

Package contents:

- Four CDs
- Course Handbook
- Online Pre-test (self-test, immediate results)
- Online Post-test (submit to SAE)
- Application for CEUs/Certificate of Completion

Equipment Requirements:

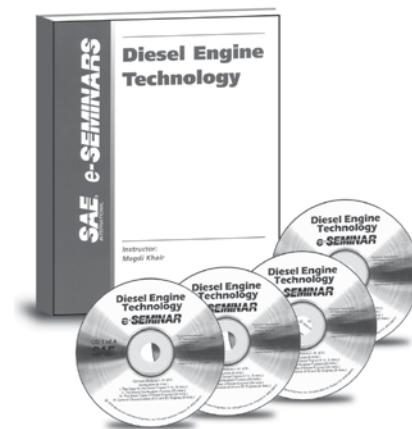
- PC Pentium class 200 MHz or better
- Windows 98 or later
- CD-ROM Drive
- Sound Card & Speakers/Headphones
- 800 X 600 screen resolution or greater (1024 X 768 Recommended)
- 32 MB of RAM or better
- Windows Media Player 7 and above
- Internet Explorer 4.0 or higher

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Single-user price

CEUS: 1.3



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Related Resources from SAE International

Classroom Version

Diesel Engine Technology Seminar

This seminar will provide you with a fundamental knowledge of the diesel engine. After a short but thorough introduction of the diesel combustion cycle, attendees will learn the importance of the fuel injection system, turbocharging, intercooling and many other aspects of engine design. (I.D.# 93014)

Diesel Engine Reference Book

This book covers diesel engineering for all types of engines. Covering all aspects of diesel engineering from thermodynamics theory to maintenance, the *Diesel Engine Reference Book* includes contributions from prominent engineers in the U.S., U.K., and Europe. Numerous line drawings, graphs, and photographs enhance the book's practical approach to the subject. This book is intended to summarize both the overall state of refinement of the modern diesel and the knowledge and views that surround its continuing development. (R-183)

The Diesel Engine

The diesel engine industry has undergone significant changes over the past 14 years as the demand for diesel engines increases worldwide. These changes have led to improved performance, reliability, and durability as well as decreased emissions. *The Diesel Engine* is a valuable resource on this rapidly progressing technology. This collection of 52 papers examines the advancements in diesel engine design and development from 1990 to 2003. (PT-109)

SAE Diesel Engines Technology Collection on CD-ROM

Heavy trucks, buses, off-highway and industrial equipment are powered by diesel engines worldwide. The 2004 SAE Diesel Engines Technology Collection on CD-ROM brings to your desktop a comprehensive resource of the latest design developments for this important power source. You'll find more than 2,300 full-text technical papers presented over the last 14 years at SAE conferences, including the 2004 SAE World Congress. (ENGD2004)

Visit store.sae.org for complete schedules, product information, and pricing on these related SAE resources.

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Diesel Engine Technology e-Seminar



Enhance your knowledge of diesel engines from your desktop.

- Gain heightened appreciation for technological advances in modern diesel engines
- Identify the sources of emissions from diesel engines and the influence of engine component design on curbing these emissions
- Obtain a better understanding of diesel exhaust aftertreatment systems and their effectiveness in reducing emissions
- Realize the importance of fuel injection parameters to performance and emission control

SAE e-Seminars

Convenient, portable, and with core content not reliant on live web connectivity, **SAE e-Seminars** offer a new way to receive the same instruction as live classroom learning without the expense of travel and time away from the workplace. e-Seminars deliver classroom seminar content on CD-ROMs, featuring full-motion video illustrated with synchronized presentation slides.

The seminar content is presented in two parts divided into ten modular topics, allowing you to progress through the course at your own pace. The program interface offers linear progression through the video as well as the flexibility to pause or review specific concepts and to jump to individual slides from the table of contents. Handout materials and a textbook are included, making the e-Seminar a complete ready-reference package, available whenever and wherever a refresher is needed. A self-quiz is available before taking the course and an online post-test will gauge new knowledge. Upon completion, you will receive 1.3 CEUs and obtain an SAE certificate of completion.

