

Intermediate Module 320

Evaluation of Paints – Chemical and Environmental Properties

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This module provides details and test procedures relating to the evaluation of paints once applied to 'standard' panels. Most of the tests will be carried out in the Paint Manufacturer's laboratory, although some customers may wish to confirm the property during the production of their finished articles.

A list of desirable properties is explained, with a discussion on how to prepare for and carry out suitable tests. The student will have an opportunity to carry out some of these.

Introduction

1. Module Prerequisites

The main prerequisite for persons taking Modules at Intermediate level is an interest in surface coatings. Preferably, they will be employed in the coatings or a related industry. In addition, they should preferably have a basic education in chemistry and physics.

2. Introduction to Module 320

Module 320 is one of a series of modules at Intermediate level. Following successful completion of this module, you may proceed to study further modules, selected on the basis of your needs. There is also a series of modules at Advance level, which you may wish to study at a later stage.

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Intermediate Module 319 contains general information about evaluating coatings and Module 313, the evaluation of pigments. These may be of interest when studying this module.

3. Structure of the module

The module is designed to take approximately 10 hours of study made up of:

- theory block - 8 hours
- Assignment work - 2 hours

The theory block is split into four sections which are not of equal length, with the first section probably taking on average up to 4 hours to go through, and the other three sections a further 4 hours between them.

Learning Objectives: For each topic in the module, there is a learning objective. These objectives are listed immediately before the Study material. Each section includes figures that you should refer to as you go through the material.

Self-Assessed Questions (SAQ): A number of SAQ's are included for you to answer as you work through the text. The answers to these are given at the end of the module in Appendix 1.

Computer Marked Assessments (CMA): On completing the text of the module, students should complete the online CMA. Full details of how to complete this important part of the Module is on the website.

Assignments (ASG): An ASG is included in Appendix 2, to be submitted to your tutor for marking. Guidance notes are included to explain what is required.

Tutor Marked Assessment (TMA): A written test of 30 minutes duration is taken, under examination conditions. This test is optional for candidates wishing to simply study the material, but it is mandatory for those wishing to receive a certificate.

4. Assessment

For full Certification, students must attempt all elements (CMA, ASG and TMA) of the course

Students may, if they wish, await their completion of three modules before sitting the TMA papers. By 'Stacking' tests in this way, they will only need to attend their test centre once instead of three times.

Students completing all assessments, the maximum possible marks for this module are 100 made up of the three elements.

CMA	20
TMA	45
ASG	35

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.

5. Objectives

Section 1. Why and how to test for environmental and chemical properties

After studying this section, you should be able to:

1.1 Differentiate between tests appropriate for new formulations and customer specification, from those for quality control in manufacture.

1.2 List environmental and chemical properties as including resistance to fouling by plant or animal life.

1.2.1 Describe the effect of fungi growth on coatings and the conditions under which growth may occur.

1.2.2 Describe methods for assessing the fungus resistance of coatings films.

1.2.3 Explain the term 'marine fouling' and explain how its growth can be controlled.

1.3 Assess the resistance of coating films to various liquids using standard methods by:

a) continuous immersion

b) contact with absorbent discs

c) spotting

comparing the relative merits of these methods.

Section 2. Corrosion resistance tests

- 2.1 Explain the importance of uniformity in preparing test specimens for a series of tests, and of careful handling after cleaning and pre-treatment
- 2.2 Discuss and compare the corrosion resistance of coatings by continuous salt spray
- 2.3 Describe important factors that can result affect process of paint application that can paint and carry out salt spray testing on phosphated and unphosphated panels.

Section 3. Film Porosity

- 3.1 Discuss and compare the corrosion resistance of coatings by humidity under condensation conditions
- 3.2 Discuss and compare the corrosion resistance of coatings by water immersion
- 3.3 Distinguish between the permeability of coatings to water and water vapour and outline the Payne cup method for water permeability

Section 4. Weathering resistance

- 4.1 Discuss the weather resistance of materials by assessing their exposure to natural and artificial weathering
- 4.2 Examine the resistance of the coating to cathodic alkali
- 4.3 Discuss colour change phenomena