASTM Committee D-2 on Petroleum Products and Lubricants, former chairman of Subcommittee 5 on Properties of Fuels, and secretary of the section on Color and Reactivity. He is retired from the Fuels Research Division of Texaco's R&D Department. Rand received his B.S. degree in chemistry from Fordham University and his Ph.D degree in physical chemistry from Rensselaer Polytechnic Institute.

About Sponsoring Committee

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ASTM Membership

Attend this course and receive a FREE 1-year membership to ASTM International and Committee D02 on Petroleum Products and Lubricants. (Applies to new members only and may not be used to renew existing memberships.)

Attention: Professional Engineers

If your state has a continuing education requirement for license renewal, ASTM training courses and ASTM membership can help you meet that requirement.

On-Site Training Available

ASTM can bring this course to your site! On-site training courses can also be tailored to meet your specific needs. For more information, please contact sales here or call 1-877-909-ASTM.

How Learning Will Be Assessed

Learning will be assessed through a series of question and answer sessions.

Questions About the Training Course

For information on this training course, please contact Training or call (610) 832-9695.

Attendee Praise

Praise from recent attendees of the course:

"Sal was a great instructor. He answered all of my questions."

"Sal Rand is an excellent instructor; very professional, encouraged participation, a wealth of experience and knowledge, and shared wonderful anecdotes relevant to material."

"Sal was very knowledgeable."

"Great instructor."

"Very informative. Easily understandable."

"Instructor was very knowledgable and very good."

"I would say that just about everything was really valuable."

"Great course with experienced and friendly instructor."

"Excellent instructor."

Related Courses

You may also be interested in these related courses:

Live Courses

- EPA Tier III SQC Readiness Workshop
- Statistics in ASTM Standard Test Method Development, Application, and Quality Assurance

Online Courses

- ASTM Petroleum Lab Technician Series

EXHIBIT 3

Textiles: Quality and Performance Standards

On-Site Training Available

ASTM can bring this course to your site! On-site training courses can also be tailored to meet your specific needs. For a quote or more information, please contact sales here or call 1-877-909-ASTM.

About the Course

This two-day course will give you a basic understanding of ASTM standards commonly used for testing fabrics, apparel, and household textiles. It will also give you an overview of the ASTM care labeling symbols.

Learn How To:

- Use these specific test methods and material specifications to establish fabric acceptability and performance
- Establish product requirements for certification
- Perform the mechanical and fabric performance test methods
- Calculate the test results and show reporting techniques
- Use the precision and bias procedures and applications
- Use ASTM care symbols on textile and apparel care labels

Who Should Attend

Anyone involved in the purchasing, testing, and evaluation of textile fabrics and apparel, including laboratory managers and technicians from industry or government textile testing laboratories.

On-Site Fees

- Referenced ASTM standards
- Course notes
- Certificate of Attendence with 1.4 Continuing Education Units (CEUs)

Course Outline

This course will be tailored to meet the needs of your individual organization. Topics covered include:

- Conditioning Textiles for Testing Mechanical Test Methods
- Mechanical Test Methods
- Air Permeability
- Test Strength
- Tongue Tear
- Fabric Count of Woven Fabric
- Mass (Weight) Per Unit Area
- Ball Burst
- Breaking Strength and Elongation of Textile Fabrics
- Performance Methods
- Failure in Sewn Seams of Woven Fabric
- Abrasion Resistance of Textile Fabrics (Rotary Perform)
- After Wash Appearance
- Surface Water Absorption of Terry Fabrics
- Care Labeling and Evaluation Practices
- Evaluation of Mens' and Boys' Home Launderable WoveShirts
- Care Symbols for Permanent Care Labels on Consumer
- Textile Products
- Development of Product
- Specifications and Product Certification Requirements

ASTM Standards Referenced

Test Methods

- D434 Resistance to Slippage of Yarns in Woven Fabrics Using a Standard Seam
- D737 Air Permeability of Textile Fabrics

- D1424 Tearing Strength of Fabrics by Falling-Pendulum Type (Elmendorf) Apparatus
- D1683 Failure in Sewn Seams of Woven Fabrics
- D1776 Conditioning Textiles for Testing Guides
- D2261 Tearing Strength of Fabrics by the Tongue (Single Rip) Procedure
- D3512 Random Tumble Pilling Tester Method
- D3775 Fabric Count of Woven Fabric
- D3776 Mass Per Unit Area (Weight) of Fabric
- D3786 Diaphram Bursting Strength Tester Method
- D3787 Bursting Strength of Knitted Goods Ball Burst Method
- D3884 Abrasion Resistance of Textile Fabrics (Rotary Platform, Double-Head Method)
- D3940 Bursting Strength and Elongation of Sewn Seams
- D4151 Flammability of Blankets
- D4231 Evaluation of Men's and Boy's Home Launderable Woven Dress Shirts and Sport Shirts
- D4685 Pile Retention of Corduroy Fabrics
- D4772 Surface Water Absorption of Terry Fabrics (Water Flow Test Method)
- D5034 Breaking Strength and Elongation of Textile Fabrics (Grab Test)
- D5035 Breaking Strength and Elongation of Textile Fabrics (Strip Method)
- D5489 Care Symbols/Care Instructions on Textile Products
- D5733 Tearing Strength of Nonwoven Fabrics by the Trapezoid Procedure Practices

Instructor

Ellen Roaldi is a Senior Technical Consulting Specialist in the Softlines area and has been with Bureau Veritas Consumer Products Services for 23 years. In her current position, Ellen is responsible for providing support globally for client initiatives as well as internal operations. This includes training clients and staff in testing theory and methodology, consulting, auditing and advising on technical information, reviewing and authoring procedural/client manuals, interpreting test results, and serving on several industry committees.

Prior to this position, Ellen provided program management services for key clients as well as assisting the regulatory team with interpretations of federal laws. Ellen also provided technical support in the textile laboratory while working previously in operations. Before joining Bureau Veritas, Ellen worked as a Quality Engineer for Talon/Textron, and as a Systems/Quality Engineer at Carborundum.

