

This course can be adapted to virtual classroom mode

Introduction to Lubrication

3 days
Overview

INTLUB-EN-A

LEVEL

Awareness

PURPOSE

This course provides a deeper knowledge on lubricants and their mode of action in internal combustion engines and other mechanical organs, their rheological behavior of lubricants in internal combustion engines, as well as the different

lubricating regimes and their mechanisms of generation according to the functioning parameters.

LEARNING OBJECTIVES

Upon completion of the training, participants will know:

- the different lubrication types (tribology),
- the different wear types and the appearance of such wears,
- the lubricants flow properties (rheology),
- all the properties required for engine lubricants,
- the lubricants classification principles and specifications.

They will be able to understand the possible origins of a lubrication problem and the consequences of the choice of a lubricant and to ask the good questions to the field specialists.

Agenda

CLASSIFICATIONS & SPECIFICATIONS OF LUBRICANTS

1 d

Lubricants rheology: the different types of flow behavior (Newtonian, non Newtonian, Bingham fluid, Maxwell fluid, thixotropic), variation of viscosity with temperature, pressure, deformation, measuring methods of the rheological properties, viscosity classifications of automotive and industrial lubricants. Service specifications of engine lubricants: API, ACEA, ILSAC, engine testing for performance evaluation.

ELEMENTS OF TRIBOLOGY

1 d

Friction laws.
Study of the different lubricating regimes (hydrodynamic, hydrostatic, elastohydrodynamic, boundary, mixed, squeeze film) and their mechanism of generation. Stribeck curve. Sommerfeld number.
Study of the different forms of wear, their mechanism, the way to fight against them (abrasive, corrosive, fatigue, contact corrosion, cavitation wear).
Relationship between wear and tribology parameters.

FUNCTIONAL PROPERTIES OF LUBRICANTS & COMPOSITION

1 d

Functional properties of lubricants according to the equipment lubricated. Effect of the properties and the utilization of the equipment.
Lubricants composition:
Base stocks mineral and synthetic, composition, compared performances.

Additives: the different types, their roles and their mode of action (detergents, dispersants, antioxidants, viscosity modifiers, pour point depressants, extreme-pressure, anti-wear, friction modifiers, rust and corrosion inhibitors, antifoaming agents).

Notions on the formulation of lubricants.