

Study Guide

Module 421 – Level 4

Ink Technology and Formulation

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Summary

This module describes the composition of different types of printing ink manufactured commercially in the United Kingdom. It covers the general principles required to formulate both liquid and paste ink and the role each component used in the formulation plays in the finished ink.

Emphasis will be placed on the choice of raw materials required for the different printing applications highlighting any relevant health and safety information and restrictions with respect to the handling of the raw materials.

You will also be shown that whilst a large number of different ink systems are formulated the underlying principles governing their formulation are similar.

Module 421 is one of a series of modules covering the Ink and Paint Industry from substrates through manufacturing and formulation to ancillary products at the intermediate level.

The formulae contained within the module should be considered as examples and must not to be considered as commercially viable products. The BCF cannot accept responsibility for the performance of these formulations and the liability for all formulations derived from information contained within the module remain solely with the formulator.

It is essential for students tackling this intermediate module to have already studied selected modules at foundation level, in particular, modules 204 and 209.

Structure of the module

The module training material consists of 5 sections, 1 self Assessment Questions (SAQ), 1 Computer Marked Assessment (CMA) 1 Practical (PAX) and 1 End Test (TMA).

The total study time will be approximately 10hrs. This doesn't include the time taken to write up the report for the PAX.

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. Please see Appendix 2 for details. If you have any problems, please contact your tutor or workplace mentor for alternatives.

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%
PAX	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 minimum 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

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](#)

Persons taking these modules should be employed or have recently been employed in the coatings or a related industry.

Most intermediate students will have studied some modules at foundation level. However, students who have not studied modules at foundation level but have a scientific background and experience of the coatings industry should be able to benefit from this module.

Successful completion of six modules, including at least four at level 4 entitles a student to a full, Level 4 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

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

Section 1. Printing Inks and their Properties

- 1.1** Explain the differences between lithographic and letterpress printing processes
- 1.2** Discuss the differences between paste inks and liquid inks
- 1.3** Explain the different methods used to dry printing inks
- 1.4** Explain why ink resistance properties are important
- 1.5** Discuss some specialised ink applications

Section 2. Letterpress Inks

- 2.1** Discuss the main printing properties of letterpress inks
- 2.2** Explain the different drying mechanisms used to formulate letterpress inks
- 2.3** Discuss the properties of the raw materials used for letterpress inks
- 2.4** Explain the formulating principles required for producing letterpress inks with different end uses
- 2.5** Discuss the common problems affecting letterpress printing

Section 3. Lithographic Inks

- 3.1** Discuss the key characteristics of lithographic inks
- 3.2** Explain how these characteristics change with different lithographic applications
- 3.3** Discuss why different raw materials are used in these different applications
- 3.4** Explain the formulating principles used to produce lithographic inks

Section 4. Gravure Inks

- 4.1** Describe the raw materials used in gravure inks
- 4.2** Explain the general principles used to formulate gravure inks
- 4.3** Discuss why the correct blend of solvents is important in the formulation of gravure inks

Section 5. Flexographic Inks

- 5.1** Discuss the general principles used in the formulation of flexographic coatings
- 5.2** Identify the raw materials used and explain their properties
- 5.3** Discuss the differences in solvent-based and water-based flexographic inks
- 5.4** Demonstrate the importance of pH in water-based flexographic inks (P.A.X.)