Ellen holds a Bachelor of Science in Textiles from Philadelphia University (formerly known as the Philadelphia College of Textiles and Science). She is a member of the American Apparel and Footwear Association (AAFA), ASTM International, the American Association of Textile Chemists and Colorists (AATCC), and the International Bedding and Law Officials (ABFLO). Ellen also serves on the Industry Advisory Board for the Textile Program at the State University College at Buffalo.

ASTM and Committee D13 on Textiles

ASTM is a world leader in the development of voluntary consensus standards. The 82-volume Annual Book of ASTM Standards, available in print and online, contain over 13,000 standards written by 140 ASTM technical committees. The standards referenced in this course were developed by Committee D13 on Textiles. For information on Committee D13, contact Jennifer Rodgers at (610) 832-9694 or go to our D13 technical committee page.

EXHIBIT 4

Marine Fuels: Specifications, Testing, Purchase, and Use

Early Bird Discount

ASTM automatically applies a discount of 10% when participants register 60 days prior to the start of the class.
After the early bird period expires, registrations are subject to standard pricing.

About the Course

This class explains how the properties of marine fuels affect fuel handling, combustion, and cost. It provides a detailed understanding of fuel quality requirements, and why they are necessary for good handling and combustion performance. Class interaction will be stressed by using practical examples of applications of the course material to past and current problems.

Learning Outcomes

By the end of this course you will be able to:

- Recall the history of marine fuel
- Describe how properties of marine fuels affect fuel handling, combustion and cost
- Describe the sampling process
- Take precautions to decreate fuel contamination.

Who Should Attend

Supervisors and managers in laboratory operations; purchasing; fuel supply and handling; and quality control. Also for shipping company employees, and those dealing with the sale, purchase, trade, or use of marine fuels, who need a detailed understanding of fuel quality requirements and why they are necessary for good handling and combustion performance.

(Not intended as a training course for lab technicians or those who run the tests, because it does not address detailed conduct of the various test methods.)

Course Description

Registration: 7:30 am-8:00 AM on first day.
Class: 8:00 AM-4:30 PM. Following lunch on the third day, the class will tour a testing laboratory.

Day 1

- Brief History of Marine Fuel
- Marine Fuel Specifications
- Chemistry Primer
- Crude Quality/Characteristics
- Refining (Fuels Manufacture)
- Refining (Blending Practices)

Day 2

- Quality Parameters, Significance and Testing
- Sampling
- Current Marine Fuel Quality
- IMO Environmental Issues/Low Sulphur/ECA/GHG - Marpol Annex VI
- Diesel Engines
- Ignition Quality

Day 3

- Fuel Purchasing
- Fuel Pre-treatment (Centrifuging)
- Fuel Handling and Delivery
- Fuel Contamination
- Resolution of Conflicts

ASTM Standards Referenced

Specification

- D2069 Marine Fuels

Test Methods

- D93 Flash Point by Pensky-Martens Closed Cup Tester
- D95 Water in Petroleum Products & Bituminous Materials by Distillation
- D97 Pour Point of Petroleum Products
- D189 Conradson Carbon Residue of Petroleum Products
- D445 Kinematic Viscosity of Transparent & Opaque Liquids
- D482 Ash from Petroleum Products
  D976 Calculated Cetane Index of Distillate Fuels
  D4294 Sulfur in Petroleum Products by Energy-Dispersive X-Ray Fluorescence Spectroscopy
- D4530 Determination of Carbon Residue (Micro-Method)
- D4737 Calculated Cetane Index by Four Variable Equation
- D4870 Total Sediment in Residue Fuels

Practices

- D1298 Density, Relative Density, or API Gravity of Crude Petroleum & Liq. Petrol. Prods by Hydrometer Method

Other

- CIMAC Std.-Rec. 11, Fuel Req. for Diesel Eng.

Fee Includes

- Course workbook and all referenced standards
- Transportation for demonstrations
- Certificate of Attendance and 2.1 Continuing Education Units (CEUs)
- Coffee breaks

About the Instructor

Robert Berner, marine fuels and lubricants consultant, has 45 years of experience in the marine fuels research and technical service. He served in the American Merchant Marine, holds a Chief Engineers license, worked for Esso International's Tanker Department as a Repair Superintendent, served in the Exxon International Marketing Department, Industrial and Wholesale Division, and was responsible for Exxon's marine fuels sales including product quality, claim dispute resolution, and policy implementation. Following his retirement from Exxon, Berner served as sales director for a bunker dot com company. He has a Bachelor of Engineering in Marine Engineering from the State University of New York Maritime College and a Masters of Business in Management and Finance from Fairleigh Dickinson University.

About Sponsoring Committee

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Free ASTM Membership

Attend this course and receive a FREE 1-year membership to ASTM International and Committee D02 on Petroleum Products and Lubricants. (Applies to new members only and may not be used to renew existing memberships.)

On-Site Training Available

ASTM can bring this course to your site! On-site training courses can also be tailored to meet your specific needs. For more information, please contact sales here or call 1-877-909-ASTM.

Attention: Professional Engineers

If your state has a continuing education requirement for license renewal, ASTM training courses and ASTM membership can help you meet that requirement.

How Learning Will Be Assessed

Learning will be assessed through a series of question and answer sessions.

Attendee Praise

Praise from recent attendees of the course:

"Wealth of case studies, real-world examples/experiences. Content exactly what I needed/expected, well presented, engaging."

Related Courses

You may also be interested in these related courses:

Live Courses

- EPA Tier III SQC Readiness Workshop
- Statistics in ASTM Standard Test Method Development, Application, and Quality Assurance

Online Courses

- ASTM Petroleum Lab Technician Series

EXHIBIT 5

Fuels Technology Hands-On Training

Early Bird Discount

ASTM automatically applies a discount of 10% when participants register 60 days prior to the start of the class.
After the early bird period expires, registrations are subject to standard pricing.

