



# Institute of Materials Finishing

## LICENTIATE MODULE

### Introduction and Guidance notes

After successful completion of the IMF Technician's Certificate, there are two projects to be completed to obtain the Licentiate, these projects should be linked by a common theme.

The purpose of these notes is to provide guidelines to help you with the accumulation and presentation of the data required for the written projects. Candidates who satisfy the Examiners with Projects A and B will be awarded the Licentiate of the Institute of Materials Finishing.

The object of the projects is to enable you to demonstrate your technical knowledge and competence in the field of surface finishing and also to develop your professional skills in, for instance, planning work, researching and evaluating data, writing formal reports and interacting with other people.

The module requires two projects, the first, Project A, a literature survey of some 3,000 to 5,000 words, on the practical work you intend to undertake for Project B.

In both cases the subject of the projects will be agreed between you, your employer and the Institute (Supervisor).

The general aims of the projects are to provide candidates with an opportunity to:

- carry out an in-depth study of a realistic finishing problem associated with industry.
- apply and integrate the technical knowledge gained through previous study with the everyday demands and constraints of the workplace.
- prepare reports and develop communication skills.

A more detailed account of what is involved in working on the projects is given in the annex.

### Project Supervision

You will have a Supervisor, appointed by the IMF, who will be someone from outside your firm. Where possible, your firm should also nominate a member of Staff to act as a "Counsellor" for day – to – day discussions.

The Supervisor will:

- Discuss the project requirements with you and your employer in order to ensure that a suitable and viable topic is chosen.
- Provide you with guidance in drawing up a work schedule once the project topic has been selected.
- provide on-going support during the course of the project.

Normally the Supervisor would expect to meet with you at least twice during the course of each project and to maintain telephone/e-mail contact with you throughout the project.

## **Project Selection**

In selecting the topic for your project the following points should be considered.

1. The subject should be related to your company's normal activities and your developing role in the company.
2. The subject matter should not infringe the commercial confidentiality of your company. However, the Supervisor will respect the confidentiality of any commercially sensitive aspects of the proposed work.
3. Your Company must provide facilities for you to:
  - a. study a specific and well-defined topic with a definite objective.
  - b. write a report on the project suitable for submission to the IMF for assessment.

## **Written Report**

Reports, both interim and final, should be printed and well presented, at least four copies are required, one each for the Supervisor, Counsellor, yourself and the External Examiner.

## **Project Assessment**

The project will be assessed according to the schemes given in the annex. An external Examiner appointed by the Examination and Qualifications Board will mark the Projects and candidates for Project B will also be expected to attend an Oral Exam and/or give a presentation to Members of the Examination and Qualification Board.

## **Timescale**

The projects will take up to 24 months to complete. Candidates are strongly advised to ensure that Project A is completed within the first 12 months so that a minimum of 12 months is available for Project B

Project B should normally be completed within a period of one to two years from the date of registration with the Institute. However the project must be completed within two years after which the registration will lapse. An extension may be approved by the Examination and Qualifications Board if valid reasons are provided in writing to the Board.

## **The Projects**

Guidance notes on the objectives, assessment of the projects and layout of the report etc. are given on the following pages.

It should be noted that the IMF is aware that some Companies are involved in work that is considered to be confidential. In such cases the IMF will endeavour to appoint a Supervisor and External Examiner acceptable to the company.

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## **ANNEX**

### **PROJECT A (3000 to 5000 words)**

#### **Objectives**

1. To carry out a literature search relevant to the topic for subsequent practical investigation.
2. Devise a programme of work for the subsequent practical investigation.
3. Identify health & safety aspects relating to the practical work including the appropriate COSSH forms, environmental aspects and risk assessment. Undertake a Risk Assessment if appropriate.
4. Produce a written report of 3000 to 5000 words which summarises the relevant literature and gives details of a feasible work schedule.

#### **Timescale**

The literature search and collection of background information for the work schedule should involve a minimum of 30 hours. You may be asked to account for this time.

Time will also be required for preparation of the formal report.