Diesel Engine Technology e-Seminar

This e-seminar provides new OEM recruits and diesel engine component suppliers with a fundamental knowledge of the diesel engine. Based on the popular classroom seminar, the ten hour and 20 minute course is divided into ten modules, delivered on four CDs and accompanied by a handbook. After a short but thorough introduction of the diesel combustion cycle, you will learn the importance of the fuel injection system, turbocharging, intercooling and many other aspects of engine design. Formation of each of the regulated emissions species as well as design changes to control these emissions will be explained. You will receive details of these emission control design changes and some sample cases quantified through the use of actual examples. An overview of developing technologies for the future with a comprehensive section on exhaust aftertreatment is also included.

Is this e-Seminar for You?

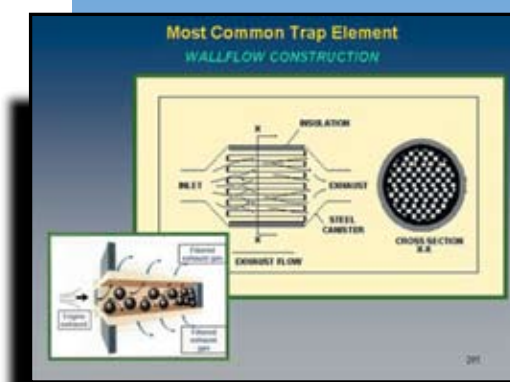
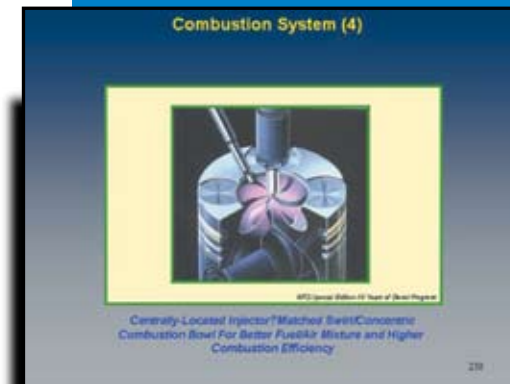
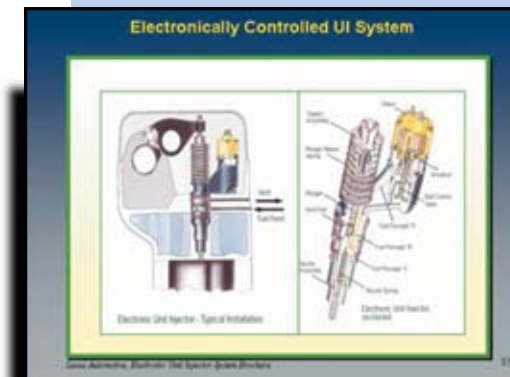
If you are involved in diesel engine support industries such as catalytic converters, lube oils, gaskets, and turbochargers, and if you are not well-versed with diesel engines although they play a major role in your career's survival, this e-Seminar is for you.



Instructor: Magdi Khair

Magdi Khair is a Staff Engineer in the Department of Emissions Research for Southwest Research Institute. Mr. Khair's expertise focuses on engine emissions testing, calibration of fuel injection systems, development of intake manifolds, optimization of intake ports, development of electronic engine controls, and exhaust emissions controls. He has work experience with AlliedSignal

Automotive Catalyst Company where he developed catalytic aftertreatment for light-duty and heavy-duty diesel engines; Ford New Holland where he participated in developing the 6.6 and 7.8 liter midrange diesel engines to meet 1991 emissions standards; Bendix Diesel Engine Controls where he led development of advanced electronically controlled diesel fuel injection systems as well as cooperative engineering programs with European and North American engine manufacturers; and Chrysler Corporation where he converted the slant six gasoline engine into an open chamber, pilot injected, and electronically controlled diesel engine. Mr. Khair received his B.S. in automotive engineering from Ain Shams University, his M.S. in thermodynamics from the University of Birmingham, England, and his M.B.A. from Michigan State University. Mr. Khair holds 13 U.S. patents in electronic fuel injection, turbocharging, exhaust gas recirculation, and aftertreatment systems. He also has authored and co-authored numerous SAE and ASME papers.