About the Course

The Fuels Technology course will be most valuable to scientists and engineers whose job responsibilities include testing and usage of gasoline, diesel, and aviation fuels. This extensive 5-day course will not only benefit newcomers to this technology but also experienced fuel technologists. The instructor's vast experience in this area will allow him to focus on key issues related to fuel specifications, performance, additives, and fuel storage and distribution. His deep involvement with ASTM and his experience with global fuel issues enrich the course content. With recent trends towards environmentally friendly ultra-clean fuels, fuel specification testing procedures have attained a reasonable level of sophistication. The significance of such testing will be fully covered in this course.

The class is taught in a participatory atmosphere, comprised of a lecture section and a hands-on laboratory practical section where participants perform the prescribed test methods using the required instrumentation. In addition to the course workbook, you will also receive a copy of ASTM's manual on *Significance of Tests for Petroleum Products*, as well as copies of various ASTM standards.

Course Topics

- Hydrocarbon chemistry, refinery processes, and fuel blending
- Gasoline engine, combustion (knocking & octane)
- Volatility (distillation, vapor pressure, vapor liquid ratio)
- Gasoline specifications and sulfur reduction
- Gasoline testing procedures, additives, oxygenates, emissions
- Jet engine fuels and combustion, specifications, testing, volatility
- Jet fuels low temperature operability, viscosity, density, and specific energy
- Properties not controlled by specifications
- Brief discussion of Distribution and Quality Control procedures
- Aviation gasoline, specifications, testing, unleaded gas
- Diesel engine, combustion principles, cetane number, specifications and testing
- Diesel engine sulfur reduction, additives, lubricity, cold flow performance
- Diesel engine emissions and microbial contamination
- Fuel Storage, fuel distribution, quality control
- Fuels of the future

Learning Outcomes

By the end of the class you will be able to:

- Recall how gasoline and compositional variables affect engine performance
- Recall how to interpret test data to determine if gasoline meets required specifications and regulations
- Recall how to use octane blending equations and calculate volatility parameters
- Define how quality is maintained throughout the distribution system
- Discuss gasohol and other ethanol mixtures in gasoline
- Discuss reformulated gasoline, and the requirements mandated by the 1990 amendments to the Clean Air Act.

Who Should Attend

- Scientists
- Engineers
- Plant Supervisors
- Senior Technical Staff
- Senior Plant Operators
- Laboratory Personnel

Course Description

Registration: 7:30 AM-8:00 AM on first day
Class Lecture: 8:00 am-12:00 pm
Laboratory Practical: 1:00 pm-4:00 pm

Lunch will be provided.

A special five-day training course will be presented describing the specifications and testing of gasoline, diesel, and aviation fuels. Two days each will be devoted to gasoline and diesel, and one day to aviation fuel. Lectures will be presented each morning, and during the afternoons the attendees will conduct selected tests themselves in the laboratory. The presentations will discuss in detail the Standard Specifications for gasoline (ASTM D4814), for diesel fuel (D975), and aviation fuel (D1655). Additionally, gasoline topics will include chemistry, combustion, octane and octane enhancers, blending, volatility, distillation, driveability, vapor pressure and vapor liquid ratio, additives, oxygenates and worldwide gasoline specifications. The diesel topics will include diesel engine design and diesel combustion, cetane number and index, fuel grades and types, flash point, viscosity, sulfur, lubricity, detergency, cleanliness, microorganisms, cold flow performance, conductivity, and biodiesel. Aviation fuel topics will include jet engine fuels and combustion, water separation, cleanliness, volatility, density, specific energy, low temperature operability, and the specifications and testing of aviation gasoline. The standards covering the hands-on testing that the participants will conduct in the afternoons will be discussed in detail.

Day 1 and 2 - Gasoline

- Combustion
- Knocking, octane
- Volatility, Distillation
- Vapor pressure, Vapor liquid ratio
- Driveability, Worldwide gasoline specifications
- Oxygenates, Sulfur, Oxidation stability, Gums, Engine deposits
- Additives

Day 3 and 4 - Diesel

- Differences among No 1, No 2, and No 4 Diesel
- Pour and Cloud Points
- Flash Point
- Viscosity
- Copper Strip Corrosion
- Sulfur
- Ramsbottom Carbon Residue
- Lubricity, (HFRR)
- Cetane Number and Cetane Index
- Water and Sediment
- Cold Filter Plugging Point (CFPP)
- Low Temperature Flow Test (LTFT)
- Biodiesel

Day 5 - Aviation Fuels

- Manufacture, Combustion in the Jet Engine
- Testing, Water Separation, Lubricity
- Specific Energy, Viscosity
- Additives, Static Electricity, Alternative Fuel Types

Laboratory Practical Description
Each day following the morning lecture section, participants will perform a selection of test methods discussed during the day using the required instrumentation. This hands-on approach will reinforce the topics and subject matter discussed during the lecture session to enhance learning and retaining knowledge.

Day 1

D86 Distillation of Petroleum Products

Learning Objectives:

A. Students will fully understand the scope, summary, significance and use as described in Sections 1, 4 and 5 of D86.
B. Students will learn how to categorize a petroleum product by Group number 1,2,3, or 4 and use this information to determine what procedure to follow in the test method
C. Students will perform and follow the step by step procedure Section 10 of D86.

D323 Vapor Pressure of Petroleum Products (Reid Method)

Learning Objectives:

A. Students will fully understand the scope, summary, significance and use as described in Sections 1, 4 and 5 of D323.

B. Students will review each Procedure A, B, C, and D and determine what types of Petroleum Products apply to each Procedure.

C. Students will perform and follow each step of Procedure A, Section 12 of D323

D381 Existent Gum in Fuels by Jet Evaporation

Learning Objectives:

A. Students will fully understand the scope, summary, significance and use as described in Sections 1, 4, and 5 of D381.

B. Students will be able to recognize what petroleum products require an Air-Jet Apparatus and what products require a Steam-Jet Apparatus for Evaporation.