The completed report should be ready for formal submission to the IMF within 6 to 12 months from the date of registration.

#### **Assessment Schedule**

The Supervisor will be responsible for assessing the Candidate's approach to the project and awarding up to 20% of the marks available.

The External Examiner will be responsible for marking the written report, according to the marking plan shown. The written report carries a maximum mark of 80%.

### Supervisor' Assessment (up to 20%)

The Supervisor will assess the candidate's

- a) approach to the problem
- b) attitude to the work
- c) organisation of self and work
- d) communication skills

### External Examiner's Assessment (up to 80%)

Written Report -

- a. presentation and style (up to 10%)
- b. content and relevance of references (up to 25%)
- c. discussion and critical nature of the review (up to 45%)

### **Layout of the Report**

#### 1. Title

This must be as meaningful as possible using a maximum of two lines. For example "Electroplating of Copper" is not sufficiently detailed if you are investigating say, brightness or variations in solution composition in which case "Factors Affecting Variations in Brightness" would be more appropriate.

#### 2. List of Contents

You will need to number chapters/sections, any sub-sections and all pages to enable you to put together a list of contents. Such a list might be:

Contents	Page
1. Introduction	1
2. Literature review	3
2.1 Historical Background	
2.2 e.g. Chromium Plating	
3. Work Schedule	10
4. Health and Safety	12
5. References	14

#### 3. Introduction

Here you introduce the subject, explain why the work is being carried out and discuss the variables which affect the phenomena you intend to investigate and indicate which of the variables you intend to study.

#### 4. Literature Review

The object of Project A is to give you experience in carrying out a thorough literature search on the subject of your subsequent practical work and to prepare a critical review of your findings.

In developing your review you should include, for instance, how the process or technique under investigation has developed with time and any published opposing views from workers in the field. Your critical review will also include a discussion and justification for your subsequent practical research. You should include the theoretical background to the practical work you intend to carry out.

If the topic of your choice for investigation does not lend itself to a traditional literature review you should consult your Supervisor who may agree that you take the alternative route of preparing a „position review“ in which the work leading up to the project is reviewed with appropriate references where possible.

## 5. References

References are a list, in numerical order as they appear in your written text, of the sources of information referred to in the literature review. It is essential that the numbers in the text match the numbers in the list. Scientific Journals vary in the detail of how references are presented. **It is important that your references are presented in a consistent style** and you should look at typical papers in Transactions of the IMF for guidance and ask for a copy of the Notes for Contributors.

An example of a reference to a journal paper is:-

S. A. Campbell, Y. Li, S. Breakspear, F. C. Walsh and J. R. Smith: Trans. IMF, 2007, 85, (5), 237–244 where 85 is the volume no. and (5) is the issue number.

A book would be referenced as follows:-

Title, author, publisher, pub year, page number.

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## **PROJECT B (5000 TO 10,000 WORDS)**

The work for Project A will have provided the initial Literature review and work schedule for the experimental work of Project B. As this project progresses it is essential to review the progress of the work and the relevance of the „work schedule“ to the actual observations made during the various stages of the work. It will probably be necessary to update the initial Literature review. All such „reviews“ should be recorded as part of the final report.

### **Objectives**

1. Use or awareness of a range of practical techniques.
2. Practice in critically reviewing the progress of the project at intervals and modifying the proposed work schedule as required.
3. Demonstration of compliance with both company and government requirements for health and safety and environmental procedures.
4. Produce a written report of some 5000 to 10000 words to include a critical review of the existing literature and of the practical work together with suggestions for further work.

### **Timescale**

Experimentation and data collection should involve a minimum of 60 hours work after the completion of Project A. You may be asked to account for this time.

Time will also be required for the preparation of the final written report.

The time limit for the completion of both projects is normally two years as stated on page 2 of this document.

### **Assessment Schedule**

The Supervisor will monitor the Candidate's progress in sections 1 to 4 below and be responsible for awarding up to 20% of the marks available.

Section 5 below, the written report, will be marked by the External Examiner according to the schedule below. This section carries a maximum mark of 80%.

