



The Institute of Materials, Minerals & Mining

# A GUIDE TO CANDIDATES APPLYING FOR MEMBERSHIP AND ec<sup>uk</sup> OR SCIENCE COUNCIL REGISTRATION VIA THE TECHNICAL REPORT ROUTE (TRR) FOR:

CENG, CSCI OR IENG

**If you would like  
further information,  
please seek advice from  
the Membership  
Department of the  
Institute**



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## INTRODUCTION

The Institute of Materials Minerals and Mining (IOM3) is licensed by ec<sup>uk</sup> to award EngTech, IEng and CEng and by the Science Council to award CSci via various routes alongside Institute grades such as TIMMM, AIMMM, MIMMM or FIMMM. The “standard route” is for candidates who have the necessary exemplifying qualifications (i.e. an accredited educational base) plus the requisite experience to meet the required competences and commitments set out in UK SPEC or Science Council rules, as interpreted by IOM3, see Appendices 2,3 and 4 for details. In terms of education this means :

For CEng or CSci:                    an accredited MEng/MSc or equivalent  
For IEng :                                an accredited Bachelors degree or equivalent.

Applicants who have a package of non-accredited qualifications e.g. BEng/BSc, MSc, PhD etc will have these checked by an accreditation panel to establish equivalence to the necessary accredited base. If you are not sure which case applies to you please contact the Institute for guidance before you apply.

For other applicants there are a variety of routes to gain or demonstrate that you have the equivalence. These are:

1. ec<sup>uk</sup> examinations
2. Further study e.g. Masters course, PhD
3. Technical Report Route (TRR)

These guidelines cover only the TRR, if you believe the other routes may apply to you please contact the Membership Department. Normally if you send in a detailed CV beforehand we can advise the options available to you.

The Technical Report Route (TRR) has been introduced to cover all other applications for IEng, CEng or CSci for applicants who do not have or are not working towards having these exemplifying qualifications (note Eng Tech is not covered by the TRR). The applicant's Technical Report must clearly demonstrate that they have the engineering/scientific knowledge and understanding as appropriate, equivalent to the same level as their peers who have progressed via the standard routes to registration. This will be rigorously assessed for both academic and technical engineering (for IEng or CEng) or scientific (for CSci) standard by peer review. PLEASE NOTE THE TRR IS PRIMARILY AN ACADEMIC ASSESSMENT AND NOT A STATEMENT OF PROFESSIONAL ABILITY. THE LATTER WILL BE COVERED AS PART OF THE PROFESSIONAL REVIEW PROCESS.

### 1.1 Indicative entry experience

The timescales listed below should be taken as a rough guide only as each case is assessed individually. If you are in any doubt please contact the Membership Department BEFORE you start to apply.

#### 1.1.a.            Applying for CEng (for CSci read BSc as opposed to BEng)

<u>Academic base</u>	<u>Relevant experience</u>
BEng or equivalent	indicative 7 years
HND/HNC	min of 10 years
None	min of 15 years

#### 1.1.b.            Applying for IEng

<u>Academic base</u>	<u>Relevant experience</u>
Foundation degree/HND/HNC	min of 5 years
ND/NC	min of 10 years
None	min of 15 years

## 1. THE PROCESS

The flow chart shown in Appendix 1 illustrates the stages in the TRR process. This total process can take up to 2 years from start to completion.

It is advised that applicants who are not currently members join the Institute at the time of applying at the grade of Affiliate as you will be applying for full membership at the same time as IEng, CEng or CSci.

Applicants should apply for membership using the standard application forms which can be downloaded from [www.iom3.org/membership](http://www.iom3.org/membership) and tick the appropriate boxes for the grades applied for. At this stage the information you need to provide is (sections 2.1 – 2.3, 2.5 see detailed notes below):

- 2.1 Completed application form
- 2.2 A comprehensive Professional Review Report
- 2.3 A synopsis of the proposed Technical Report ( see below for details ) NOT a full report.
- 2.4 Payment of the initial application fee £120. Your application will not commence if this is not enclosed
- 2.5 The name of a mentor who can advise you on your application and the completion of the full report. If you cannot identify a mentor the Institute can help you once the synopsis has been assessed and approved

We strongly recommend that you only apply once you are able to complete sections 2.1-2.5 above and send a single copy of your application to the address found on page 9.