C. Students will perform and follow the step by step procedure Section 11 of D381.

Day 2

D525 Oxidation Stability of Gasoline

Learning Objectives:

A. Students will fully understand the scope, summary, significance and use as described in Sections 1, 4, and 5 of D525.

B. Students will review the detailed Apparatus Section 6 and Annex A1, compare each section to the actual equipment required, and demonstrate how each component fits together to compile a complete Oxidation Stability Apparatus for Fuels.

C. Students will perform and follow the step by step procedure Section 10 of D525.

D130 Detection of Copper Corrosion from Petroleum Products by Copper Strip Tarnish Test

Learning Objectives:

A. Students will fully understand the scope, summary, significance and use as described in Sections 1, 4, and 5 of D130.

B. Students will be able to recognize what petroleum products require a Pressure Vessel Apparatus and what products require a Test Tube Apparatus.

C. Students will perform and follow the step by step procedure Sections 10 and 11 for Preparation of Test Strips and Test Procedure.

D7667 Determination of Corrosiveness to Silver by Automotive Spark-Ignition Engine Fuel -Thin Silver Strip Method

Learning Objectives:

A. Students will fully understand the scope, summary, significance and use as described in Sections 1, 4, and 5 of D7667.

B. Students will be able to recognize what petroleum products require following Procedure A -Using a Pressure Vessel (PVP) and what products require following Procedure B - Using a Vented Test Tube (VTTP).

C. Students will perform and follow the step by step procedure Sections 10 and 11 for Preparation of Test Strips and Test Procedure.

D1319 Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption

Learning Objectives:

A. Students will fully understand the scope, summary, significance and use as described in Sections 1, 4, and 5 of D1319.

B. Students will review the detailed Apparatus Section 6 and compare each section to the actual equipment required, and demonstrate how each component fits together to compile a complete Fluorescent Indicator Adsorption Apparatus (FIA).

C. Students will perform and follow the step by step Procedure as per Section 10 of ASTM D1319.

Day 3

D93 Flash point by Pensky-Martens Closed Cup Tester

Learning Objectives:

A. Students will fully understand the scope, summary, significance and use as described in Sections 1, 4, and 5 of D93.

B. Students will review the detailed Apparatus Section 6 for both manual and automated equipment compare each section to the actual equipment required, and determine what procedure A, B, or C is applicable to what product type, and what the key parameter differences are between each procedure.

C. Students will perform and follow the step by step Procedure A, B, C, (Section 11, 12,13) of D93.

D2500 Cloud Point of Petroleum Products

Learning Objectives:

A. Students will fully understand the scope, summary, significance and use as described in Sections 1, 4, and 5 of D2500.
B. Students will review the detailed apparatus Section 6 and compare each section to the actual equipment required.
C. Students will perform and follow the step by step procedure Section 8 of D2500.

D97 Pour Point of Petroleum Products

Learning Objectives:

A. Students will fully understand the scope, summary, significance and use as described in Sections 1, 4, and 5 of D97.
B. Students will review the detailed apparatus Section 6 and compare each section to the actual equipment required.
C. Students will perform and follow the step by step procedure Section 8 of D97.

D445 Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)

Learning Objectives:

A. Students will fully understand the scope, summary, significance and use as described in Sections 1, 4, and 5 of D445.
B. Students will review the detailed apparatus Section 6 and compare each section to the actual equipment required.
C. Students will perform and follow the step by step procedure in Sections 10 General and 11 for Transparent Liquids.

Day 4

D2709 Water and Sediment in Middle Distillate Fuels by Centrifuge

Learning Objectives:

A. Students will fully understand the scope, summary, significance and use as described in Sections 1, 4, and 5 of D2709.
B. Students will review the detailed apparatus Section 6 and compare each section to the actual equipment required.
C. Students will perform and follow the step by step procedure in Section 8 of D2709.

D524 Ramsbottom Carbon Residue of Petroleum Products

Learning Objectives:

A. Students will fully understand the scope, summary, significance and use as described in Sections 1, 4, and 5 of D524.
B. Students will review the detailed apparatus Section 6 and compare each section to the actual equipment required.
C. Students will perform and follow the step by step procedure in Section 9 of D524.

D6371 Cold Filter Plugging Point of Diesel and Heating Fuels

Learning Objectives:

A. Students will fully understand the scope, summary, significance and use as described in Sections 1, 4, and 5 of D6371.
B. Students will review the detailed apparatus Section 6 and compare each section to the actual equipment required.
C. Students will perform and follow the step by step procedure in Section 12 of D6371.

D6079 Evaluating Lubricity of Diesel Fuels by the High-Frequency Reciprocating Rig (HFRR)

Learning Objectives:

A. Students will fully understand the scope, summary, significance and use as described in Sections 1, 4, and 5 of D6079.
B. Students will review the detailed apparatus Section 6 and compare each section to the actual equipment required.
C. Students will perform and follow the step by step procedure in Section 11 and measuring the wear scar in Section 12.

D4294 Sulfur in Petroleum and Petroleum Products by Energy Dispersive X-ray Fluorescence Spectrometry

Learning Objectives:

A. Students will fully understand the scope, summary, significance and use as described in Sections 1, 3, and 4 of D4294.
B. Students will review the detailed apparatus Section 6 and compare each section to the actual equipment required.
C. Students will perform and follow the step by step procedure in Section 12 of D4294.

Day 5

D1298 Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method

Learning Objectives:

A. Students will fully understand the scope, summary, significance and use as described in Sections 1, 4, and 5 of D1298.

B. Students will review the detailed apparatus Section 6 and compare each section to the actual equipment required.

C. Students will perform and follow the step by step procedure in Section 10 of D1298.

D2386 Freezing Point of Aviation Fuels

Learning Objectives:

A. Students will fully understand the scope, summary, significance and use as described in Sections 1, 4, and 5 of D1298.

