

Study Guide

Advanced Module 509

Appearance and Properties

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Summary

The **first Section** of this advanced module is concerned with additives which modify the appearance of dry films e.g. finishes such as hammer and wrinkle. We go on to study the various types of surface-active agents which are so important in determining the properties of dispersions. Also in the Section, we look at the importance of anti-foams, texturing agents and matting agents. The problem of gas checking and ways of overcoming it are also discussed.

In **Section 2**, we turn to additives used to modify the properties of dry films. Additives such as adhesion promoters, heat stabilisers, lubricants, anti-scurr agents anti-fouling additives and other biocides, corrosion inhibitors and finally, ultra-violet absorbers.

In **Section 3**, the use of additives which affect environmental properties of coatings is described, in particular, anti-fouling agents for marine coatings, as well as other biocides used in specific situations where biological attack of a substrate occurs. Following a description of corrosion inhibitors, the section ends with a detailed discussion of UV absorbers, with particular emphasis on types and their chemistry.

The **final Section** is devoted to film plasticisers. Here we look generally at the background, the effect of plasticisers on film strength, flexibility and hardness. Finally, the various types of plasticiser are covered in some detail, including their chemical formulae.

Structure of the Module

The module training material consists of 4 sections, 1 set of self-assessment Questions (SAQ), 1 Computer Marked Assessment Questions (CMA), 1 Practical Exercise (PAX), 1 Assignment (ASG) and an End Test (TMA).

The module is designed to take approx. 10 –11 hours study time. This excludes the time taken to write up the reports for the PAX and 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.

Practical Attendance Exercises (PAX)

Only a few modules contain PAX. However, we recommend that when starting any module, you look at the requirements for a PAX, to see if you anticipate any problems in carrying this out. For example, apparatus, materials, laboratory space and time. This PAX is concerned with assessing colour difference between pairs of coloured chips and is fully described in Appendix 2 of the Module. If you have any problems, please contact your tutor or workplace mentor for alternatives.

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 3 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.

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 this module

CMA	20%	
PAX	15%	
ASG		20%
TMA	<u>45%</u>	
TOTAL	<u>100%</u>	

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 6 modules.

Module Objectives

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

Section 1. Modifiers to film appearance

- 1.1 Describe how Wrinkle finishes are produced
- 1.2 Explain how Hammer finishes are formulated
- 1.3 Give examples of types of Surface active agents
- 1.4 Explain Pattern or texturing additives
- 1.5 Explain the role of Matting agents
- 1.6 Explain the term Gas checking and describe it's effect

Section 2. Modifiers to film properties

- 2.1 Describe the role of Adhesion promoters
- 2.2 Give examples of Heat stabilisers
- 2.3 Give examples of Optical brighteners
- 2.4 Explain the role of Lubricants
- 2.5 Explain the role of Anti- scuff agents

Section 3. Environmental properties of coatings

- 3.1 Understand the use of anti-fouling coatings
- 3.2 Give examples of other types of biocides
- 3.3 Explain the use of corrosion inhibitors
- 3.4 Give examples of UV absorbers

Section 4. Plasticisers

- 4.1 Understand the background to plasticisers
- 4.2 Describe the effect of plasticisers
- 4.3 Explain the plasticising effect on flexibility and film hardness
- 4.4 Give examples of types of plasticiser
- 4.5 Explain the role of Camphor
- 4.6 Explain the role of Castor Oil