### 2.1 Completing the application form

Application requires submission of the appropriate **application form plus supporting documentation**. It is important to **complete all sections of the form in the space provided**, even if you amplify certain sections in your Professional Review Report. Your application must be printed or written in BLOCK CAPITALS. This form is also available on the Institute's website [www.iom3.org/membership/appform.doc](http://www.iom3.org/membership/appform.doc).

#### SECTION A – PERSONAL DETAILS

Please complete all details in section A, including your **membership number** (if you are already a member).

#### SECTION B – TECHNICAL EDUCATION & ACADEMIC QUALIFICATIONS

**Photocopied evidence of academic qualifications must be provided. Photocopies must be certified by your sponsor as being true copies.**

#### SECTION C – PRESENT EMPLOYMENT

Please give details of your employer showing your **immediate superior** and any **staff who report to you**. This should include any professional qualifications that they hold (e.g. FIMMM, MIMMM, AIMMM, CEng, CSci, IEng, EngTech, other professional qualifications).

#### SECTION D – REFERENCES

**You must have two referees** who should be members of the Institute of Materials, Minerals and Mining at or above the grade you are applying for. In the case of those applying for IEng, CEng or CSci registration, referees must also be registered with ec<sup>UK</sup> or the Science Council, as appropriate, at the same level. **One of your referees should act as your sponsor.** (In exceptional cases, professional members of other engineering or scientific Institutions may be acceptable as referees.) Family members and subordinates within your company are not acceptable as referees.

## SECTION E – DECLARATIONS

**You and your sponsor must sign the declaration statements at the end of your application form and your sponsor must authenticate all supporting documentation .**

**Please fill in your details in the boxes provided at the top of the two referee forms**, both front and back, including your full name, membership number (if currently a member) and grade for which you are applying. Please fill in the name of your referee at the top of the letter on the front page.

Your two referees must each complete a referee form, providing as much detail as possible, including their own details and signature. You should ask your referees to return the forms to us unless they prefer to give them to you for submission with the application.

Photocopies of your academic certificate/s must be provided with your application. (We do not require copies of secondary school qualifications.) For non-accredited first degrees the Institute will ask you for transcripts / synopses of any higher degree courses undertaken, e.g. MSc, PhD.

### **2.2 Professional Review Report**

The Professional Review Report is, effectively, an extended CV, showing your career development. It provides you with the opportunity to demonstrate broad training and experience in the science and engineering of materials, minerals and mining. This should include some quantification of the training undertaken and the responsibilities that you have had during your career.

For each position you have held, you should outline the training you undertook, including attendance at formal training courses and on-the-job training, summarising the materials and techniques with which you have become familiar. You should also provide a description of your function and responsibilities, quantifying these where possible. Be sure to indicate what you have personally achieved and been accountable for as well as your contribution to a team.

Your Professional Review Report should link your career development to the requirements of competence and commitment listed in Appendix 2 for IEng, Appendix 3 for CEng or Appendix 4 for CSci. In your report, indicate in the **right hand margin** of your text which requirements each paragraph fulfils.

It is not expected that you will have gained extensive experience in all areas but it is essential that, over the period of your career, you have gained sufficient experience in **the science and engineering of materials, minerals and mining** and wider **management issues** to satisfy the majority of the requirements; in areas where your direct experience has been limited, you should at least be familiar with the issues.

The Professional Review Report will demonstrate your career progression. It should provide information regarding your initial period of training and experience showing your breadth and depth of relevant knowledge and experience.

It should also establish the approximate length of time you have been working at the level of responsibility appropriate to the grade applied for as well as the degree of responsibility that you currently hold.

**Your Professional Review Report must be a maximum of 5 sides of A4 and each page must be numbered.** Documents received over this limit may be returned, delaying your application.

**You must sign your Professional Review Report under the statement:**

*I certify that this Professional Review Report is a true and accurate statement.*

**Your sponsor must authenticate your Professional Review Report under the statement:**

*I certify that I have read the Professional Review Report of (your name) and confirm that, to the best of my knowledge, it is a true and accurate statement.*

## **2.3 Format and content of the Synopsis**

**Introduction** – background and reasons for selection of the proposed topic

**Key objectives**

**Challenges encountered**

**Technical review of the engineering principles employed**

**Resolution of the objectives**

**Conclusions and lessons learnt**

The synopsis should not be more than 750 words and should be typewritten with double spacing and printed doubled sided on A4 paper. Any not conforming to these requirements will be returned to the applicant. Please submit one copy with your application.

## **2.4 Payment**

You are required to enclose a payment of £120 to cover the administration of your application.