B. Students will review the detailed apparatus Section 6 and compare each section to the actual equipment required.

C. Students will perform and follow the step by step procedure in Section 10 of D1298.

D2624 Electrical Conductivity of Aviation and Distillate Fuels

Learning Objectives:

A. Students will fully understand the scope, summary, significance and use as described in Sections 1, 4, and 5 of D2624.

B. Students will review the detailed apparatus Section 6 and compare each section to the actual equipment required.

C. Students will perform and follow the step by step procedure in Section 11 of D2624.

D1322 Smoke Point of Kerosine and Aviation Turbine Fuel

Learning Objectives:

A. Students will fully understand the scope, summary, significance and use as described in Sections 1, 4, and 5 of D1322.

B. Students will review the detailed apparatus Section 6 and compare each section to the actual equipment required.

C. Students will perform and follow the step by step procedure from Section 11.1 to 11.5.6 of D1322.

D3948 Determining Water Separation Characteristics of Aviation Turbine Fuels by Portable Separometer

Learning Objectives:

A. Students will fully understand the scope, summary, significance and use as described in Sections 1, 4, and 5 of D3948.

B. Students will review the detailed apparatus Section 6 and compare each section to the actual equipment required.

C. Students will perform and follow the step by step procedure in Section 10 of D3948.

ASTM Standards Referenced

Test Methods

- D86 Distillation of Petroleum Products
- D93 Flash Point by Pensky-Martens Closed Cup Tester
- D97 Pour Point of Petroleum Products
- D130 Detection of Copper Corrosion from Petroleum Products by Copper Strip Tarnish Test
- D381 Existent Gum in Fuels by Jet Evaporation
- D445 Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)
- D524 Ramsbottom Carbon Residue of Petroleum Products
- D525 Oxidation Stability of Gasoline
- D975 Standard Specification for Diesel Fuel
- D1298 Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method
- D1319 Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption
- D1322 Smoke Point of Kerosine and Aviation Turbine Fuel
- D1655 Standard Specification for Aviation Turbine Fuels
- D2500 Cloud Point of Petroleum Products
- D2624 Electrical Conductivity of Aviation and Distillate Fuels
- D2709 Water and Sediment in Middle Distillate Fuels by Centrifuge
- D3948 Determining Water Separation Characteristics of Aviation Turbine Fuels by Portable Separometer
- D4294 Sulfur in Petroleum and Petroleum Products by Energy Dispersive X-ray Fluorescence Spectrometry

- D4814 Standard Specification for Automotive Spark-Ignition Engine Fuel
- D6079 Evaluating Lubricity of Diesel Fuels by the High-Frequency Reciprocating Rig (HFRR)
- D6371 Cold Filter Plugging Point of Diesel and Heating Fuels
- D7667 Determination of Corrosiveness to Silver by Automotive Spark-Ignition Engine Fuel -Thin Silver Strip Method

Manuals

- Significance of Tests for Petroleum Products

Fee Includes

- All referenced ASTM standards and course notes
- Transportation to and from tour site
- Coffee breaks
- Course Completion Certificate with 3.5 Continuing Education Units (CEUs)

About the Instructors

Dr. Salvatore J. Rand is an ASTM Fellow and a consultant in motor and aviation fuel technology. He is vice-chairman of ASTM Committee D-2 on Petroleum Products and Lubricants, former chairman of Subcommittee 5 on Properties of Fuels, and secretary of the section on Color and Reactivity. He is retired from the Fuels Research Division of Texaco's R&D Department. Rand received his B.S. degree in chemistry from Fordham University and his Ph.D degree in physical chemistry from Rensselaer Polytechnic Institute.

David Forester has over 40 years' experience in the fuel and refining additive business and has over 35 US patents on development of diesel and jet fuel additives, refinery antifoulants, and other refinery and process related additives. He has designed, implemented and/or automated many fuel test methods, including many ASTM standards that have resulted in new additive products, reformulations, and improvements to diesel fuel additive products. He has been a member of ASTM Committee D02 for over 20 years and currently serves as Chairman of Subcommittee D02.14 Stability and Cleanliness of Liquid Fuels which has jurisdiction for 48 ASTM standards, test methods, practices and guides. Mr. Forester has authored or co-authored multiple SAE and IASH papers/presentations, and co-authored Chapter 11 "Methods for Assessing Stability and Cleanliness of Liquid Fuels" in Significance of Tests for Petroleum Products" 8th Edition published 2010 by ASTM. He is currently functioning as associate editor of fuels for the 2nd edition revision to "The Fuels and Lubricant Handbook" published by ASTM.

Dr. Raj Shah currently holds the position of Director at Koehler Instrument Company, Long Island, NY where he has been working for the past two decades. He holds a Bachelor's degree in Chemical Engineering from the Institute of Chemical Technology (ICT) and a Ph. D in Chemical Engineering from The Pennsylvania State University and a MCP degree in Marketing and Management from Long Island University.

He is an active member of ASTM, STLE, NLGI, SAE, ACS, AOCS, SPE and AICHE and chairs various subcommittees in several of these organizations. He has over 100 publications and has co-edited an ASTM reference bestseller book "Fuels and Lubricant Handbook: Technology, Properties, Performance and Testing."

Dr. Shah is an elected Fellow of The Society of Tribologists and Lubrication Engineers (STLE) and was given the honor in 2016, in recognition for his outstanding contributions to the field of tribology. He is also the recipient of the Fellows award from NLGI since 2007, which endorsed his invaluable work in the field of greases. Raj is a Certified Professional Chemist and a Certified Chemical engineer with the National certification commission in chemistry and chemical engineering. He has also been awarded the Chartered Scientist status from the Science Council, UK and the Chartered Chemist status from the Royal society of chemistry.

