

IMF PROFESSIONAL QUALIFICATIONS, EDUCATION AND TRAINING by **J K Dennis & R R Read**

PROFESSIONAL GRADES OF MEMBERSHIP

Professional Grades of Membership - Fellow, Member and Licentiate of the Institute of Metal Finishing with the respective insignia of FIMF, MIMF and LIMF have been awarded since 1955, following recognition by the then Science Research Council. The Institute's Council has also approved the introduction of two further professional qualifications – Associate of the Institute of Metal Finishing (AssocIMF) and Technician of the Institute of Metal Finishing (TechIMF). To be eligible for the TechIMF grade, candidates must hold a Technician Certificate and have appropriate work experience.

Holders of the TechIMF qualification are eligible to apply for the Engineering Technician (EngTech) award of the Engineering Council. To-date, all IMF applicants have been successful in being awarded EngTech and now hold a further professional qualification that is recognised, both in the UK and Internationally, outside the surface finishing industry.

The Associate grade is an interim one for a limited period whilst a person is on route to obtaining the Technician or higher grades. Candidates for this award must have passed the Foundation examination or have completed an equivalent basic science course and have had training in surface finishing and have a minimum of two years experience.

Copies of the Regulations for entry to all Professional Grades of Membership can be obtained from Exeter House or accessed from the IMF website (www.instituteofmetalfinishing.org). Some changes have been made recently to give more emphasis to relevant experience rather than to age. Are you at present holding the appropriate level of professional Grade? Check the regulations, it may give your career a boost if you can upgrade to a higher level.

Do you hold a Foundation Certificate or a Technician Certificate? If so why not enquire about applying for an AssocIMF or TechIMF? Over 800 of these Certificates have been awarded during the last ten years. If you know anyone who is not already a member of the Institute why not tell them about the new Professional Grades of Membership and encourage them to join the IMF?

EDUCATION AND TRAINING

Education and training are two of the most important activities of the Institute. Academic programmes have been developed to meet a wide range of requirements from Foundation up to Licentiate level. The content varies from basic general information to specific programmes on organic coatings. Bespoke academic training programmes have been developed to meet the needs of companies such as Land Rover, BMW and Seagate (in Ireland) and others and have been recognised by these companies as having led to significant improvements in the quality of their products. Further, the Automotive Surface Finishing course, as taught at Land Rover and BMW, was the first course to be recognised by the Automotive Academy and given Industry

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Recognised Status. All other courses and modules were approved by the Automotive Academy. Bespoke courses are available in other surface finishing areas and an example of such courses is given under the later CORPORATE EDUCATION section

A significant investment of time and money has been made to up-date most Distance Learning modules.

The Foundation module and tutored course has been significantly revised and extended.

A new course on Environmental issues and Health & Safety has been developed which is also available as a Distance Learning module.

The Technician Certificate can be studied by Distance Learning or a Tutored Route. Student notes are supplied where applicable, to aid candidates' study for courses and modules. The Tutored Programmes can also be offered in different modes to suit company requirements, if studied 'in house'. The IMF's aim is to provide an educational service to individuals and companies. Please contact Exeter House to discuss your requirements and obtain a copy of the examination regulations document.

Opportunities to progress through the IMF educational route lead to Professional Qualifications and the eventual award of Licentiate of the Institute of metal Finishing.

A recent change has been to give membership of the Institute to those enrolling on any education and training course or module for a period of up to one year, which will enable students access to IMF mail shots, including the 'IMFormation' two-monthly newsletter, the alternating two-monthly 'Transactions of the IMF' and attendance at any fee charged events at member rate.

QUALIFICATIONS

Foundation Certificate – Awarded following the passing of the Foundation Certificate examination. Subject to the necessary experience enables candidates to apply for the first stage professional qualification of Associate of the Institute of Metal Finishing and use of the insignia **AssocIMF**.

Technician Certificate – can be achieved by studying on a tutored Technician Certificate course or various Distance Learning modules as shown below:

Choose one module from:

Plating Practice;
Automotive Surface Finishing;
Paint & Powder

Plus one module from:

General Principles;
Environment and Health & Safety (course or module)

The award of a Technician Certificate, coupled with three years direct involvement in surface finishing technologies, enables candidates to apply for the *second* stage professional qualification of Technician of the Institute of Metal Finishing and use of the insignia **TechIMF**.

Holders of the TechIMF may apply to the UK Engineering Council for the award of Engineering Technician (**EngTech**).

