STAMFORD®
AvK®

Application Engineering Training Course Catalogue

Introduction

Cummins Generator Technologies manufactures the world's broadest range of alternators from 4 to 11,200 kVA under the STAMFORD and AvK brands. Internationally renowned for built-in quality, our alternators set the standard for ruggedness, reliability and versatility.

For nearly a century, our experience and knowledge gathered from a large and diverse number of applications of synchronous generator installations help our customers operate with greater efficiency, making it possible for them to compete more successfully throughout the world.

To best support our customers, Cummins Generator Technologies strives to develop and maintain the highest level of technical capability possible. Continuous education, available through cutting-edge instruction, helps to make this possible.

Benefits of Training

Cummins Generator Technologies offers a wide range of alternator application training courses to help our customers in the design and operation of our products.

Customised to Meet Your Requirements

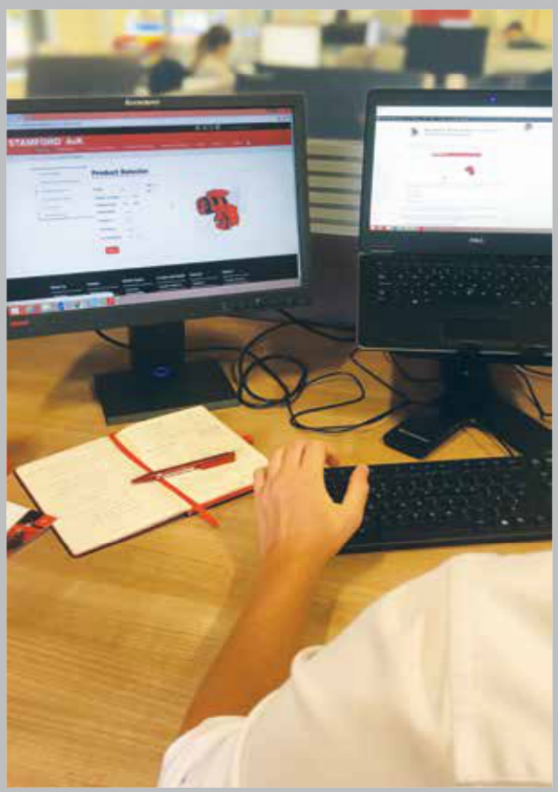
Our training packages can be customized to meet your training requirements. We strive to be as flexible as possible to adapt our training modules to ensure we deliver material that suits your business objectives. From the very basics of electrical fundamentals to complex alternator sizing we will aim to deliver training to the meet the specified requirements of the delegates.

Our training courses can be conducted in-house or locally at customer premises.

The Trainers

Cummins Generator Technologies application training modules are personally delivered by our own Application Engineering Team members. The team have a vast wealth of alternator application and design experience. The team are dedicated and strive to ensure customers experience in relation to training and knowledge sharing. The trainers will adapt to meet your requirements, ensuring the experience is value added. Please contact our Application Engineering department to determine availability of trainings.

Contact: applications@cummins.com



Course Modules

AETM001 Electrical Principles

Objectives

An introduction into electricity and magnetism. Defines the role of magnetism in the generation of electricity. Provides circuit theory such as Ohms' law and basic electrical calculations.

Topics

Magnetism
Electrical theory
Electric circuits
Standard Formula

Prerequisite Knowledge

None

Timing & Delivery

1.5 hours

AETM002 Alternator Fundamentals

Objectives

Understand the design and construction of an alternator and how the individual components contribute towards generating electricity. Also the different types of excitation systems and winding configurations to provide the desired output voltage.

Topics

Basic Components
Alternator Construction
Excitation Systems
Winding Configurations

Prerequisite Knowledge

Electrical Principles

Timing & Delivery

Basic: 1 hour
Advanced: 3 hours

AETM003 STAMFORD Products

Objectives

An overview of the STAMFORD product range from S0-S9.
A detailed explanation of the products, design features along with options and accessories.

Topics

- S0/S1
- UC22/27
- S4/5/6
- S7
- P80 and S9
- Options & Accessories

Prerequisite Knowledge

None

Timing & Delivery

Basic: 1 hour

Advanced: 2 hours

AETM004 AvK Products

Objectives

An overview of the AvK product range. Low voltage DSG and High voltage DIG products, air cooled, totally enclosed along with options and accessories.

Topics

- DSG
- DIG
- Bearing arrangements
- Mounting and frame construction
- Enclosures
- Accessories

Prerequisite Knowledge

None

Timing & Delivery

Basic: 1 hour

Advanced: 2 hours

AETM005 Automatic Voltage Regulators (AVRs)

Objectives

AVRs are the heart of an alternator providing a vital role in the operation of alternators. This module explains the difference between analogue and digital AVRs along with key operating features.

Topics

- Self Excited
- Separately excited
- Analogue AVRs
- Digital AVRs
- AVR Key Functionalities
- Accessories

Prerequisite Knowledge

Alternator Fundamentals

Timing & Delivery

2 hours

AETM006 Alternator Ratings & Duty

Objectives

Standby or Continuous, Class H or Class F, Prime or ESP, confusing?