Dr. Shah is an elected fellow of American Institute of Chemists and of the Energy Institute, UK. That fellowship was awarded to him in recognition of his professional experience and depth of knowledge and expertise that helped make a difference in the field of Energy. Raj is also a Chartered engineer with the Engineering Council, UK and was elected a Chartered Petroleum engineer with the Energy Institute in recognition of his specific expertise as a practitioner in energy engineering. Dr. Shah is a recent recipient of the PM Ku medal from STLE and the John A Bellanti Sr. Memorial award from NLGI, both prestigious recognitions for his volunteer work with the respective institutions over the years.

Raj has been particularly active with ASTM going back approximately 25 years. He was the vice-chair for the D02.G committee for over 12 years and served in leadership capacities in subcommittees D02. 9 and D02.12. In recent years, Dr. Shah is a co-instructor for the ASTM hands-on Motor gasoline course, and the ASTM Fuel technology Course. Raj is a previous recipient of the ASTM Award of Excellence thrice in his career, and has also been lauded with the illustrious ASTM Eagle award.

Dr. Shah is an elected fellow of the Royal Society of Chemistry, which is typically awarded by one's peers to signify a scientist's high level of accomplishment. Dr. Shah is the only recipient of both the President's award and the Long service award from NLGI India and was honored in 2013 with the distinguished alumni award recipient from the Institute of Chemical Technology.

Raj volunteers his time to both professional and charitable organizations and has served on the Founders board of directors of Developmental Disabilities institute, a special needs school for autistic children in Long Island, and also served on the NLGI board of directors for over 15 years. Dr. Shah is involved in working closely with several universities and is currently on the advisory board at: The Department of Chemical Engineering: State University of New York, Stony Brook, The School of Engineering, Design, Technology and Professional programs (SEDTAPP): Pennsylvania State University, and the Samuel Ginn College of Engineering, Tribology and lubrication science minor at Auburn University. Fluent in multiple languages, he enjoys world music, mixology, kayaking and mobile photography and lives in Melville, NY with his family.

Vincent Colantuoni, B.E, M.B.A, is the Product Manager for Koehler Instrument Company, Inc.

Koehler is a Manufacturer of Petroleum Testing Equipment with their major customer base being Petroleum Refineries, Inspection and Research Laboratories and other Major Universities and Institutions, where he has 10 years of experience in the Petroleum/Petrochemical Industry.

Vincent has been an active member of ASTM International, a worldwide standardization organization since 2008, in Committee D02 on Petroleum Products, Liquid Fuels, and Lubricants. At ASTM International, he serves as the Secretary of Subcommittee 9, Section C on the Oxidation Testing of Turbine Oils. Within this section, Vincent is also the Technical Contact for ASTM test method D943 and is responsible for any changes being proposed or made to the method. Vincent also assumes administrative responsibilities in Subcommittee C for Turbine Oils and Subcommittee G on Lubricating Greases. In Subcommittee C, he is the Technical Contact for ASTM test methods D665 and D3605. In Subcommittee G, he is the Technical Contact for ASTM test methods D217 and D1403.

Education:

Master of Business Administration, M.B.A. Double Major in Management/Operations Management and Sustainable Business 2015, Baruch College, City University of New York, N.Y.

Bachelors of Engineering, B.E. in Chemical Engineering Specialization in Business Management and Technology Transfer 2007, Stony Brook University, Stony Brook, N.Y.

About ASTM and Sponsoring Committee

Organized in 1898, ASTM is one of the world's largest voluntary standards development organizations. ASTM standards have grown to be among the world's most widely used and accepted documents. The 82-volume *Annual Book of ASTM Standards* contain 12,000 standards written by 34,000 members on our 140 technical committees. Committee D02 on Petroleum Products, Liquid Fuels, and Lubricants developed the standards used in this course. For more information, contact Alyson Fick at (610) 832-9710 or go to our D02 technical committee page.

ASTM Membership

Attend this course and receive a FREE 1-year membership to ASTM International and Committee D02 on Petroleum Products and Lubricants. (Applies to new members only and may not be used to renew existing memberships.)

Attention: Professional Engineers

If your state has a continuing education requirement for license renewal, ASTM training courses and ASTM membership can help you meet that requirement.

How Learning Will Be Assessed

Learning will be assessed through a series of question and answer sessions.

Questions About This Training Course

For information on this training course, please contact Training or call (610) 832-9686.

EXHIBIT 6

Crude Oil: Sampling, Testing, and Evaluation

Price: $1,550.00

Register Online:

In order to register, please enter the number of attendees in the appropriate box below and click add attendees.

San Antonio, TX

11/4/2019 - 11/6/2019

Holiday Inn
San Antonio Riverwalk
217 N. St. Mary's Street
San Antonio, TX 78205

210-224-2500

Number of Attendees

ADD ATTENDEES

Early Bird Discount

ASTM automatically applies a discount of 10% when participants register 60 days prior to the start of the class.
After the early bird period expires, registrations are subject to standard pricing.

About the Course

This extensive 3-day class covers the sampling, analysis and evaluation of crude oil. You'll gain an understanding of crude oil analytical measurement, composition and classification; quality variations and what causes them; sampling (both manual and automatic); inspection, assays and test methods; basic crude oil evaluation; quality case studies; current challenges and future needs in characterization, and much more.

Learning Outcomes

By the end of this course you will be able to:

- Discuss the history of crude oil as it relates to supply and training patterns
- Define and discuss key terminology
- Discuss sample protocols
- Review and discuss case studies.

Who Should Attend

- Laboratory technicians and chemists responsible for the analysis of crude oil samples for quantity and quality purposes
- Laboratory technicians and chemists responsible for the analysis of crude oil samples for quantity and quality purposes
- Refinery personnel responsible for evaluating crude oil to determine their processing characteristics
- Operating (field) personnel responsible for collecting samples will also benefit from a better understanding of how test results are directly dependent on proper sample collection and handling
- Traders and buyers involved in sale, purchase, or exchanges of crude oil.