## **2.5 Mentor**

The Institute strongly recommends you to use a Mentor during the application process. You should identify a member who knows your work, is already a registered engineer or scientist at or above the level for which you are applying, is located close to you and is familiar with the subject area and the requirements of the Technical Report Route. If this is not possible the Institute will, during the assessment process seek to identify and appoint a suitable mentor. The role of the mentor is:

- Advise on content and subject matter
- Discuss conclusions with you and challenge technical reasoning and assumptions made
- Comment constructively on drafts for the synopsis and Technical Report and advise changes necessary
- Advise you on interview techniques and do's/do nots
- They **MUST** not contribute to the technical content or style of the report. These are purely down to you.
- The mentor will not be involved in any part of the peer assessment process

Once you have completed all the relevant sections of the application please send one copy along with your payment (cheques made payable to the Institute of Materials Minerals and Mining) to the address listed on page 9.

## **2. ASSESSMENT OF THE APPLICATION AND SYNOPSIS**

On receipt of a complete application the next stage is that the application will be assessed by peer review. This will include two scrutineers at or above the grade applied for and from a background as close to the subject area of the synopsis/ applicant as practicable. The scrutineers then report back to the Membership Committee who will discuss the case and decide whether to invite you to commence writing up the full Technical Report. If you have not identified a Mentor the Committee will endeavour to identify a suitable candidate to act as your mentor. It is in your interests to identify a Mentor as per Section 2.5 above.

You can expect to hear the outcome within 2 weeks of the Committee date (the Committee typically meets 4 times per year March June September and December).

### 3. THE TECHNICAL REPORT

As mentioned previously it has to be stressed that the purpose of the TR is to establish equivalence to an accredited educational base and hence it is expected to be an ACADEMIC REPORT not focussing on professional ability or be a management report.

You should only commence writing up the full Technical Report once you have been assessed as above and advised to commence writing up. Any applicants choosing to ignore this requirement risk delaying their application or having it rejected and we wish to ensure that your time and ours is not wasted.

Once you have been approved to write up the TR you have a maximum of 2 years from the date of the letter advising you of this, to submit the full TR. This may be extended in exceptional circumstances at the Institute's discretion. The TR must be all your own work and you and your sponsor will have to sign the report to this effect.

#### 4.1 Format of the Technical Report

Where possible the format for the TR should be used:

**Title page:** Name, Address, Membership number, Report Title, Purpose of the report e.g. CEng application via the TRR, date

**Executive summary:** Summarise the main objectives and conclusions/ findings and achievements

**Contents page:**

**Introduction:** should clearly indicate what the report is about and demonstrate clearly your capabilities as a practising competent engineer/scientist

**Main body of the report:** can be sub-divided but has to show the application and understanding of engineering or scientific principles relevant to IOM3:

- each section should have a clear theme with ideas presented in a logical manner backed up by data, references or other sources
- keep to the subject of the report and avoid repetition. It is better to be concise than wordy
- ensure the report links in to the aims and objectives
- diagrammatical or graphical supporting information is welcome if it is relevant and the applicant is able to discuss this at interview
- any lengthy supporting calculations should be included as an Appendix

**Discussion:** this is where you develop and apply the arguments based on your materials, minerals or mining engineering and/or scientific knowledge as appropriate dependent on whether you are seeking ec<sup>uk</sup> or Science Council registration as well as Institute membership.

**Conclusions:** the applicant must be able to provide a considered opinion on their work linked in to engineering or scientific principles. Able to identify lessons learnt and recommend process or materials changes as a result of the work and implementation of these recommendations.

**Appendices:** should be limited to any calculations too lengthy for the body of the report or essential background data

In general the length of the TR will vary depending on the educational base of the applicant. The following guide should be taken as an **estimate only** and advice should be sought from the Institute and your mentor.

Educational base	Applying for	Report length ( words )
None relevant	IEng,CEng,CSci	7500
ND/NC	IEng	5000
	CEng or CSci	7500
HND/HNC	IEng	4000
	CEng or CSci	6000
BSc	CEng or CSci	2500
BEng	CEng or CSci	2000

#### 4.2 General rules for submission of the TR

- Report must be focussed and logical in presentation
- Care should be taken regarding spelling and grammar
- The maximum word count must be 7500. Reports over this may be rejected and returned for resubmission
- Report should be typewritten in English on double side A4 paper using double spacing and left unbound
- **You must sign at the end of your Technical Report under the statement:**

*I certify that this Technical Report is all my own work and a true and accurate statement.*