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Advanced Technician Certificate - Technician Certificate + modules shown below:

Materials Science
Surface Coating
Process Management

Plus one module from:

Electrochemistry
General Principles
Environment (course or module)

provided that the selected module has not been studied as part of the Technician Certificate route.

Licentiate LIMF is awarded after successfully completing Licentiate Research Projects A and B or by a recognised alternative route approved by the IMF's Examination and Qualifications Board. Please consult the Regulations for other routes to LIMF.

DISTANCE LEARNING PROGRAMMES

IMF Distance Learning Programmes offer candidates the opportunity to study for the Foundation Certificate, Technician Certificate, Advanced Technician Certificate and Licentiate. Professional grades of membership (**AssocIMF, TechIMF and LIMF**) are awarded to candidates with relevant academic qualifications and appropriate experience.

Information is provided in the optional form of either professionally recorded audiocassettes, CDs or in some cases a written text, all with extensive back up notes, to enable students to study privately. UK students are invited to attend an induction/enrolment session at the IMF to receive advice about the best study methods. They are also linked to an "industrial counsellor" ideally from within their own company. If there is no suitable counsellor within the company then someone appropriately qualified, local to the student's home or company, is appointed.

Distance Learning modules may be studied outside the UK by arrangement, providing suitable counsellors and examination facilities can be approved by the IMF.

Assessment

Throughout the modules there may be components (*but not in all modules*) referred to as SAQs, CMAs, PAXs, SPAXs, and TMAs - these are defined below:

SAQs - Self-Assessment Questions - at the end of some lessons there are some questions, which the student should answer to ascertain that the lesson has been understood, then refer to the appendix for the answer.

CMAs - Computer Marked Assessments - multi-choice question papers - each of a series of questions with several answers to each.

PAXs – These are Practical Assignment Exercises which the student is invited to carry out. Those in General Principles and Plating Practice have been superseded by SPAXs, but

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nevertheless can be advantageous to a student if they have the facilities to carry them out, although they do not carry forward any marks to the final assessment.

SPAXs - Simulated Practical Assignment Exercises - information is supplied as if the student had actually carried out the exercise. The student is required to write up the exercise and assess the results. These are only included in the General Principles and Plating Practice modules as not all students have access to laboratory facilities.

TMA's - Tutor Marked Assignments - essentially fairly simple projects which may be associated with sample parts included in some modules or the material studied up to that point in time.

The above components, where applicable, contribute a percentage to the overall pass mark. In this way students are rewarded for their work during the study period.

For the award of a Technician Certificate the "Formal Examination (or End Test)" is of 2 hours duration and consists of:

Section A - Five short questions, no choices

Section B - Essay type questions, with choice of 5 out of 8

For the Environment module the End Test consists of:

25 multiple choice question,

2 essay type questions and

A project – which is associated with the student's company and by agreement of the company, students and the Institute. The written up project is a minimum of 3000 words.

For the Foundation module/course the examination is of 1½ hour duration and consists of:

30 multi-choice questions and

5 short essay questions.

Final Pass Mark – The End Test contributes the major percentage with the remainder being contributed from the Continual Assessment (i.e. CMA's, PAX's (or SPAX's), TMA's or project where applicable.

The pass mark for all examinations is 40%, merit 60% and distinction 75%

MODULES AVAILABLE

Foundation Module

This is a broad introduction to surface finishing processes, it requires no prior academic qualification or knowledge of chemistry and leads to the award, on obtaining the final pass mark, of the Foundation Certificate.

Students study a total of 15 units some of which are mandatory. Unit available for study are:

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Mandatory (7 units)

Surface Finishing	Corrosion
Environment & Surface Finishing	Health and Safety
Cleaning and Pretreatment Services	Sacrificial Coatings

A technology 'block' covering 5 units is then studied:

Electroplating	OR	Organic Finishing	OR	Aerospace
Principle of Electroplating *		Conventional Paint Coating		Conventional Paint Coatings
Plant and Equipment		Electrophoretic Paint Coatings		Paint Application Methods
Care and Maintenance		Paint Application Methods		Testing of Paint and Powder
Electroless Plating		Testing of Paint and Powder & Organic Coatings		& Organic Coatings
		Coating Powders & their Application		Chemical Conversion Coats
				Anodising of Aluminium

* classed as 2 units

Students than choose 3 units from the following (providing not from the mandatory ones or those from their selected Technology Block,