This module explains the different rating classes and the overall impact on operating life.

Topics

- Rating Definitions
- Duty Cycle
- Insulation Classes
- Life Expectancy
- Direction of rotation
- Negative Phase Sequence Currents

Prerequisite Knowledge

Alternator Fundamentals

Timing & Delivery

Basic: 1 hour
Advanced: 2 hours

AETM007 Alternator Performance Data

Objectives

Reactance's, efficiencies, transient voltage dips, what do they all mean and how do they influence the decision on which alternator suits a particular application? This module explains all of the key performance characteristics.

Topics

- Technical Data Sheets
- Reactance's
- Efficiency
- Transient Voltage Dip/Rise
- Short Circuit Decrement Curves
- Operating Charts
- Mag Curve

Prerequisite Knowledge

Alternator Fundamentals, Electrical Principles

Timing & Delivery

2 hours

AETM008 Parallel Operation

Objectives

When more power is required and the genset output has reached the maximum output, what next? This module explains the principle of paralleling gensets to provide a larger source of power. From paralleling single or multiple gensets together to paralleling to the grid this will provide the theory and operating principles.

Topics

- Synchronisation
- Droop
- Power Factor Control
- Neutral currents

Prerequisite Knowledge

Alternator Fundamentals

Timing & Delivery

1 hour

AETM009 Mechanical Design

Objectives

There are many mechanical considerations when designing and operating gensets. From selecting the correct alternator, coupling arrangement, mounting, torsional compatibility, etc. This module will take you through what needs to be considered and why.

Topics

- Vibration
- Torsional
- Couplings
- Alignment

Prerequisite Knowledge

Alternator Fundamentals

Timing & Delivery

2 hours

AETM010 Environmental Factors

Objectives

The environment in which the alternator operates in can greatly impact the performance and life expectancy. This module considers all of the environmental conditions and how to protect the alternator to ensure optimal performance.

Topics

- Temperature
- Altitude
- Humidity
- IP Ratings
- Saline

Prerequisite Knowledge

Alternator Fundamentals

Timing & Delivery

1 hour

AETM011 Alternator Sizing

Objectives

What size of alternator is required? What needs to considered when selecting an alternator for a certain load requirement? How can the load characteristics effect the alternator selection? There are many types of loads that can be powered by gensets with different operating characteristics. This module provides guidance on how to size an alternator based on the load requirements.

Topics

- Motor Starting
- Non Linear Loads

Prerequisite Knowledge

Alternator Fundamentals, Electrical Principles

Timing & Delivery

2 hours

AETM012 Alternator Protection

Objectives

Why spend the capital and invest in a standby or prime power genset if you are not going to protect your asset? Whether electrical, mechanical or thermal protection all should be considered and can be provided at minimal cost. This module provides an overview of typical considerations for alternator protection and the related alternator parameters.

Topics

- Current Transformers
- Winding Thermal Protection
- Overload
- Fault currents

Prerequisite Knowledge

Alternator Fundamentals

Timing & Delivery

1 hour

AETM013 Alternator Testing

Objectives

At Cummins Generator Technologies we are proud to have invested in building world leading alternator testing facilities in all of our manufacturing locations. We have the capability to load test low, medium and high voltage alternators up to 5500kVA. This module provides and overview of the tests carried out at Cummins Generator Technologies and what we can offer with regards to witness testing.

Topics

- Routine Testing
- Marine Certification
- Testing options

Prerequisite Knowledge

Alternator Fundamentals,

Alternator Performance Data

Timing & Delivery

1 hour

AETM014 Codes & Standards

Objectives

UL, CSA, CE - what does it all mean and how does it affects the genset design and operation? This module provides an overview of the basic codes and standards covering alternators and their use in certain applications or regions.

Topics

- UL
- CSA
- CE Machinery Directive
- ROHS

Prerequisite Knowledge

None

Timing & Delivery

1 hour

AETM015 Marine Applications

Objectives

Life at sea…..great until something goes wrong, miles out at sea with nothing but water! Marine Societies provide great support in ensuring the equipment on board provide a high level of security by setting the standards for electrical equipment. This module explains the requirements and what Cummins Generator Technologies can provide to ensure compliance.

Topics

- Marine Societies
- Marine Specifications
- Shaft Alternators PTO/PTH

Prerequisite Knowledge

Alternator Fundamentals

Timing & Delivery

1 hour

AETM016 Grid Code Compliance

Talk about electricity generation, and most people will think of huge centralised power plants. However, environmental concerns are driving a significant change to the traditional power generation and distribution model. Specifically, there is a shift towards distributed power generation from smaller facilities at a more localised level, and an increase in the use of generation from renewable sources. Grid Codes are being introduced in part, to protect the system from potential mass drop-off events. This module provides an overview of the introduction of Grid Codes and their impact on generating sets.

Topics

- Distributed power systems
- Grid Code requirements
- Fault ride through
- Certification & modelling

Prerequisite Knowledge

Alternator Fundamentals

Timing & Delivery

1 hour

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