*Signed :*

*Date:*

#### **Your sponsor must authenticate your Technical Report under the statement:**

*I certify that I have read the Technical Report of (your name) and confirm that, to the best of my knowledge, it is his/her own work and a true and accurate statement.*

*Signed:*

*Date:*

- One copy to be submitted to the Institute to the address on page 9, within the 2 year period specified after approval of the synopsis

#### 4. THE NEXT STAGE

After submission of your Technical Report the Institute will identify two TRR “Academic” Interviewers who may be the same two members who acted as scrutineers of the synopsis. They will assess your full Technical Report and complete a TRR scrutineering report which will be returned to the Institute with their recommendations:

- Accept and proceed to Interviews
- to Reject outright
- to Reject but recommend changes which if made and TR resubmitted may lead to acceptance

You will be notified in writing at this stage of this outcome and any recommendations.

If you have been advised that you are being called for Interviews then the format for these will be:

- an Academic Interview to explore your depth and breadth of engineering ( for IEng or CEng) or scientific(for CSci) principles. This will always precede the Professional Review Interview (PRI) and if the interviewers deem you have not met the academic standards then you may not be asked to attend the PRI at this time
- a Professional Review Interview (PRI) which will explore your professional abilities and your engineering or scientific competences

These interviews will be held where possible on the same day and as local to you as possible, and both interview panels may be made up of the same members. It may not always be possible to hold both interviews on the same day or at a very local centre. You should come to the interviews well prepared and familiar with your application as you will be questioned in detail on this and related matters. The Institute would make a further charge for these interviews of £60 ( payable to the Institute of Materials Minerals and Mining) which needs to be paid before the date of the interview , unless arranged at very short notice , in which case payment on the day by cheque would be acceptable. If payment has not been received the Institute reserves the right to cancel the interviews.

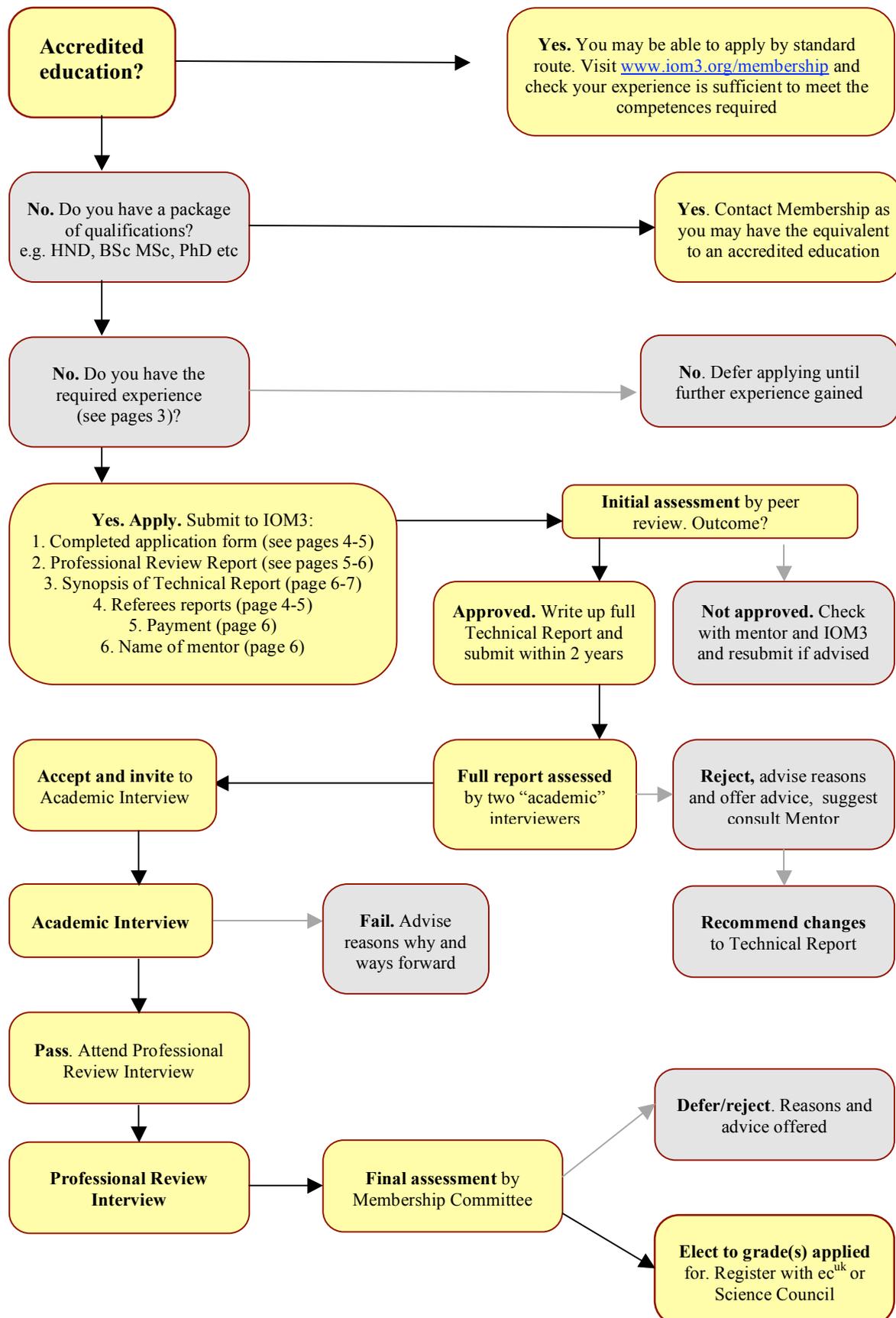
After these interviews your interview panel(s) will report back in writing to the Institute and your case will then be assessed in the standard way with the final decision made by the Membership Committee. After the case has been heard at the next Membership Committee meeting you will be written to within two weeks of the meeting with the outcome of your application. Should you be rejected you will be offered constructive advice but you have the right to appeal and details of the process can be provided at the time. If you are accepted the Institute will confirm registration with ec<sup>uk</sup> or the Science Council, as appropriate, and make any grade changes necessary, upon payment of any fees due.

