

# The Institute of Metal Finishing

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## IMF Professional Qualifications Education and Training By J K Dennis and R R Read

### PROFESSIONAL GRADES OF MEMBERSHIP

**Professional Grades of Membership** – The grades of membership have recently been updated and are - Associate, Technician, Graduate, Member and Fellow of the Institute of Metal Finishing.

#### **Associate (AssocIMF)**

The Associate grade is an interim one for a limited period whilst a person is en 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 a minimum of two years experience in the Surface Finishing industry

#### **Technician (TechIMF)**

To be eligible for TechIMF grade a candidate must hold a Technician Certificate and have 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 of the Surface Finishing Industry.

#### **Licentiate**

The Licentiate ‘grade’ is no longer available but the Licentiate ‘qualification’ can still be obtained by persons possessing the Advanced Technician Certificate and on completion of the Licentiate Research Project (see page 8)

#### **Graduate (GradIMF)**

Candidates for this grade must produce documentary evidence that they are able to fulfil one of the following regulations:

**G1** possess a degree from a course approved by the Institute’s Examination & Qualification Board (e.g a science or engineering or similar) and have successfully completed and passed one of the IMF’s Foundation or Technician modules.

**G2** possess a degree from a course approved by the Institute’s Examination & Qualification Board (e.g a science or engineering or similar) and have a minimum of 2 years industrial experience in the field of surface finishing.

**G3** possess the IMF’s Licentiate qualification.

#### **Member (MIMF)**

Candidates for election to this grade must produce documentary evidence to the satisfaction of the IMF’s Examination & Qualification Board that they are able to fulfill one of the following regulations:

**M1** possess a degree in chemistry, materials science, metallurgy, corrosion science or other related subject and have had a minimum of six years direct involvement in surface finishing technology at a senior level. If the applicant has an enhanced first degree (e.g. M Eng, MSci) or a postgraduate degree (MSc or MPhil), a total of 5 years direct involvement in surface finishing technology at a senior level may be acceptable.

**M2** possess a PhD qualification in chemistry, materials science, metallurgy, corrosion science or other related subject and have completed 3 year’s direct involvement in surface finishing technology.

**M3** possess the IMF’s Licentiate qualification and have had for a minimum period of 5 years direct involvement in surface finishing technology at a senior level.

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**M4** that having been engaged in the field of surface finishing technology for at least 10 years and holding an important position of responsibility, the Candidate has shown a demonstrable commitment to continuing professional development. The nature of the experience and positions of responsibility held will be taken into account in consideration of applications under this category.

## **Fellow (FIMF)**

Candidates for election to this grade must be persons who, through a combination of education, experience and training have acquired a high level of competence in the science and technology of surface finishing, and in addition can satisfy the IMF's Examination & Qualification Board they have an established and mature reputation in the field of surface finishing.

## **EDUCATION AND TRAINING**

Education and training are two of the most important activities of the Institute. Programmes having been developed to meet a wide range of requirements. These have recently been given a total update to reflect changes in technology, health and safety and environment legislation. The content varies from basic general information to specific programmes for Surface Finishing technologies available as Distance Learning modules and Tutored Courses.

Bespoke training programmes have been developed to meet the needs of several companies and have been recognised by the companies as having led to significant improvements in the quality of their products.

A significant investment of time and money has been made to overhaul all the IMF's education programme irrespective whether by Distance Learning or Tutored route. The Foundation Certificate syllabus was significantly revised and extended in 2009 whilst the Technician Certificate syllabi have been completely revised and extended. The environmental module reflects the latest changes in legislation and now benefits by the addition of sections on Health & Safety and is now known as Environmental, Health & Safety.

All Technician and Foundation Certificate modules can be studied by both Distance Learning and Tutored routes. Study modules are supplied to students irrespective of which route is chosen in electronic form on a memory stick. The IMF's aim is to provide an educational service to individuals and companies. Please contact David Meacham at the IMF offices at Exeter House on 0121 622 7387 to discuss your requirements and obtain a copy of the examination regulations document.

Opportunities to progress through the IMF educational route can lead to Professional Qualifications.

Affiliate membership of the Institute is given free for a period of up to one year to those enrolling on any education or training programme. This enable students to access 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 a discounted member's rate.

## **QUALIFICATIONS**

**Foundation Certificate** – Awarded following the passing of the Foundation examination. Subject to the necessary experience or an external qualification enables candidates to apply for a professional grade of membership of the Institute and use of the appropriate insignia.

