

Study Guide

Module 202 – Level 2

Media and Solvents

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Summary

In Foundation Level Module 201 media are classified based on their physical properties, and then the mechanisms of film formation are described.

In this module, we look at examples of film formers based on their physical form and outline some of the health hazards that can arise in their use. Some of their commonly determined properties are outlined.

Under material properties and test methods, the importance of flow and viscosity measurements are stressed.

The module then goes on to classify solvents based on their chemical groups and behaviour. In an Assignment, will test the student's ability to define test methods suitable for identifying solvents. Attention is paid to the fire and health hazards of solvents.

The film-forming processes of non-convertible resins are then outlined with particular emphasis on nitrocellulose. Finally, an introduction is given to some convertible resins. These are covered in detail in Intermediate Modules.

Structure of the Module

The module consists of a theory block, 7 sets of Self Assessed Questions, 1 Assignment (ASG), 1 Computer Marked Assessment (CMA) and a final Tutor Marked Assessment (TMA)

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

Theory	10 hrs
ASG	4 hrs

For full certification, the CMAs must be completed satisfactorily.

Marks for this module: -

CMAs	20%
ASG	35%
TMA	45%

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

Module Pre-requisites

The main prerequisite, for persons taking this first Foundation Level module, is an interest in surface coatings. They will, preferably, be considering employment, be employed or had recent employment in the coatings or a related industry.

Basic knowledge of chemistry and physics is desirable.

MODULE OBJECTIVES

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

SECTION 1 – FILM FORMERS & THEIR PROPERTIES

- 1.1 Identify a range of film formers and identify the health hazard associated with them and describe precautionary measures to minimise each hazard.
- 1.2 Some commonly determined properties of film formers

SECTION 2 – MATERIAL PROPERTIES & TEST METHODS

- 2.1 Using a diagram or otherwise, define Newtonian flow and the three major types of non-Newtonian flow.
- 2.2 Describe with the aid of labelled diagrams, the determination of viscosity by a rotational viscometer and either a U-tube or an efflux cup viscometer.
- 2.3 Predict the effect on the viscometer of a solution of (a) temperature change and (b) concentration change.
- 2.4 Describe the significance of viscosity measurement in the manufacture and application of a surface coating.

SECTION 3- SOLVENTS

- 3.1 Classify solvents accordingly to their chemical groups and behaviour.
- 3.2 List six characteristic properties of solvents and state which property is the most important as regards the legislation affecting transportation, storage and usage.
- 3.3 State three precautions that should be observed in order to minimise the risk of a solvent fire.
- 3.4 State two ways in which solvents can become a hazard to health and describe a precaution in each case that should be observed to minimise the risk.

SECTION 4 NON-CONVERTIBLE RESINS - NATURAL

- 4.1 Describe the film-forming processes of non-Convertible media
- 4.2 Given a diagram of the cellulose molecule, identify the functional group present and state two reasons for the unsuitability of cellulose as a film former.
- 4.3 Describe the two modifications necessary to produce usable film formers from cellulose, using cellulose nitrate as an example.
- 4.4 Describe in outline the properties of cellulose nitrate, with special reference to its high flammability.
- 4.5 Describe the need for the use of added resins and plasticisers.

SECTION 5 CONVERTIBLE RESINS

- 5.1 List the vegetable oils used as raw materials for the manufacture of resin intermediates.
- 5.2 Describe an alkyd resin as an oil-modified polyester.
- 5.3 Give examples of two-pack resin systems.
- 5.4 Give examples of resin systems that cure by application of heat.