

NEWS BULLETIN

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Title: CFR Training Program For 2007

Bulletin No. 07-01

Date: January 15, 2007

CFR COURSES

Octane Operation, Octane Maintenance, and Crankcase Overhaul Courses will continue to be given in the same manner as they have in the past for the 2006 CFR Training Program. We have also added a basic FIT course for 2007 which will provide guidance to the user on the operation and very basic maintenance of the unit. It will also cover the full method that is used to operate the FIT unit. Further details can be found in the general overview below.

GENERAL OVERVIEW

- All courses are conducted at the Waukesha Engine Product Training Center in Waukesha, Wisconsin. This facility is fully equipped with a CFR Combination Research/Motor Method Octane Rating Unit, a CFR Cetane Method Diesel Fuel Rating Unit, a full range of maintenance tools/equipment, and modern classrooms with complete audio/visual capabilities.
- Extensive hands-on experience by all students will be emphasized in each of the courses. Students are encouraged to actively participate in the course and ask questions to promote a better understanding of the material by all students.
- All students are required to wear safety glasses with side shields while in the CFR training area and are encouraged to bring their own safety glasses for comfort and convenience.
- Each student receives numerous supplemental training materials for use during the course and to take back to the workplace. These include: the latest version of the ASTM manual with CFR test methods, CFR Training Course Manual, CFR Operations and Maintenance Manual, CFR Tool Catalog, copies of all presentations given during the course, and Waukesha CFR Product Brochures.
- **Each course starts on Monday and is scheduled for four full days. The FIT classes will be three full days. Classes start at 8:30 a.m. and end at 4:00 p.m.** The student's travel plans should be arranged accordingly.



COURSE DESCRIPTIONS

Octane Operation – This course is designed for lab personnel who need additional knowledge of the basic function and operation of the CFR Octane Rating Units and a better understanding of the extensive changes recently made to the ASTM Research and Motor test methods. Topics covered in this course include:

- Classroom lecture and discussion covering the theory of octane testing with the CFR engine; description and function of major engine components and instrumentation; and a review of recent improvements to the CFR Octane Rating Units.
- Discussion covering engine safety, as well as personal safety, while operating or maintaining the CFR engine.
- Detailed review and discussion of the ASTM Research (D 2699) and Motor (D 2700) test methods with particular emphasis on operational aspects including basic engine and instrumentation setup; Toluene Standardization Fuel qualification requirements; and details of the equilibrium bracketing, falling level (dynamic) bracketing, and compression ratio testing procedures.
- Hands-on operation of the CFR Combination Research/Motor Octane Rating Unit by all students with sample ratings obtained using the equilibrium bracketing, falling level (dynamic) bracketing, and compression ratio testing procedures.
- Review of basic preventive maintenance and troubleshooting techniques that help to assure consistent and accurate octane ratings.

Octane Maintenance – This course is designed for CFR personnel who need further knowledge and experience concerning overhaul of the CFR Octane Rating Unit cylinder, clamping sleeve, and carburetor. Topics covered in this course include:

- Classroom lecture and discussion covering the theory of octane testing with the CFR engine; description and function of major engine components and instrumentation; and a review of recent improvements to the CFR Octane Rating Units.
- Discussion covering engine safety, as well as personal safety, while operating or maintaining the CFR engine.
- Hands-on cylinder and clamping sleeve overhaul including removal from the crankcase; measurement of all critical components; grinding of valves and valve seats; valve guide and seat removal and replacement; and reassembly of the cylinder and clamping sleeve on the crankcase.
- Hands-on carburetor overhaul including description and function of all critical components of the new equilibrium/falling level carburetor system.
- Review of routine crankcase inspection and maintenance requirements including changing oil and filter; operation and maintenance of the oil pressure control and crankcase breather systems; and measurement of crankshaft endplay and main bearing clearances.

Cetane Operation – This course is designed for CFR personnel who need additional knowledge of the basic function and operation of the CFR Cetane Rating Unit and coverage of the latest D613 test method. Topics covered in this course include:

- Classroom lecture and discussion covering the theory of Cetane testing with the CFR Cetane Unit; description and function of major engine components and instrumentation; and a review of recent improvements made to the CFR Cetane Rating Unit.
- Discussion covering engine safety and personal safety, while operating the CFR Cetane Rating Unit.
- Detailed Review of the ASTM D613 test method with emphasis on operational aspects including basic engine and instrumentation settings and setups.
- Hands-on operation of the CFR Cetane Unit by all students with sample ratings
- Review of basic preventative maintenance and troubleshooting techniques that help to assure consistent and accurate ratings.