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**Technician Certificate (TC)** – is awarded after successfully completing two of the technician level modules shown below:

Principles of Electroplating  
Electroplating Practice  
Paint, Lacquer & Varnish \*  
Powder Coating  
Environmental, Health & Safety,  
Automotive Surface Finishing \*  
Material Science (available early 2012)  
Electroforming (available early 2012)

\* These subject modules together cannot rate towards the award of a Technician Certificate.

The award of a Technician Certificate, coupled with appropriate direct involvement in surface finishing technologies, enables candidates to apply for the professional grade 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 and use of the insignia **EngTech**, an internationally recognised qualification

## **Advanced Technician Certificate (ATC)**

On receipt of a Technician Certificate (TC), students may elect to study two further modules, one of which must be Environmental, Health & Safety (unless previously studied) from those shown under TC and on passing the examinations will receive the Advanced Technician Certificate

## **Licentiate**

Holders of the Advanced Technician Certificate can progress to the Licentiate qualification by completion of a literature survey and associated research project. The award of the licentiate qualification enables candidates to apply for the Graduate grade of IMF membership and to use the insignia **GradIMF**.

## **DISTANCE LEARNING and TUTORED PROGRAMMES**

These programmes offer candidates the opportunity to study for the Foundation Certificate, Technician Certificate, Advanced Technician Certificate and Licentiate and become eligible to apply for their respective grades of IMF membership.

Study material is provided in the form of lessons on a memory stick, or in special circumstances as written text. UK students are invited to attend an induction/enrolment session at the IMF to receive

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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 their company, then someone appropriately qualified and 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 approved by the IMF, are available.

## **Assessment**

Marked Assignments (MAs) - essentially short projects which may be associated with the testing of sample parts included in some modules or on the material studied up to that point in time. These assignments contribute to the overall pass mark. In this way students are rewarded for their project work during the study period.

The assessment for the Foundation Module:

MAs 2 off, which contribute up to a maximum of 20% towards the final pass mark

1½ hour written examination consisting of:

30 multiple choice question each with five possible answers only 1 of which is correct, which contribute up to a maximum of 40% to the final pass mark, plus

5 short essay questions that contribute up to a further maximum of 40% to the final pass mark

The assessment for all the Technician Certificate level modules comprises:

MAs 4 off, which contribute a maximum of 20% to the final pass mark

2 hour written examination consisting of:

Section A - Five short essay questions, without choice

Section B – Longer essay type questions, with choice of 5 out of 8  
The maximum total percentage from the examination is 80%

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

## **MODULES AVAILABLE**

The modules are identical for persons studying by either the distance learning or tutored course routes.

### **Foundation Module**

This is a broad introduction to surface finishing processes; it requires no prior academic qualifications or knowledge of chemistry, and leads to the award of the Foundation Certificate.

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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 of value to process operators, line managers and sales personnel to improve their knowledge of the processes operated within their companies.

There are currently 29 units available for study:

**7 Mandatory units** must be studied plus 5 from one of the **Technology Blocks** and a further **3 Optional units** from those units not already selected for study.

## Mandatory Units

- |                                    |                         |
|------------------------------------|-------------------------|
| 1. Surface Finishing               | 2. Corrosion            |
| 3. Environment & Surface Finishing | 4. Health and Safety    |
| 5. Cleaning and Pretreatment       | 6. Sacrificial Coatings |
| 7. Services                        |                         |

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

| <b>Electroplating</b>  | <b>Or</b> | <b>Organic Finishing</b>   | <b>Or</b> | <b>Aerospace</b>  |
|--|-----------|--|-----------|---|
| ↓  |           | ↓  |           | ↓   |
| Principles of Electroplating *<br>Plant and Equipment<br>Care and Maintenance<br>Surface Improvement |           | Conventional Paint Coating<br>Electrophoretic Paint Coatings<br>Paint Application Methods<br>Testing of Paint/Powder Coatings<br>Coating Powders & their Application |           | Conventional Paint Coatings<br>Paint Application Methods<br>Testing of Paint/Powder Coatings<br>Chemical Conversion Coatings<br>Anodising of Aluminium & its Alloys |

\* classed as 2 units

Students then choose 3 units, which they have not previously studied from the following list of units.

