

Training - New Fuels: Impact on Engine and Turbine Operation



BIOMOT-EN-P



Face-to-face only



3 days

This course provides a deeper knowledge on issues raised by the use of the new fuels planned for the near or further future: biofuels, gaseous fuels, synthetic fuels, alternative jet fuels

Level

Knowledge

Public

Engineers and technical staff involved in motor fuel quality management in relation to engine technologies

Objectives

Attendees will be able to implement the following skills:

- Analyze the context and development potential of alternative fuels (political context, potential of new sectors, standardization mechanisms for new products),
- Describe the main methods of obtaining these products and their economic and environmental impact, and know/recognize the main characteristics of these products,
- Evaluate the impact on the operation of piston combustion engines and turbines and define the resulting engine and vehicle adaptations.

Pedagogical & technical resources

Industry experts.

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course.

Responsible

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

FUELS STRUCTURE & MAIN PROPERTIES

0.5 day

Groups of hydrocarbons, alcohols, ethers, fatty acid esters.

Fuels required properties for engine operation

- Heat value, specific energy.
- Volatility: vapor pressure, distillation.

- Combustion: octane rating and cetane rating.
- Cold flow properties: cloud point, CFPP, pour point.
- Lubricating properties.
- Viscosity.
- Sulfur content.
- Stability, corrosion.

Gasoline and Diesel fuel structures from oil bases. Specifications.

SYNTHETIC FUELS: GTL, BTL, CTL

0.25 day

Processes to get such fuels.

Economic and environmental impacts.

BIOFUELS

1 day

Situation and stakes

- Biofuels policies in the world: Brazil, United States and Europe situations.
- Biofuels production chains, well-to-wheel ecobalance, available resources.

Spark Ignited engine biofuels

- Production chains.
- Ethanol and ETBE characteristics.
- Potential and difficulties linked to the use of gasoline-alcohol mixtures: octane rating, latent heat of evaporation, water tolerance, volatility, corrosion, pollutant emissions, lubrication.
- Flex-fuel engines: difficulties linked to the use of ethanol high rated fuels, technical solutions.
- Second generation ethanol.

Biofuels for Diesel engines

- Use of direct vegetable oils (DVO) on Diesel engines: principles and limits. Fatty acid esters characteristics and impacts on the engine operating: solubility, "sulfur free", lubricating properties, emissions, washing power, dilution, cetane rating, cold engine behavior, heating value.
- Storage stability, oxidation stability.
- "Biohydrocarbons" (hydrotreated oils): production modes, characteristics.

Biofuels for aeronautic turbine

- Certification, fit-for-purpose tests, drop-in fuel.
- Main certified (or in certification process) production ways: DVO hydrotreatment, synthetic biofuels, biological processes.
- Impact on logistics, aeroplanes and aeronautic turbines.

OTHER ALTERNATIVE FUELS

0.25 day

Synthesis alternative fuels: GTL, BTL, Methanol (production processes).

Economical and environment impact.

GASEOUS FUELS: GPL-C, NGV (NATURAL GAS VEHICLE), DME, HYDROGEN

0.25 day

Origins and resources of these fuels.

IMPACT OF NEW FUELS ON IC ENGINES & TURBINES OPERATION

1 day

Impact of partial or full use of new fuels on performances, polluting emissions and on-board storage.

Case study and adaptation:

- Road transportation engines: passenger cars and trucks.

- Industrial and stationary engines.
- Marine engines.
- Stationary turbines.
- Aero turbines.

To French entities : IFP Training is referenced to DataDock ; you may contact your OPCO about potential funding.
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