

Study Guide

Advanced Module 505

Formulation Requirements of Industrial Systems

Wood Finishes and High Performance Coatings

Author: K Arbuckle

Updated by P Collins

Summary

In this Advanced Module the basic formulation requirements of coatings for use on wood, including furniture, and in high performance applications, including structural steelwork, pipework and marine situations, are discussed.

For furniture applications stains, cellulose nitrate, polyurethane, UV and acid catalysed systems are covered. Also shown are tables comparing the performance properties of a range of clear wood finishes.

For high performance applications specific paint types are illustrated after an introduction on corrosion mechanisms. These include two-pack epoxies, coal tar epoxies, two-pack polyurethanes, chlorinated rubber, zinc silicate and vinyl paints.

Examples of paint coating systems, including systems for use on ships, are then described with recommendations on component thicknesses for optimum performance. These include antifouling compositions.

Structure of the Module

The module training material consists of 2 sections, 1 set of Self-Assessed Questions (SAQ), 1 Computer Marked Assessment Questions (CMA), 1 Assignment (ASG) and an End Test (TMA).

The module is designed to take about 12 hours of study. This excludes the time taken to write up the report for the ASG.

Self-Assessment Questions (SAQ)

Are designed to enable you to check your own progress. Questions are asked as you progress through the module. You should write down your answers and then check them against the answers given in the Appendices. No marks are awarded for SAQs.

Computer Marked Assessment Questions (CMA)

Are a multi-choice question set that tests your understanding of the module. Please carry out this test before you submit any other work for marking by your tutor. These are completed online, you will need to log onto your study portal and then follow the CMA link/instructions.

Assignment (ASG)

The ASG are an exercise in which the student research into and reports on certain objectives. You can discuss your proposed assignment with your tutor and mentor before commencing work. You will need to write a report on the assignment, which is then sent to your tutor for marking. Please see further instructions included in the Appendix on ASG Guidance Notes. You may choose the assignment to suit your interests.

Tutor Marked Assessment (TMA)

Is a mandatory end test question paper taken under 'closed books', fully invigilated exam conditions. These are normally held on-site with an invigilator in attendance, which is normally your workplace mentor. The student or mentor will contact Lorraine Beard, and she will arrange for the TMA and instructions to be sent, by email to the chosen invigilator, and then this is then given to the student on the day and time that

has been chosen. **Note** that the End Test (TMA) will require questions to be answered on both Wood Finishes **and** High-Performance Coatings.

Marks for the module

CMA	20%
ASG	35%
TMA	45%
	100%

An overall mark of 50% or more is necessary for successful completion of the module, with students achieving at least 40% of the marks available in each element. In addition, an overall mark of 50% – 64% must be achieved for a PASS to be awarded, an overall mark of 65% – 84% must be achieved for a Merit and over 85% for a Distinction.

Module Pre-requisites

The main prerequisite for persons taking Modules at Advanced level, is an interest in surface coatings.

Persons taking these modules should be employed or have recently been employed in coatings or a related industry.

These modules include references to scientific concepts relating to coatings technology. For example, those identified with an asterisk contain many references to chemical formulae and reactions. Therefore, it is a requirement that you have a scientific education, with Chemistry and Physics to at least UK Advanced Level or higher, of which you can provide evidence.

[Overview of qualification levels](#)

Successful completion of six modules, including at least four at level 5, entitles a student to a full, Level 5 International Certificate in Coatings Technology (ICCT), awarded by The Coatings Training Institute. However, individual certificates are also presented if the student chooses to take less than six modules.

Module Prerequisites

It is essential for students tackling this advanced module to have already studied selected modules at Intermediate level, in particular, modules **408 and 409**. Science subjects at GCSE or Advanced levels would also be an advantage.

This module could well be studied with **Module 506** which covers the formulation of Automotive Coatings and Can Coatings.

A student should be currently employed in the Coatings Industry or be a supplier to this industry. Past relevant experience within the industry would be a distinct advantage.

Disclaimer:

The formulae within this module have been provided by raw material suppliers or are based on information generally available. They are provided as guidelines only, and the British Coatings Federation cannot accept any liability in respect to consequences arising (whether directly or indirectly) from their use.

Module Objectives

When you have finished this module, you should be able to do or understand the following:

Section 1. Wood Finishes

- 1.1 Discuss the basic requirements of coatings for use as wood finishes and their application methods
- 1.2 State the performance properties of the above coatings
- 1.3 Test methods for wooden furniture

Section 2. High Performance Coatings

- 2.1 Elementary corrosion theory
- 2.2 The essential requirements of surface preparation prior to coating application
- 2.3 Basic formulations of typical coatings used in the Protective Coatings and Marine Coatings markets
- 2.4 Protective coating systems for steel
- 2.5 Ship coating systems
- 2.6 Anti-fouling compositions