Course Description

Registration 8:00-8:30 AM
Class 8:30 AM to 4:30 PM each day

Day 1

- Crude Oil History; Supply and Trading Patterns
- Definitions and Terms
- Quality Variations and Their Causes
- The Complexities of Crude Oil Composition
- Sampling Protocols

- Sampling Containers and Sample Integrity

Day 2

- Composition and Classification
- Inspection Analyses (Cursory Assay)
- Comprehensive Analyses (Full Assay)
- Other Important Crude Oils and Fraction Properties
- Basics of Crude Oil Processing Evaluation
- Break Out Group Exercises

Day 3

- Bituminum and Extra Heavy Crude Oils
- Crude Oil Quality Case Studies
- ASTM Crude Oil Proficiency Testing Program
- Challenges Presented to the Analyst by Heavier, Higher Sulfur Feedstocks and Opportunity Crude Oils
- Future Needs in Crude Oil Characterization and Analytical Test Method Requirements

Referenced Documents

- D97 Pour Point of Petroleum Products
- D287 API Gravity of Crude Petroleum and Petroleum Products (Hydrometer Method)
- D323 Vapor Pressure of Petroleum Products (Reid Method)
- D445 Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity)
- D473 Sediment in Crude Oils and Fuel Oils by the Extraction Method
- D664 Acid Number of Petroleum Products by Potentiometric Method
- D1298 Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method
- D2622 Sulfur in Petroleum Products by X-ray Spectrometry
- D2892 Standard Test Method for Distillation of Crude Petroleum (15-Theoretical Plate Column)
- D3230 Salts in Crude Oil (Electrometric Method)
- D3700 Standard Practice for Obtaining LPG Samples Using a Floating Piston Cylinder
- D4006 Water in Crude Oil by Distillation
- D4007 Water and Sediment in Crude Oil by the Centrifuge Method (Laboratory Procedure)
- D4057 Manual Sampling of Petroleum and Petroleum Products
- D4177 Automatic Sampling of Petroleum and Petroleum Products
- D4294 Sulfur in Petroleum Products by Energy-Dispersive X-ray Fluorescence Spectrometry
- D4377 Water in Crude Oil by Potentiometric Karl Fischer Titration
- D4530 Determination of Carbon Residue (Micro Method)
- D4629 Trace Nitrogenin Liquid Petroleum Hydrocarbons by Syringe/Inlet Oxidative Combustion and Chemiluminescence
- D4807 Sediment in Crude Oil by Membrane Filtration

Fee Includes

- Course notes
- Referenced documents
- Certificate Of Attendance
- 2.1 CEUs (Continuing Education Units)
- Coffee breaks

About the Instructors

Harry Giles is retired from the U. S. Department of Energy where he was manager of crude oil quality programs for the Strategic Petroleum Reserve. He was employed by the DoE for over 30 years, prior to which he held several positions with other U.S. government agencies and the University of Manchester in the United Kingdom. He has authored or co-authored a number of articles on crude oil analysis, characterization, storage, and on fuel stability and cleanliness. Giles is a technical advisor to ASTM for their Crude Oil Interlaboratory Crosscheck Program (ILCP). Currently, he is Executive Director of the Crude Oil Quality Association.

Dr. Arden Strycker has over 30 years experience in the petroleum industry including both advanced oil production technologies and downstream analytical testing and analyses. He has worked at the National Institute of Petroleum & Energy Research developing

enhancements for production methods in depleted reservoirs in the 1980's and 1990's. Since then, his career shifted to crude oil assays and ASTM analytical testing of crude oil properties. For over 10 years at Northrop Grumman the laboratory provided to the Department of Energy's Strategic Petroleum Reserve (SPR) numerous inspection and comprehensive assays of domestic and foreign crude oil streams and the up to 700 million barrels of crude oil stored underground in salt caverns. Specialized assay software was utilized as part of the program to generate customized assays of cavern blends. These were used successfully by the SPR in sales of the crude oil. More recently Dr. Strycker has led the Crude Assay Department of SGS North America at Deer Park, TX. Crude assays, custom distillations, and custom testing are provided to clients around the world, with strong emphasis on North and South America crude oils. Arden received his B.S. in chemistry from Southern Oregon University, and his Ph.D. in organic chemistry from Oregon State University.

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On-Site Training Available

ASTM can bring this course to your site! On-site training courses can also be tailored to meet your specific needs. For more information, please contact sales here or call 1-877-909-ASTM.

How Learning Will Be Assessed

Learning will be assessed through a series of question and answer sessions.

Quetions About This Training Course

For information on this training course, please contact Training or call (610) 832-9695.

Attendee Praise

Praise from recent attendees of the course:

"Very well balanced to meet the needs of a diverse audience."

"These courses are promoted by my company as a way to continue education. I always learn something new from them and they definitely add to personal enrichment."

I really enjoyed the course and was glad that I was taught by Mr. Giles."

All topics were applicable to what I needed to know."

"The wide scope of the course was helpful."

"Very much enjoyed the presentation and the knowledge of Harry Giles. Also appreciated the diversity of the group. Helped me understand more/different facets of our industry."

"Increased my understanding; answered outstanding questions."

Related Courses

You may also be interested in these related courses:

Live Courses

- *EPA Tier III SQC Readiness Workshop*
- *Statistics in ASTM Standard Test Method Development, Application, and Quality Assurance*

Online Courses

- *ASTM Petroleum Lab Technician Series*

EXHIBIT 7

#2 Diesel Fuel Training -- E-Learning Bundle

Price: $2192

About the Series

ASTM's **Petroleum Lab Technician Series** enables lab technicians to improve their skills through industry leading, self-guided, online training. The e-learning courses are a key tool to supplement existing internal lab QA/QC programs.

Each course includes:

- Self-guided training complete with video demonstrations, checklists, concept presentations, data sheets and glossaries
- Quiz with automatic grading
- Certificate upon successful completion of course and passing score on the quiz.

ASTM E-Learning Center

All ASTM online courses are available by subscription on ASTM's E-Learning Center. The E-Learning Center provides advanced features that let you set up learning plans, track learning progress and compliance, and run reports.