Anodising of Aluminium and its Alloys	Nickel Plating
Chromium Plating	Copper, Silver and Gold
Electroless Plating	Alloy Plating & Composite Coatings
Printed Circuit Board Processes	Paint Application Method
Chemical Conversion Processes	Zinc & Cadmium Plating
Coating Powders and their Application	Conventional Paint Processes
Testing of Organic Coatings & Materials	Electrophoretic Paints
Vacuum Metallisation	Surface Improvement
Vitreous Enameling	Duplex Coating
Principles & uses of Electroplating	Electroplating Plant & Equipment
Maintenance of Solutions	

General Principles (Will be updated with new titles/format/subjects from 1 July 2010)

This module provides a broad based introduction to finishing processes and does not require any prior academic qualifications, although a basic knowledge of chemistry is useful. The sections in this module are:

Why Surface Finishing?	Anodising of Aluminium
Surface Reactions in Aqueous Solutions	Process Control in Surface Finishing
Properties of Electrolytes	Surface Finishing of Printed Circuits
Properties of Electrodeposited Metals	Organic Finishing of Metals

This module is available on CDs and as a 'written script' version.

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Plating Practice *(Will be updated with new titles/format/subjects from 1 July 2010)*

This module provides knowledge of electroplating and electroless plating and includes sections on deposition of specific metals, treatment and disposal of wastes and maintenance of health and safety.

Sections in this module are:

Introduction to Electroplating	Electroless Deposition of Metals
Surface Preparation and Pre-treatment	Plant and Equipment used for Plating
Electrodeposition of some metals e.g. Cr, Ni, Zn etc	Treatment and Disposal of Wastes
	Maintenance of Health and Safety

This module is available on CD's and as a 'written script' version

The Application of Paints, Lacquers and Varnishes (vol 1) and Powder Coating (vol 2) *(Will be updated with new titles/format/subjects from 1 July 2010)*

This module is divided into 2 volumes. Volume 1 provides information about "wet" industrial organic finishing processes both solvent and water based whilst volume 2 is powder coating and its application.

Volume 1 - specific sections cover:

Introduction to the Materials	Testing Applied Coatings
Pre-treatment of Substrates	Problem Solving
Methods of Application	Health, Safety and the Environment
Drying and Curing	

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Volume 2 – specific sections cover:

Introduction to Powder Coating	Testing of Applied Coatings
Pre-treatment of Substrates	Solving Powder Coating Problems
Application of Powder	Health, Safety and the Environment
Methods of Melting and Curing	

Each of the above modules may be studied as a separate unit since companies may not always process components for both painting and powder coating.. A module can be examined and a certificate showing required satisfaction issued following examination.

Environment Module

Assessment and certification is by a written examination (25 multi-choice questions plus 2 essay questions) and a project. This module can be chosen as an alternative module towards the Technician Certificate and the Advanced Technician Certificate.

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The syllabus covers:

Environmental Awareness
The External Environment

The Workplace Environment
Legal Aspects.

Electrochemistry

This is essentially a theoretical module but necessary for students who wish to progress in the science of Surface Finishing. Sections contained in the module cover:

Electrochemical Cells & Electrode Reactions	Equilibrium Electrochemistry
Electrochemical Cell Reactions	The Electrode/Electrolytic Zone
Electrolytes and their properties	Kinetics of Electrode Processes

Material Science

This module covers aspects of the manufacture, properties and examination of materials used by surface finishers:

Properties of Material	Manufacture of Materials
Mechanical Properties and their Evaluation	Corrosion and Protection
Architecture of Solids	Examination of Materials
Phase Composition	

Surface Coating

This module deals in greater depth with the coating materials and processes introduced first in modules 1 & 2. Approximately 25% is devoted to organic finishing. Sections covered include:

Overview of Surface Coating	Non-electrochemical Coating Processes
Pre-treatment of Surfaces	Organic Coatings
Electrochemical Processes	

Process Management

This module covers operational procedures, standards, health & safety and comparison of coating processes. It is different from other modules in that it is based entirely on continuously assessed assignments.

Licentiate Research Project - Projects A and B

Project "A" is a literature search towards Project "B" and should be written up in approximately 5000 words. This sets the groundwork for the actual project (B).

Project "B" involves the carrying out or supervising of the actual project work. On completion, a thesis of about 10,000 words is submitted.

Projects are usually concerned with a topic associated with the student's employer and undertaken with the employer's agreement. The IMF will respect confidentiality of the project with the employer.

Completion of both Projects A and B leads to the award of the professional qualification, Licentiate (LIMF).

TUTORED PROGRAMMES

Tutored courses are run both in this country and outside the UK at Foundation and Technician Certificate levels. The detailed syllabi, continuously assessed assignments and examinations are provided from the UK for overseas programmes. The IMF Examinations and Qualifications Board approve tutors, invigilators and the 'secure' conditions under which examinations must be taken.

