



# VARNISH & DEPOSIT PREVENTION AND REMOVAL

VARNISH & DEPOSIT PREVENTION AND REMOVAL  
SPECIALIST, VPR<sup>®</sup> ICML CERTIFICATION

International Council for Machinery Lubrication

 **Course Period : 2 Consecutive Days**

 **ICML Exam : 2<sup>nd</sup> Day**





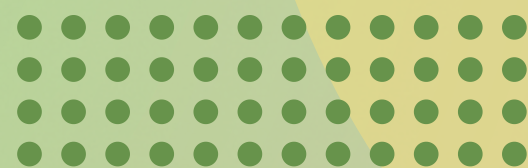


# Introduction

Varnish and deposit formation can significantly impact equipment reliability, efficiency, and service life. This program is designed for professionals who understand the importance of proactive maintenance and want to advance their knowledge of the techniques and tools that minimize deterioration.

The VPR certification equips participants with the expertise to assess and apply the right combination of technologies for varnish prevention and removal. It also covers the proper procedures for designing and implementing an effective varnish removal system—ensuring cleaner, more reliable, and longer-lasting machinery.





# Training Objectives

By the end of this program, participants will be able to:

- ▶ Identify the problems caused by varnish and deposits, and their impact on equipment reliability and lubricant performance.
- ▶ Explain the chemical and operational factors that contribute to oil breakdown and varnish formation.
- ▶ Apply proactive methods to extend lubricant life, including contamination control, additive management, and fluid health monitoring.
- ▶ Evaluate and compare available technologies for varnish removal and prevention, recognizing the advantages and limitations of each method.
- ▶ Develop effective strategies for designing, implementing, and maintaining a varnish prevention and removal program in industrial applications.





## MODULE (I)

### > Problems Associated with Varnish and Deposits

- Flow restriction, starvation and filter plugging
- Restricted movement, stiction and silt lock
- Increased friction and effect on efficiency
- Impaired heat transfer
- Bearing operation
- Need to flush
- Accelerated lubricant degradation
- Lubricant performance properties

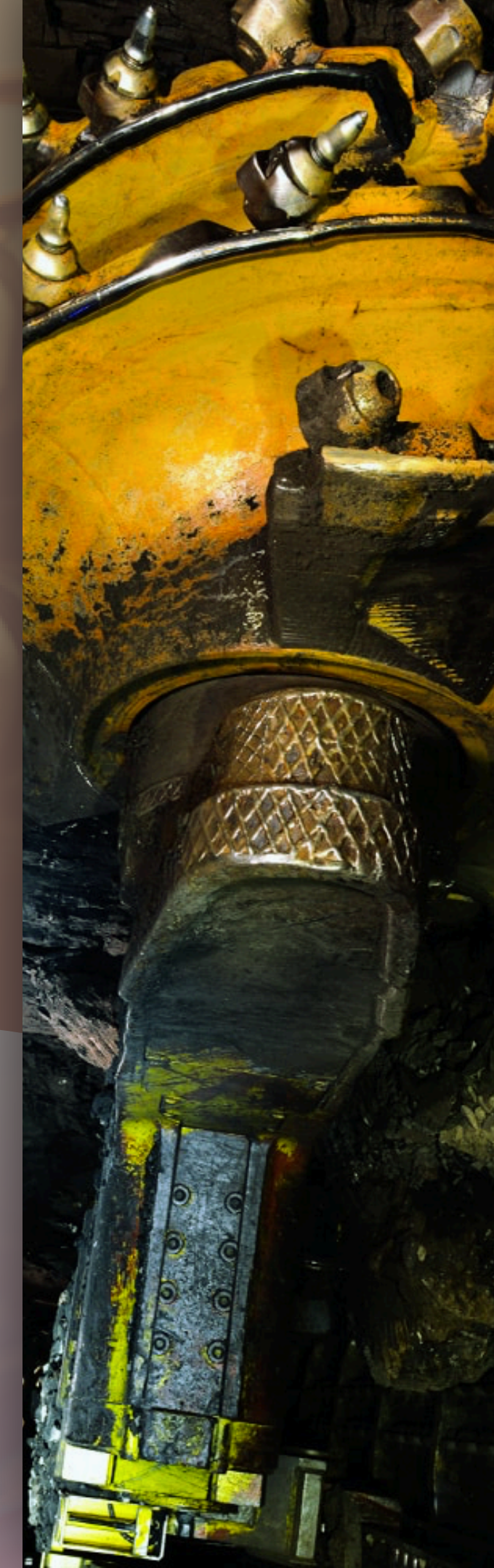
## MODULE (II)

