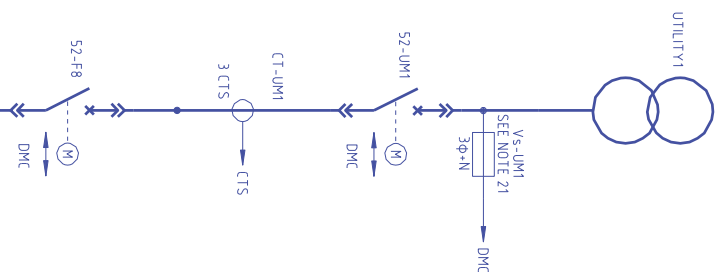


# SALES APPLICATION ENGINEERING EMEA

## APPLICATION ENGINEERING TRAINING

## COURSE DESCRIPTION AND CURRICULUM



### AIM OF THE COURSE

The objective of this Application Engineering training is to provide a comprehensive study of the technical aspects of the selection and installation of Diesel and Gas generating sets and related sub-systems. Divided into three different parts, this training aims to provide engineers, from varied backgrounds or responsibilities, with the necessary skills and tools to leverage sales and select and install effectively Cummins Power Generation products. At the same time, this course also encourages the discussion and exchange of experiences between application engineers from different locations.

### METHODOLOGY

The training will be delivered in a classroom format and will be focused on real case studies and practical examples. Attendees are expected to participate actively in the training by engaging in the discussions and by sharing their own views or experiences. Extensive documentation for each part will be provided with manuals, white papers, application bulletins and more. There will be a knowledge check session at the end of each training day followed by an exam at the end of each section.

### COURSE REQUIREMENTS

To attend any of the Application Engineering training parts the course participants must:

- Have completed the On-Line AE classes in Cummins Learning Centre
- Be a recognised Cummins Distributors / Dealers

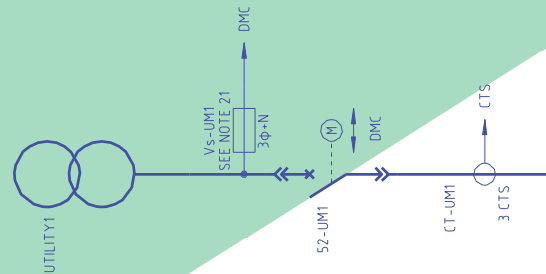
### CONTACT

[sae.emea@cummins.com](mailto:sae.emea@cummins.com)

## COURSE STRUCTURE

This course is structured in three different and separate parts, Product Selection, Mechanical Design and Electrical Design. These parts are to be delivered across different dates providing the attendants the flexibility and the option to attend only one, two or three parts of this training.

PRODUCT SELECTION		MECHANICAL DESIGN		ELECTRICAL DESIGN	
PS01	ISO8528 Ratings & Applications	MD01	Exhaust Systems	ED01	Cummins Electrical Products Building Blocks
PS02	Fuel requirements	MD02	Cooling Systems	ED02	All about Alternators
PS03	Location considerations	MD03	Room Ventilation	ED03	Generator set paralleling, protections and Transfer Switches
PS04	Emissions	MD04	Fuel Systems	ED04	LV, MV and HV Systems & Associated protections
PS05	Loads and Transient Performance	MD05	Noise & Vibration	ED05	Networking and Communication
				ED06	Data Centers Topologies and Tier Ratings



## WHO SHOULD ATTEND?

*Product Selection* is mostly focused on the several aspects to be taken into consideration whilst selecting both diesel and gas generator sets and their related sub-systems. Due to its diversified content, it is targeted at both technical sales and application engineers.

*Mechanical Design* and *Electrical Design* focus on all the mechanical and electrical considerations required for project design and implementation. Due to its purely technical nature, these two parts are mainly targeted to engineers looking to develop and improve their skills and knowledge in these fields.

## RESOURCES

During the Application Engineering training the course participants will be required to access different databases to gather information. Prior to the training attendants must ensure that they have access to the following databases and tools:

- GCE (Global Customer Engineering) – access to G-Drive technical data
- Power Suite™ – access to technical data, drawings, Gensize™ amongst others.
- Power Zone – online ordering tool for CPGK gensets
- QuickServe Online – aftermarket and service database

## EVALUATION AND CERTIFICATION

Certificate will be attributed to those who attend the training days and successfully pass the exam. The pass criteria is 85% minimum.



