Study Guide

Advanced Module 504

Formulation - Decorative Applications

Author: C Robertson

Summary

This Module contains a comprehensive study of the individual coatings used in coating systems for decorative applications both for masonry and for wood, concentrating on what may be called DIY systems.

Adhesion to the substrate is usually a critical factor in determining the performance of a coating system and different substrates and their properties are discussed in the first section of the module, with particular reference to wood and plaster.

The module then goes on to explain the need for multi-layer coating systems, before describing the basic functions of the individual coatings and the physical, chemical and environmental properties they need to exhibit.

The subject of pigments and pigmentation is then discussed. In addition to considering the types of pigment, binder and solvents used, particular attention is given to pigment volume concentration (PVC) and the concept and impact of the "critical pigment volume concentration" (CPVC) are discussed.

In the final section, the function of each of the components of a multi-layer system is explained in relation to the substrate, inter-coat requirements and final appearance and performance of the system. The media requirements of each of these components are included in this section.

As the module is designed to cover a wide range of possible end requirements, it is written in a general sense. However, the student will be expected to demonstrate an understanding of the concepts explained by carrying out the Assignment, which can be tailored to reflect a topic in which the student (or the student's company) may have particular expertise.

Other decorative coatings for wood are included in Module 505 which concentrates on paint systems for furniture applied in an industrial environment.

Structure of the Module

The module training material consists of 5 sections, 1 Self-Assessment Questions (SAQ), 1 Computer Marked Assessment Questions (CMA), 1 Assignment (ASG) and an End Test (TMA).

This module is designed to take approx.. 8 – 10 hours of study. This exludes the time 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. In this module, the assignment is designed to show that the knowledge of the student can be utilised in practice, to produce a viable coating formulation.
[This module does not include any no practical exercises (PAXs)]

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.

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 the 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 Objectives

After studying the module, you should be able to:

Section 1. Discuss the principal physical and chemical resistance properties and environmental properties that may be required from a coating

1.1 Discuss the principal physical properties, which may be required from a paint/coating system
1.2 Discuss the principal chemical resistance properties, which may be required from a paint/coating system
1.3 Discuss the environmental requirements which may be required from a paint/coating system

Section 2. Review the general influence of pigmentation on coating properties

2.1 Make a general comparison of inorganic and organic pigments.
2.2 Explain pigment volume concentration and critical pigment volume concentration

Section 3. Selection of media for decorative coatings

3.1 Discuss the use of oleoresinous media
3.2 Discuss the use of solvent-based media
3.3 Discuss the use of water-borne media
3.4 Discuss the use of aqueous emulsion media

Section 4. Explain the function of, and requirements for components of coating systems in relation to the substrate, intercoat requirements and final appearance of the system

4.1Explain function and requirements of emulsion paints
4.2 Explain function and requirements of primers
4.3 Explain function and requirements of a fillers and stoppers
4.4 Explain function and requirements of undercoats
4.5 Explain function and requirements of the finish or 'topcoat'

4.6 Discuss possible basic differences in the composition of the system components referred to in 3.1

Section 5. Discuss the composition of individual components of a coating system.

5.1 List and explain the variables affecting composition
5.2 Discuss the relevance of pigment volume concentration to the end use of the coating
5.3 Discuss the composition of individual components of a coating system
Paints
5.3.1 Discuss the composition of Emulsion Paints
5.3.2 Discuss the composition of Primers
5.3.3 Discuss the composition of Fillers and Stoppers
5.3.4 Discuss the composition of Undercoats
5.3.5 Discuss the composition of Finishes
5.4 Summarise the factors involved in selecting a coating system