e-Seminar Content/Objectives

Module I. The Case for the Diesel Engine

[Total Run Time: 1 hour, 5 minutes]

- Define the compression ignition concept
- Compare compression-ignited (CI) and spark-ignited (SI) engines
- Determine how nitric oxide emissions can be formed in CI and SI engines
- Determine the reason for high thermal efficiency in CI engines
- Examine some distinguishing features that contribute to the superiority of CI engines
- Learn how CI engines contribute less to global warming by reducing carbon dioxide, a greenhouse gas, emission in the environment
- Compare the thermal efficiency of various energy conversion machines

Module II. The Diesel Combustion Process

[Total Run Time: 29 minutes]

- Examine the four-stroke combustion process
- Describe the pressure-volume diagram and apply it to diesel combustion
- Describe the pressure-crankangle diagram and apply it to diesel combustion
- Examine valve events and timing and define valve overlap

Module III. The Basic Types of Diesel Engines

[Total Run Time: 24 minutes]

- List various types of diesel engines
- Differentiate between direct- and indirect-injected diesel engines (DI & IDI)
- Differentiate between various piston crown designs
- Examine the importance of combustion bowl design on mixing fuel and air in preparation for high efficiency combustion

Module IV. General Characteristics of DI and IDI Engines

[Total Run Time: 9 minutes]

- Determine the difference between DI and IDI in terms of peak combustion pressure
- Determine the difference between DI and IDI in terms of peak combustion temperature
- Examine the influence of combustion pressure rate of rise on noise characteristics
- List the differences between the DI and IDI engines in terms of their general characteristics

Module V. The Diesel Fuel Injection System

[Total Run Time: 1 hour, 38 minutes]

- List the major and auxiliary functions of the diesel fuel injection system
- Categorize and list the various types of diesel fuel injection systems
- Describe the function of the pump-line-nozzle injection system

- Describe the function of the unit injector system
- Describe the function of the common-rail system
- Highlight the advantages of electronically-controlling fuel injection systems

Module VI. Air Management — Supercharging & Turbocharging

[Total Run Time: 50 minutes]

- Determine the purpose of supercharging
- Describe various methods of supercharging
- List the various supercharger drives
- Evaluate the performance of a centrifugal compressor through analyzing its performance map
- Describe the basic operation of a turbocharger
- List different types of turbochargers
- Define turbocompounding, sequential turbocharging, and turbo-multistaging

Module VII. Emissions Formation in Diesel Engines

[Total Run Time: 46 minutes]

- Differentiate between regulated and unregulated exhaust emissions
- Explain the heat release diagram and give its relevance to emission formation
- Describe in detail the phases of combusting a diesel fuel spray
- Describe hydrocarbon, carbon monoxide, nitric oxides, particulate matter, and smoke formation in diesel combustion

Module VIII. Diesel Emission Standards

[Total Run Time: 53 minutes]

- Recognize the adverse health effects of regulated emissions
- Define the engine certification, self-audit, and audit processes
- List the limits of regulated emissions for various engines, vehicles, and applications
- Review the details of emission analyzers and instrumentation

Module IX. Steps Towards the Modern Diesel Engine

[Total Run Time: 1 hr]

- Review the design changes to the fuel injection system to control NOx emissions
- Describe changes to the induction system for NOx reduction
- Review combustion bowl design changes to achieve better mixing
- Define the influence of intake port and intake manifold designs on emissions control
- List design changes aimed at reducing lube oil contribution to particulate emissions
- Describe the influence of high injection pressure on ignition delay and emission controls

Module X. Current and Future Technologies

[Total Run Time: 3 hours, 4 minutes]

- List technology options for future diesel engines
- Explain how modern diesel fuel injection systems are helping diesel engines achieve better performance and cleaner exhaust
- Describe the important design features of the modern diesel combustion system
- Describe the role of the induction system in engine performance and exhaust emission control

- Define the role of modern fuel composition on engine exhaust emissions
- Detail the various diesel aftertreatment systems and list their advantages and disadvantages
- Determine the importance of integrating engine and aftertreatment controls
- List technologies and electrical accessories considered for future diesel engines and cite their advantages and disadvantages

* for classroom version see back panel.