#### Supervisor's Assessment (up to 20%)

1. Validity of the work schedule
2. Use and range of investigative techniques
3. Ability to solve problems
  - a. interpretation of results
  - b. flexibility of approach to unforeseen problems

#### 4. Self discipline and work organisation

#### 5. External Examiner's Assessment (up to 80%)

Written report - marked by the External Examiner who will consider :

- |   |             |
|---|-------------|
| a. Presentation and style                   | (Up to 10%) |
| b. Experimental procedure                   | (Up to 25%) |
| c. Results, discussion/critical review      | (UP to 30%) |
| d. Summary and suggestions for further work | (Up to 15%) |

### **Lay-out of the Report**

It is suggested that you look at Transactions to gain some idea of the style but remember, a report must have virtually all the details of the results of your experimentation whereas when writing a paper for publication a certain selectivity is allowed.

#### 1. Title

This must be as meaningful as possible using a maximum of two lines. You may find it preferable to finalise the title of the project after you have completed the practical work in order to reflect the actual work carried out.

#### 2. Synopsis

The object of a synopsis is to give an overall view of the aims and conclusions of the report. It should be approximately 100 to 150 words and include the objectives of the work and a brief summary of the results and conclusions.

#### 3. List of Contents

See Project A for details

#### 4. Introduction

Here you introduce the subject of your investigation, briefly discuss parameters that were considered in your investigation as well as those that could have influenced the work.

#### 5. Literature review

The Literature review from Project A will need to be updated during the completion of Project B. The complete revised review should be included in the final report.

#### 6. Work Schedule

This section should indicate the order in which you investigate the main variables and the approximate time allowed for each variable. If you produce a project time line, this should be included either in this section or as an Appendix.

## 7. Health and Safety

This should be presented as a risk assessment of the experimental work you will undertake and you should consider both the health and safety and environmental implications of the work. Any formal documentation, (e.g. COSHH forms), that you prepare, must be included.

## 8. Experimental methods

It is important that you identify all the parameters you have investigated, including, where appropriate, the composition of any solutions used as electrolytes, or in any pre-treatment process, means of temperature control etc.. If, for example, you are investigating plating conditions state the volume of the electrolyte used e.g. 500ml or 5l or ....., include the number of amp-hours the solution is worked for in obtaining your results.

You should give details of all materials, equipment and apparatus used. Describe and explain the use of any unusual equipment you may have needed to design, commission and/or build. Any statistical methods used in designing your experiments should be described.

It is possible that you, personally, may not operate specific pieces of equipment but will make use of in-house skilled operators or of the services of external companies especially in the use of sophisticated testing equipment. In such circumstances you must indicate the fact but should show an understanding of the principles of the technique that has been used to obtain your results. In such cases greater emphasis in the assessment of your work will be placed on the interpretation and conclusions you draw from these contracted out procedures.

## 9. Results

Results should be presented in tabular, graphical etc form wherever possible. When results are illustrated graphically individual points must be clearly shown so that the spread of results may be easily seen.

Calculations - if there are any complex calculations in the work, for example, determining statistical data or the use of a complicated equation, then an indication of how they were done should be included. Such information may be provided in this section or in a separate appendix if preferred.

## 10. Discussion

In this section you compare your results with those of other workers mentioned in your literature survey and attempt to discuss the reasons for differences, if any.

Any observation you have on your results should be discussed here along with any sources of error and resulting limitations of conclusions drawn. Any commercial implications of your results should also be mentioned.

You should identify any other variables that could have usefully been investigated and suggest further work that could be carried out to solve the questions raised from the work reported.

9. Conclusions

Only the main conclusions from your work should be summarised in this section.

10. References

Use the format suggested in Project A

11. Appendices

Drawings, diagrams, photographs, graphs and tables are usually either in the appropriate place in the text or collected together in separate appendices. Your company may have policy on the position of tables etc. in a report, if so it is suggested that you follow this, if not then you are free to consult your Supervisor for advice. Assessment of presentation depends on the overall report being clear and tidy and will not be influenced by the position in the manuscript of tables etc..