

Study Guide

Advanced Module 512

Water Borne Coatings

Author: R J Stanfield

Summary

Water borne products, coatings with water as the main volatile component, are referred to in several of the BCF Technical Certificate modules. The growing importance of this type of coating has resulted in a demand for a module dealing specifically with water borne coatings. This unit is designed to meet this demand.

The module summarises the existing technology involved in the formulation, manufacture and use of water borne coatings and includes possible future developments.

It begins by discussing the history of water borne coatings, explains the reasons for their increasing use and describes their general properties in comparison with non-water borne products.

Relevant legislation relating to the volatile content of coatings is referred to and explained.

The module continues with a discussion on the principal methods available to make water borne film formers for use in coatings before describing specific types of water borne coating, their properties, and applications. These discussions include both solution and dispersion types.

The final section is devoted to possible future trends.

Structure of the Module

The module training material consists of 7 sections, 1 Self-Assessment Questions (SAQ), 1 Computer Marked Assessment Questions (CMA) and 1 Assignment (ASG) and an End Test (TMA).

The module is designed total study time will be approx. 10 -11 hours. 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.

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's	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. Preferably, they will be employed in the coatings or a related industry. They may also be employed by a user of paints, lacquers, inks or powder coatings.

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

Section 1. Define water borne coatings, review their history, relevant legislation, development and general properties

- 1.1 Define the term water borne coatings
- 1.2 Briefly review the history of water borne coatings
- 1.3 Explain the legislation relating to the trend towards water borne coatings
- 1.4 Describe the general properties of water borne coatings compared with coatings containing organic solvents

Section 2. Review the components of coatings and explain difference in properties of solutions and dispersions

- 2.1 Review the constituents of coatings
- 2.2 Explain the differences between solutions & dispersions
- 2.3 Describe the principles of solubility/dispersibility in water

Section 3. Describe the principal methods of making the film former component water reducible

- 3.1 Describe the general methods of making film formers water reducible
- 3.2 Describe how to make alkyd & polyester resins water reducible
- 3.3 Describe how to make Epoxy & Polyurethane resins water reducible
- 3.4 Describe how to make amino and acrylate resins water reducible

Section 4. Explain the factors involved in the pigmentation of water borne coatings and understand hazards associated with some raw materials use

- 4.1 Explain the factors involved in pigmentation of water borne coatings
- 4.2 Understand the handling care required with specific raw materials used in water borne resins

Section 5. Understand the use of water borne coatings in electrodeposition

- 5.1 Describe the principal of electrocoat coating systems
- 5.2 Describe production & properties of cathodic electrocoat system
- 5.3 Describe production & properties of anodic electrocoat system

Section 6. Identify the application & uses of water borne coatings

6.1 Household coatings

6.2 General Industrial, marine & and protective coatings

6.3 Automotive coatings

Section 7. Future developments