ADDITIONAL SAE e-SEMINARS

The same instruction as live classroom learning without the travel expense!

Catalytic Converters: Design and Durability e-Seminar

Instructors Ron Heck and Suresh Gulati will take you from the early development of catalytic converters and the key inventions that made them viable to the recent advances in converter technology required to meet the ever stringent emissions regulations for both light-off and underbody converters. Applications of converter design to gasoline-powered cars, truck, and motorcycles will be presented. This e-Seminar will be especially beneficial for mechanical, metallurgical, and chemical engineers, materials scientists, and chemists involved in heterogeneous catalysis, who are interested in handling, assembling, and failure analysis of catalytic converters. Based on the popular classroom seminar, this ten-hour, 45-minute course is divided into twelve modules on four CDs, and is accompanied by a handbook and a textbook. **Order No. PD130405; \$1,095 List/\$995 SAE Member**

Introduction to Brake Control Systems e-Seminar

James Walker, Jr. delves into brake control technology in this e-Seminar. Starting with the fundamentals of the tire-road interface, this course introduces participants to brake control system mechanization, system sensor needs, and the basic control strategies employed by anti-lock braking systems (ABS), traction control systems (TCS), electronic stability control systems (ESC), and their derivatives. Limiting factors and compromises that must be made in the design and development of brake control systems are covered through a brief review of hydraulic brake system functionality, the friction circle concept, and the fundamentals of longitudinal and lateral vehicle dynamics. Brake control system integration with other vehicle on-board technologies are also discussed. Based on the popular classroom seminar, Introduction to Brake Control Systems: ABS, TCS, & ESC, the nine and a half hour course is divided into 13 modules on two CDs, accompanied by a handbook. **Order No. PD130501; \$995 List/\$895 SAE Member**

The Basics of Internal Combustion Engines e-Seminar

In this e-seminar, Dr. William Mark McVea covers the most relevant topics related to internal combustion engines – ranging from hydrocarbon fuel ignition to volumetric. Powertrain engineers, component suppliers, vehicle platform powertrain development specialists, and those involved in the application, design, and discussion of engines will gain a practical, hands-on approach to the basics of combustion and the gaseous cycles, the major components, and the design theories of the three most common internal combustion engines (2- and 4-stroke gasoline and 4-stroke direct-injection diesel). Based on the popular classroom seminar, the nine-hour, 25-minute course is divided into eight modules on three CDs and is accompanied by a handbook. **Order No. PD130404; \$995 List/\$895 SAE Member**

Fundamentals of Modern Vehicle Transmissions e-Seminar

In this e-seminar, Dr. William Mark McVea details the transmission's primary functions – to provide drivability characteristics to the vehicle and adaptive connectivity between the engine and the remainder of the fixed function driveline. The discussion then focuses on the latest transmission systems designed to achieve the most efficient engine operation. Current designs, the components and sub-systems used, their functional modes, how they operate, and the inter-relationships are examined. Automatic control, hydro-mechanic design theory and implementation, mechatronics, toroidal transmission functions, and the future of the automatic transmission are discussed. Continuously Variable Transmission (CVT) systems, which represent a fundamental shift in the way power is transmitted from the primary source to the remainder of the driveline, is covered in depth. Based on the popular classroom seminar, the 14-hour course is divided into nine modules on five CDs, accompanied by a handbook. **Order No. PD130419; \$1,195 List/\$1,095 SAE Member**

For more information, visit <http://www.sae.org/e-seminars>