Cetane Maintenance – This course is designed for CFR personnel who already have a basic understanding of the D613 method and rating techniques, but need further knowledge and experience concerning the top-end overhaul. This would include the following: Cetane cylinder, cylinder head, pump removal and installation, as well as timing, hand-wheel disassembly/assembly, and calibration. Topics covered in this course include:

- Classroom lecture and discussion covering the description and function of major engine components/instrumentation, and review of recent improvements to the CFR Cetane Rating Units.
- Discussion covering engine safety and personal safety, while operating or maintaining the Cetane Unit.
- Hands-on cylinder, cylinder head, and hand-wheel maintenance to include the use of measuring equipment critical to the proper tolerances of all components; valve grinding and seat grinding techniques; valve guide and seat removal and replacement; and assembling of the cylinder and head to maintain the proper over-travel. This will also include removal/installation of the injection pump and techniques on proper timing.
- Review of routine crankcase inspection and maintenance requirements including oil and filter changes; operation of the oil pressure control and crankcase breather systems; and a measure of crankshaft endplay and main bearing clearances.

Crankcase Overhaul and Maintenance – This course is designed for more experienced CFR personnel who need additional knowledge and understanding of the requirements for overhauling a CFR-48 crankcase. Topics covered in this course include:

- Classroom lecture and discussion covering description and function of major crankcase components, and the critical wear specifications and measurements used to determine when replacement is required.
- Discussion covering engine safety, as well as personal safety, while operating or maintaining the CFR engine.
- Hands-on crankcase overhaul including complete disassembly; discussion on the function and measurement of all critical components; and reassembly of the crankcase using the required fit and torque specifications.
- Review of routine preventive maintenance and inspection practices required between crankcase overhauls.

FIT – This course is designed for lab personnel who need knowledge of the basic function and operation of the FIT Rating Unit and a better understanding of the ASTM FIT D7170-06A method. Topics covered in this course include:

- Classroom lecture and discussion covering the theory of CVCC testing with the FIT Unit; description and function of major components , instrumentation and necessary reagent materials.
- Discussion covering FIT safety, as well as personal safety, while operating or maintaining the FIT Unit.
- Detailed review and discussion of the ASTM D7170-06A test method with particular emphasis on operational aspects including instrument setup and basic operation per current method procedures.
- Hands-on operation of the FIT CVCC Rating Unit by all students
- Review of basic preventive maintenance and basic troubleshooting techniques that help to assure consistent and accurate DCN ratings.

2007 CFR TRAINING SCHEDULE AND REGISTRATION

Schedule

CFR courses are held from 8:30 a.m. – 4:00 p.m. each day of the course. Each four-day course will be offered in 2007 on the dates listed below. Please note that the FIT classes are 3 days. All courses are conducted at the Waukesha Engine Product Training Center in Waukesha, Wisconsin.

March 19 - 22	Octane Operation
May 7 -10	Octane Maintenance
May 14 - 16	FIT
May 21-24	Crankcase Overhaul
June 4-7	Octane Operation
June 18-21	Octane Maintenance
July 23- 26	Octane Operation
Aug 6-9	Octane Operations
Aug 20-23	Octane Maintenance
September 10-13	Cetane Operation
September 24-27	Cetane Maintenance
October 8-11	Octane Maintenance
October 22-24	FIT

Waukesha can also conduct on-site training at your facility. Please call us at (262) 650-5603 for more details.

Course Fee

The fee for each of our training courses is \$1,200 per student. This fee covers four days of instruction, all supplemental training materials, and lunch each day of the course. This fee does not cover travel and living expenses, which are the responsibilities of the student.

Cancellation

Reservations not cancelled in writing at least 30 days prior to the starting date of the course will result in a full charge for the course fee. Substitutions are accepted.

Hotel Accommodations

Waukesha has arranged a special rate at the Comfort Suites Hotel in Pewaukee, WI, for students attending our CFR training courses. The hotel will provide free transportation to and from Mitchell International Airport in Milwaukee and daily transportation between the hotel and the Waukesha Product Training Center. Please contact the Comfort Suites Hotel at (262) 506-2000 or 1-888-506-2005 to make your room reservation and be sure to mention Waukesha Engine to obtain the special rate.

Registration

Course registration can be completed by mail, fax, or by email using the form below. Please contact Judy Wesley at (262) 549-2915 or by email at **Judy.Wesley@waukeshaengine.dresser.com** if you have questions or require further details concerning the training courses. Class size is limited and openings are filled on a first come, first served basis. Please apply early to assure availability.

Mail registration form to: Judy Wesley, Waukesha Engine, Dresser Inc., 1101 West St. Paul Avenue, Waukesha, WI 53188 or fax to Judy Wesley at (262) 549-2960.



Registration Form

Course Title: _____

Course Dates: _____

Student's Name: _____

Company: _____

Address: _____

Telephone: () _____

Fax: () _____