#2 Diesel Fuel Bundle

The #2 Diesel Fuel e-learning bundle includes all of the following courses. Courses are also available individually. Each course can be completed in about one hour.

- D86 Distillation
- D93 Flash Point
- D97 Pour Point
- D130 Copper Corrosion
- D189 Carbon Residue
- D445 Viscosity, Kinematic
- D482 Ash
- D524 Carbon Residue
- D664 Acid Number
- D974 Acid Number
- D1298 Density
- D1319 Hydrocarbon Type
- D2500 Cloud Point
- D2622 Sulfur Content
- D2624 Electrical Conductivity
- D4052 Density, Relative Density
- D4294 Sulfur Content
- D4530 Carbon Residue
- D4629 Nitrogen
- D5453 Sulfur Content
- D5762 Nitrogen
- D6079 Lubricity
- D6468 High Temperature
- D7688 Lubricity (HFRR)

CEUs and Certificate

CEUs: Available for all courses. Please see individual course listing for more information.

Certificates: A certificate is available upon successful completion of the course and an 80% or higher score on the exam.

Preview a Course

To preview a demo version of a course, click here.

Access

1 year online subscription for a Single User Only via username/password. Requires internet access.

For pricing for Multi-User access or for more information, please contact sales here or call 1-877-909-ASTM.

Technology Requirements

For a list of technology requirements for accessing ASTM Training please click here.

Price: $2192

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FAQ RETURN TO COURSE LISTING

All Search topic, title...

EXHIBIT 8

Other Petroleum Courses

Price: $2825

About the Series

ASTM's **Petroleum Lab Technician Series** enables lab technicians to improve their skills through industry-leading, self-guided online training. The e-learning courses are a key tool to supplement existing internal lab QA/QC programs.

Each course includes:

- Self-guided training complete with video demonstrations, checklists, concept presentations, data sheets and glossaries
- Quiz with automatic grading
- Certificate upon successful completion of course and passing score on the quiz.

ASTM E-Learning Center

All ASTM online courses are available by subscription on ASTM's E-Learning Center. The E-Learning Center provides advanced features that let you set up learning plans, track learning progress and compliance, and run reports.

Other Petroleum Courses

The Other Petroleum Course package includes all of the following courses. Courses are also available individually.

- Aviation Fuel Quality: Control Procedures Training Bundle
- Aviation Fuel - Quality Control Procedures: An Overview
- General Fuel Handling
- Particulate Detection
- Water Detection
- Filtration Equipment
- Microbial Contamination Detection
- Flash Point: Sampling and Test Specimens
- Flash Point: Preparation, Verification and Maintenance of Apparatus
- Flash Point: Explanation and Terminology
- Flash Point: Apparatus and Auxiliary Equipment
- Flash Point Bundle: Includes all 4 Flash Point courses listed above
- D611 Aniline Point
- D4308 Electrical Conductivity
- D4860 Water and Sediment Content
- D6426 Filterability
- D6824 Filterability
- D7261 Water Separation

Preview A Course

To preview a demo version of a course, click here.

Access

1 year online subscription for a Single-User Only via username/password. Requires internet access.

For pricing for Multi-User access or for more information, please contact sales here or call 1-877-909-ASTM.

Technology Requirements

1 year online subscription for a Single-User Only via username/password. Requires internet access.

For pricing for Multi-User access or for more information, please contact sales here or call 1-877-909-ASTM.

Price: $2825

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EXHIBIT 9

ASTM E23 Standard Test Methods for Notched Bar Impact Testing of Metallic Materials -- E-Learning Course

Price: $125.00

About the Series

ASTM's **Mechanical Engineering Technician Series** enables lab technicians to improve their skills through industry-leading, self-guided online training. The training courses are a key tool to supplement existing internal lab QA/QC programs.

Each course includes:

- Self-guided training complete with video demonstrations, checklists, concept presentations, data sheets and glossaries
- Review quiz with automatic grading
- Certificate upon successful completion of training module

ASTM E-Learning Center

All ASTM online courses are available by subscription on ASTM's E-Learning Center. The E-Learning Center provides advanced features that let you set up learning plans, track learning progress and compliance, and run reports.

About the Course

This courses covers the test methods that describe notched-bar impact testing of metallic materials by the Charpy (simple-beam) test and the Izod (cantilever-beam) test. The course covers the requirements for: test specimens, test procedures, test reports, test machines verifying Charpy impact machines, optional test specimen configurations, designation of test specimen orientation, and determining the percent of shear fracture on the surface of broken impact specimens.

In addition, information is provided on the significance of notched-bar impact testing, and methods of measuring the center of strike.

Learning Outcomes

By the end of this course you will be able to:

- Determine the impact strength of a metal
- Predict the likelihood of brittle fracture accurately
- Explain the Charpy and Izod test approaches
- Summarize the procedural steps required to determine the absorbed energy of metallic materials by notched bar impact testing

Audience

Anyone who runs the E23 test method or who needs an understanding of the test method and how it is properly run.

Course Content

- Introduction
- Demonstration Videos
- Procedural Outlines
- Glossary
- Data Sheet
- Quiz
- Referenced Materials
- Certificate

Videos

- Preparation of Apparatus (Duration: 4:11)
- Test Temperature Considerations (Duration: 5:04)
- Charpy Test Procedure (Duration: 4:25)

CEUs and Certificate

CEUs: .1 or 1 PDH

Certificate: A certificate is available upon successful completion of the course and an 80% or higher score on the exam.

Reference Materials Included

ASTM E23

Access

1 year online subscription for a Single-User Only via username/password. Requires internet access.

For pricing for Multi-User access or for more information, please contact sales here or call 1-877-909-ASTM.

Technology Requirements

For a list of technology requirements for accessing ASTM Training please click here.

Stock #

TRAIN-E0023-PASS

Price: $125

ADD TO CART

FAQ RETURN TO COURSE LISTING