### > Factors Affecting Breakdown

- Effect of base fluid on breakdown and deposit formation:
  - A) Groups I – IV more prone to oxidation.  
Very non-polar – lower relative saturation point.
  - B) Group V prone to hydrolysis (esters), thermal degradation (PAGs) and oxidation (limited discussion).  
Relatively polar – higher relative saturation point.
  - C) Additive Selection.  
Amine antioxidants, phenol antioxidants and antiwear additives.  
Additive synergy and anti-synergy.
- Contamination:
  - A) Catalysis by acids or wear metals (cupric surfaces, babbitt etc.).
  - B) Impact of water.
  - C) Process chemicals (H<sub>2</sub>S, process gases, H<sub>2</sub>, He etc.).
  - D) Intermixing of oils (poor maintenance, leakage etc.).
- Temperature:
  - A) Arrhenius law.
  - B) High temperature excursions (microdieseling, electrostatic discharge etc.).
  - C) Oxidation of base-stock and additives.
  - D) Additive drop out.
  - E) Oil base-stock phase separation.

# Course Outline<sub>1</sub>

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# Course Outline<sub>2</sub>



## MODULE (III)

### > Proactive Methods that can be used to Minimize Oil Breakdown

- Keep temperature down during service and storage.
- Keep oil clean and dry.
- Use thermally/oxidatively-robust formulations.
- Use oils with high impurity-holding capacity (IHC).
- Nitrogen blanketing (creates potential for entrained gas/nitration).
- Antioxidant additives.
  - A) Spent additives can actually contribute to deposits.
- Controlling aeration and foam.
- Controlling electrostatic discharge
- Maintaining optimum fluid health

## MODULE (IV)

### > Methods/Technologies that can be used to Remove Oil Breakdown Products and/or Prevent Deposits

- Particulate filtration (pros and cons)
- Electrostatic precipitation and agglomeration. (pros and cons)
- Centrifugal separation (pros and cons)
- Ion exchange resins (pros and cons)
- Oil soluble PAGs (pros and cons)
- Chemical flush (pros and cons)
- Detergents and solvents (pros and cons)
- Solubility Enhancers (pros and cons)
- Spark-free/antistatic filters





# VPR<sup>®</sup> Specialist

## Requirements:



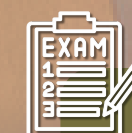
### Prerequisite Certification

- Candidates **must** hold either MLA I or MLT I certifications



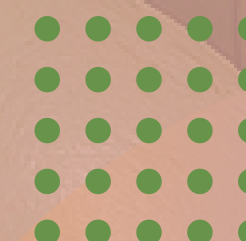
### Experience

- Have **minimum of 1 year** of experience with industrial lubricants and the knowledge base of the Varnish and Deposit Prevention and Removal Body of Knowledge.

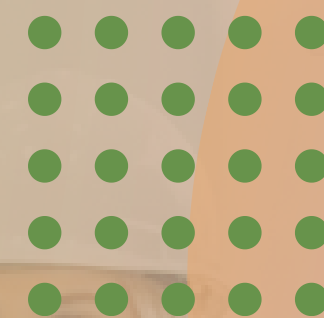


### Examination

- Format: 25 multiple-choice questions
- Duration: 45 minutes
- Type: Closed-book
- Passing Score: 70%







# WHO SHOULD ATTEND

This program is ideal for professionals involved in lubrication, reliability, and asset management, including but not limited to:

▶ **Maintenance & Reliability Engineers**

▶ **Condition Monitoring Specialists**

▶ **Lubrication Engineers & Technicians**

▶ **Plant & Asset Managers**

▶ **OEM and Service Engineers**

▶ **Professionals in machinery lubrication and reliability**



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