# PRODUCT SELECTION

## PS01

### ISO8528 RATINGS & APPLICATIONS

Rating definition as per ISO 8528 and standard conditions defined. What parameters impact the genset rating? How to select the right rating for standard and specific conditions. Discussions on competitor's optional ratings. What are site-specific ratings (SSR) and when they should be used?

## PS02

### FUEL REQUIREMENTS

Recommended fuel properties for Cummins Engines and impact of fuel properties on product performance. Biodiesel fuel blending. Fuel storage regulations and recommendations. Fuel consumption VS Lubricating oil consumption.

## PS03

### LOCATION CONSIDERATIONS

The impact of altitude and temperature on the genset components. Altitude and temperature derate calculations. Outdoor or Indoor applications. Noise requirements, Cold weather application considerations Hot weather application considerations. Operation at high altitude. Sandy environments. Coastal and other corrosive environments. Site security.

## PS04

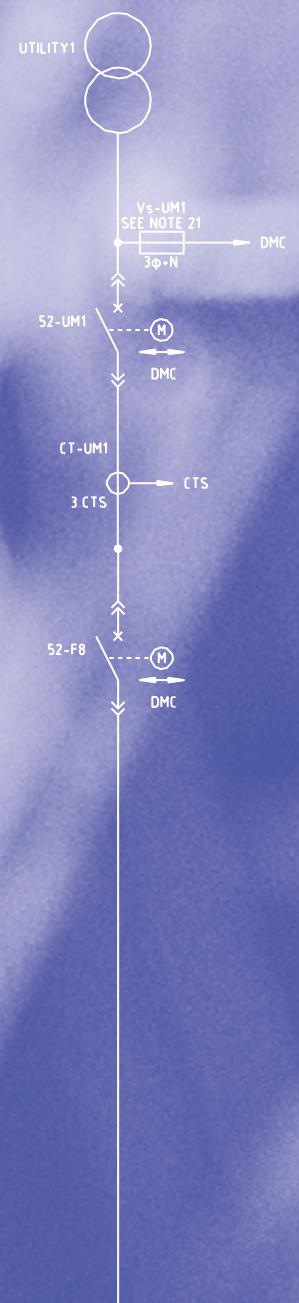
### EMISSIONS

Comparison of the different emission regulations currently applicable in Europe. Interpretation of emission data sheets, emission requirements and how to compare these with published data. Conversions and corrections for comparison of requirements. Aftertreatment solutions and their impact on emission reductions, installation/design considerations.

## PS05

### UNDERSTANDING LOADS AND TRANSIENT PERFORMANCE

Impact on generating set performance from the different types of loads: lighting, transformers, motors, pumps, UPS and regenerative loads. Power factor considerations. How some loads impact alternator performance and how some others impact engine performance. Starting methods, starting sequence, and customer-specified starting requirements for load stepping. Transient performance classes as per ISO 8528-5. Customer requirements versus ISO 8528. Beyond ISO 8528-5. Transient performance on Gas Generating sets.





# MECHANICAL DESIGN

## MD01

### EXHAUST SYSTEMS

Exhaust system considerations. Exhaust backpressure calculations. Common issues and specific solutions. Exhaust systems in Combined Heat and Power applications.

## MD02

### COOLING SYSTEMS

Engine cooling requirements: coolant, installation considerations, maintenance and serviceability. Radiator arrangements and radiator performance. Remote cooling applications: types of systems, how to decide, calculating static and friction heads. Deaeration tanks. Heat exchangers sizing calculations. Limiting Ambient Temperature.

## MD03

### VENTILATION

System design recommendations: requirements, single and multiple sets, inlet and outlet louvres. Calculating airflow requirements. Airflow restriction calculation, and recommendations. Common issues and solutions.

## MD04

### FUEL SYSTEMS

Fuel Supply and fuel properties. Day tank sizing and recommendations. Bulk tank sizing and recommendations. Fuel Systems layout considerations: day and bulk tanks location and recommendations. Fuel cooling: identify the need for fuel cooling, fuel cooler calculations and use of a day tank as a heat sink. Fuel maintenance: fuel shelf life and fuel polishing.

## MD05

### NOISE & VIBRATION

Sound Power and Sound Level and sources of noise. Adding multiple noise sources. Noise attenuation over distance. Noise reduction techniques and solutions. Understanding silencer attenuation. Vibration isolating foundation calculations. Vibration isolators (single isolation and dual isolation). Seismic isolation requirements. Common issues and solutions.

