Gas Engine Technology (GET) Course

Note that course daily agendas and detailed outlines are subject to change.

Course Name	Gas Engine Technology
Training Category	Technical Theory and Application
Course Description	This course is the foundation for all engines. The information can be applied to virtually all gas engines and is very comprehensive in all areas of engine maintenance, operation and troubleshooting. GET is a required prerequisite for all other Waukesha training.
Course Length	4 ½ Days
Language	Courses are generally taught in English with English language materials. Contact Waukesha Product Training if you need a course / course materials in a language other than English. *Note: Bilingual Homework and Exams in Russian and Spanish are presently available for request at time of registration.*
Course Audience	This course is recommended for anyone who is responsible for the care and maintenance of Waukesha products, but also for those who desire a thorough understanding of gas engine theory and technology not easily attained in the field.
Prerequisite	None, but the student should be knowledgeable in internal combustion engines and understand basic engine terminology.
Safety Requirements	GET does not include an engine lab so safety shoes are not required. A production facility tour will require safety glasses that will be provided.
Recommended Clothing	The course consists of training in the classroom. Casual attire is recommended.
Course Objectives	The program thoroughly covers the fundamentals of gas engine technology with specific references to Waukesha products. Given classroom instruction on theory and essential systems knowledge, homework, and reviews students will learn overview knowledge of: • Breathing Systems • Cooling Systems • Lubrication • Fuels • Combustion Theory • Ignition • Mounting and Alignment • EGA
Supporting Materials	Students receive product manuals and a separate manual of the instructor's slides and notes. Additional materials include handouts or other aids for learning may also be provided to students.

Day 1

Introduction

Engine Products and Features

Cooling Systems

Mounting and Alignment

Day 2

Homework Review

Combustion Theory

Fuel Systems

Day 3

Homework Review

Fuel Systems

Exhaust Gas Analysis

Lubrication

Day 4

Homework Review

Plant Tour

Breathing

Ignition

Day 5 (Noon finish)

Note: *This is a half day ending at 12:00 PM. Lunch is not provided.*

Test Introduction

Course examination

Test Review and Class Closure

GET Course Overview

Course Topics

Cooling System
- Design requirements
- Jacket water conditioning
- Scale deposit
- Cavitation erosion
- Corrosion

Mounting and Alignment
- Crankcase deflection
- Coupling alignment
- Linear and torsional vibration
- Single bearing generator alignment

Combustion Theory
- Detonation
- Preignition
- Rich burn vs. lean burn principles

Gas Fuel System
- Gas fuel composition
- Lean and stoichimetric combustion theory
- Detonation & preignition
- System operation, maintenance and troubleshooting
- System adjustment

Exhaust Gas Analysis (EGA)
- Test location & procedures for best accuracy
- Testing Prep & expectations for RB/LB

Lubrication System
- Oil specification and performance
- Understanding oil analysis
- System requirements

Air Induction and Exhaust Systems/Breathing
- Design requirements
- Maintenance
- Breather adjustment
- Back Pressure

Ignition System Fundamentals
- Waukesha ignition system history/overview
- Magneto
- CEC (Customer Engine Control)
- ESM Engine Control System
- ESM2
- Knock detection
- Spark plug function, application and troubleshooting