- |   |  |
|---|--|
| 8. Surface Improvement                      | 9. Principles & uses of Electroplating |
| 10. Plant & Equipment                       | 11. Copper, Silver & Gold Plating      |
| 12. Nickel Plating                          | 13. Chromium Plating                   |
| 14. Zinc & Cadmium Plating                  | 15. Electroless Plating                |
| 16. Alloy Plating & Composite Coatings      | 17. Printed Circuit Board Processes    |
| 18. Maintenance of Solution/Product Quality | 19. Conventional Paint Processes       |
| 20. Electrophoretic Paint Processes         | 21. Paint Application Methods          |
| 22. Coating Powders & Application           | 23. Testing Paint & Powder Coats       |
| 24. Chemical Conversion Coatings            | 25. Anodising of Aluminium & Alloys    |
| 26. Vacuum Metallisation                    | 27. Vitreous Enameling                 |
| 28. Duplex Coatings                         | 29. Electroforming                     |

Study time of units chosen is anticipated to be approximately 40-45 hours. In addition, there is some 'homework' referred to as Self Marked Assessments (SMAs) and Marked Assignments (MAs), that will require further study time. SMAs and MAs are situated at various positions in the module.

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## **Technician Modules**

Students should preferably have a basic knowledge of chemistry or have completed the Foundation Certificate Module.

Each of the modules contains various headed sections that are broken down into specific lessons, applicable to the module title and section.

Each module is self consistent and contains all relevant information without recourse to another module. Hence, there is some duplication of lessons in the modules, since a student may only wish to study a single module.

## **Principles of Electroplating**

- Why Surface Finishing?
- General Principles of Electroplating
- Chemical Reactions at Electrode Surfaces
- Properties of Electrodeposited Metals
- Care & Maintenance of Solutions & Product Quality
- Introduction to Corrosion
- Anodising
- Services
- Health, Safety & Environmental Issues

## **Electroplating Practice**

- Introduction to Electroplating
- Basic Science for Electroplating
- Surface Preparation and Pretreatment
- Electrodeposition of Metal Coatings.
- Plating Metal Coatings without Electricity
- Plant & Equipment used for Electroplating
- Services
- Health, Safety & Environmental Issues

## **Paints, Lacquers and Varnishes**

- Why Surface Finishing
- Basic Science for Coatings
- Introduction to Paints, Lacquers & Varnishes
- Preparation for Painting
- Application of Paints, Lacquers & Varnishes
- Plant & Equipment
- Services
- Controlling the Product and the Process
- Health, Safety and Environmental Issues

## **Powder Coating**

- Why Surface Finishing
- Introduction to Corrosion
- Basic Science for Coatings
- Introduction to Powder Coating
- Cleaning & Pretreatment
- Application Methods
- Plant & Equipment
- Services
- Controlling the Product & Process
- Health, Safety and Environmental Issues

## **Environmental, Health & Safety**

- Why Surface Finishing
- Waste
- Treatment & Disposal of Wastes
- Legal and other Aspects
- Protection from Health, Safety & Environmental Hazards
- Managing Health, Safety & Environmental Impacts
- Surface Finishing & the Environment

## **Material Science**

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

## **Automotive Surface Finishing**

- Why Surface Finishing
- Basic Science for Coatings
- Organic Coatings
- Preparation of Substrates
- Preparation for Painting
- Application of Coatings
- Plant and Equipment
- Services
- Controlling the Product and Process
- Health, Safety & Environmental Issues in Surface Finishing

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## **Licentiate Qualification Research Project**

Initially this requires a literature review towards the proposed project and should be written up in approximately 5000 words. This sets the groundwork for the actual project.

The project involves the carrying out or supervising of the actual project work. On completion, a thesis of about 10,000 words is submitted plus a revised version of the literature review.

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 the projects leads to the award of the Licentiate certificate.

## **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 has been run in-house in companies to suit employee working patterns/shifts.

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 memory stick for the selected units to minimise note taking during classes, thus students can concentrate primarily on the tutor's presentation.

During the period of the course there are two MAs 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 Modules**

A Technician Module requires a minimum 72 hours of teaching/tutoring per module and approximately a further 40 hours private study, and is taught within companies by Training Consultants approved by the Institute.

The syllabus covers the broad subject matters already listed under the section on Technician Modules. See page 6.

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Four assignments – Marked Assignments (MA's) have to be completed during the course and sent to the Institute for marking prior to the final examination. The marks from the assignments contribute towards the final pass mark.

The duration of the final examination is two hours.

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

## **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, would deliver the course either at the company premises or at a mutually agreed venue. Student notes would be supplied and an examination (if required) can be arranged. Students who achieve the pass level would receive an appropriate certificate or alternatively a certificate of attendance.