Foundation Course

The Foundation Course is a tutored programme. It has also been run in-house in companies, over periods such as 1 day or ½ day per week for the necessary number of weeks to suit company working patterns.

The course is designed to provide personnel in surface finishing and related technologies with the opportunity to increase their scientific and practical knowledge. It is also of value to line managers and sales personnel to improve their knowledge of the processes operated within their companies.

The syllabus was revised in 2009 to cover additional areas of surface finishing technologies. Students are required to study fifteen units. The range of subject units available are identical to those documented under Distance Learning Foundation Certificate as shown on page 5.

Students are supplied with a manual containing "Course Notes" for the selected units to minimise (not eliminate) note taking during classes; thus students can concentrate primarily on the tutor's presentation.

During the period of the course there are two CMAs and two TMAs, the latter contributing up to 20% towards the final marks.

At the conclusion of the course there is a one and half hour examination. The examination includes 30 multiple choice questions. A mark is given for a correct answer, there is no penalty for a wrong choice. There are also 5 short essay questions. Successful candidates are awarded the "Foundation Certificate", pass mark 40%, merit 60% & distinction 75%.

Technician Certificate

(Will be updated from July 2010 when it will follow the same as that for the Distance Learning route)

The Technician Certificate Programme requires a minimum 72 hours of teaching/tutoring and approximately a further 40 hours private study. When taught by an IMF Branch the course is normally based on 32 weeks, one evening per week. However, by agreement the course can be taught over alternative tutoring periods and further can be taught 'in-house' at a company by approved Institute recognised training consultants.

Students should preferably have a basic knowledge of chemistry or have completed the Foundation Certificate Course or Module. The syllabus covers the broad subject matters already listed under the General Principles and Plating Practice Distance Learning Modules.

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Four assignments (homework) have to be completed at specified times during the course and a 'phase test' is set approximately half way through the course. The objective of the 'phase test' is to give experience in writing answers to questions. The marks from the assignments and the phase test contribute towards the final pass mark.

The final examination is of three hours duration; 6 questions out of 12 must be answered, including **one** compulsory calculation question.

Pass mark 40%, merit 60% and distinction 75%.

Environment Course

This is a more recent addition to the Institute's range of courses by the tutored route. Assessment and certification is by written examination and a project as per Environment Module.

The syllabus covers:

Environmental Awareness
The External Environment

The Workplace Environment
Legal Aspects.

CORPORATE EDUCATION

Bespoke courses for companies involved in surface finishing can be arranged using existing course or module materials in conjunction with new topics specific to the requirements of the company. A tutor with the appropriate experience, approved by the Institute, delivers the course either at the company premises or at a mutually agreed venue. Student notes are supplied and an examination (if required) arranged. Students who achieve the pass level receive an appropriately worded certificate or alternatively a certificate of attendance.

Below is shown two examples of bespoke course contents arranged following discussion between the company and the IMF.

Automotive Surface Finishing Course (for Automotive Surface Finishing Technician Certificate)

An Overview of Surface Finishing
Pre-treatment of Substrates
Coatings Application
Process Control in Surface Finishing

Problem Solving
Health and Safety
Environment Considerations

The course is a hybrid between a Distance Learning module and a taught course. Students received in-house tuition from an IMF tutor, but must also undertake significant private study.

The above course is equivalent to a Distance Learning module and with the addition of the General Principles or Environment (D/L or Tutored), enables students who pass the appropriate end test(s) to receive the Technician Certificate and would then be able to apply for TechIMF and further, the EngTech qualification of the UK Engineering Council.

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Environment and Health & Safety Course

The course recently taught at a major aerospace component company, consisted of most aspects of the Environment course with the specific units from the Foundation course covering Cleaning & Degreasing, Nickel, Chromium & Cadmium Plating, Anodising and Health & Safety.

Chemistry for Metal Finishing

A very recent tutored course on the use of laboratory equipment for analysis and testing.

SYLLABI

The full Syllabus and Objectives for all of the Distance Learning Modules and Tutored Courses can be obtained from Exeter House or from the IMF website www.instituteofmetalfinishing.org and then clicking onto the required course or module.

TUTORIALS

A series of Tutorial articles on Surface Finishing topics is available from the Institute. These are aimed at technical personnel who wish to update their knowledge, both for professional and examination purposes. Each volume consists of 10 –12 articles.

Volume 1	Fundamentals of Electrochemistry
Volume 2	Process Technology, Kinetics & Control
Volume 3	Applications, Testing & Measurement

Please contact the Institute for further information
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