# Base Oil Production

**Refining & Environment**

| 3.00 days | Overview | RPC/BOR |

## AUDIENCE
Non-technical professionals from oil or lubricant industries, or subcontractors interested in base oil refining technology and environment.

## PURPOSE
This course provides in-depth knowledge of lube base stocks manufacturing with an overview of the business environment.

## LEARNING OBJECTIVES
Upon completion of the course, participants will be able to:
- give an overview of lubricant uses, classifications and markets,
- explain the relation between quality requirements, processes used and composition of lube base stocks and by-products,
- describe the main operating parameters and their impact on performances.

## PREREQUISITE
No prerequisites for this course.

## WAYS AND MEANS
Detailed course material with a glossary of the main technical terms used in the refining industry.
Active participation of trainees through interactive games.
The use of photos, videos and demonstration material makes it possible to understand the size of the devices and units presented.

## Agenda

### CLASSIFICATION & PROPERTIES OF BASE OILS
0.25 d
- Commercial lubricant function and composition, purpose of additive introduction, demand structure.
- Mineral base oil classification, market trends.
- Main quality criteria in relation with chemical composition, specifications.

### STRUCTURE OF BASE OIL MARKET
0.25 d
- Market demand in relationship with uses of lube oils.
- International market and future trends in main developing countries.

### BASE OIL MANUFACTURING SCHEMES
0.25 d
- Composition of vacuum distillates and residue: influence on refining.
- Conventional manufacturing scheme vs. base oil manufacture by hydrotreatment: units' purpose, products quality.
- Rerefining of drained lubricants.

### BASE OIL CONVENTIONAL REFINING PROCESSES
1.00 d
Vacuum distillation:
Residue fractionation: distillates yields depending on crude oil.
Operating conditions. Quality control: viscosity and flash point tuning.
Solvent extraction:
Vacuum residue deasphalting and aromatics extraction: solvent choice, operating variables, viscosity and VI control.
Solvent recovery, energy consumption.
Solvent dewaxing:
Paraffin crystallization in the presence of a solvent: operating conditions.
Specific equipment: chillers, rotating filters.

BASE OIL UNCONVENTIONAL REFINING PROCESSES
Hydrotreatment processes:
Typical process flow diagram - Main equipment: reactor, heaters, heat exchanger.
Chemical reactions and catalyst for hydrotreating.
Operating conditions: pressure, temperature, hydrogen ratio, WABT.
Impact of conditions on quality: pour point, viscosities, VI, CCR…
Hydrorefining: hydrocracking of vacuum distillates and deasphalted oil.
Hydrodewaxing: hydroisomerization of slack wax/gatsch.
Hydrofinishing:
hydrofinishing of lube basestocks, paraffins and microwaxes,
white oils manufacturing principles: required properties.

SAFETY IN BASE OIL REFINING
Overview of the main specific risks in base oil refining.
REX of accidents.