**If you are unsure regarding any of the procedures included in this document then help is available from the Institute Membership Department as below or from your Mentor. We would recommend seeking help if you are not at all sure about any stage in the process before you commence.**

Membership Department  
Institute of Materials Minerals and Mining  
Stoke Regional Office  
Shelton House  
12 Stoke Road  
Stoke on Trent  
ST4 2DR  
UK  
Tel: + 44 (0) 1782 221704 email: [mal.shelley@iom3.org](mailto:mal.shelley@iom3.org)  
Website: [www.iom3.org](http://www.iom3.org)

## APPENDIX 1

### PROCESSES INVOLVED IN THE TECHNICAL REPORT ROUTE



## APPENDIX 2

### A GUIDE TO THE COMPETENCE AND COMMITMENT TO BE DEMONSTRATED FOR ASSOCIATE MEMBER (AIMMM) AND INCORPORATED ENGINEER (IEng)

Incorporated Engineers must be competent throughout their working life, by virtue of their education, training and experience, to:

<b>A.</b> Use a combination of general and specialised engineering knowledge and understanding to apply existing and emerging technology.	1. Maintain and extend a sound theoretical approach to the application of technology in engineering practice
	2. Use a sound evidence-based approach to problem-solving and contribute to continuous improvement
<b>B.</b> Apply appropriate theoretical and practical methods to design, develop, manufacture, construct, commission, operate and maintain engineering products, processes, systems and services.	1. Identify, review and select techniques, procedures and methods to undertake engineering tasks
	2. Contribute to the design and development of engineering solutions
	3. Implement design solutions and contribute to their evaluation
<b>C.</b> Provide technical and commercial management.	1. Plan for effective project implementation
	2. Manage the planning, budgeting and organisation of tasks, people and resources.
	3. Manage teams and develop staff to meet changing technical and managerial needs.
	4. Manage continuous quality improvement.
<b>D.</b> Demonstrate effective interpersonal skills	1. Communicate in English with others at all levels.
	2. Present and discuss proposals
	3. Demonstrate personal and social skills
<b>E.</b> Demonstrate a personal commitment to professional standards, recognising obligations to society, the profession and the environment.	1. Comply with relevant codes of conduct
	2. Manage and apply safe systems of work
	3. Undertake engineering activities in a way that contributes to sustainable development
	4. Carry out continuing professional development necessary to maintain and enhance competence in own area of practice.

These are expanded on the following pages.

- A Use a combination of general and specialised engineering knowledge and understanding to apply existing and emerging technology**
- A1 Maintain and extend a sound theoretical approach to the application of technology in engineering practice.**  
This could include an ability to:
- Identify the limits of own personal knowledge and skills
  - Strive to extend own technological capability
  - Broaden and deepen own knowledge base through new applications and techniques
- A.2 Use a sound evidence-based approach to problem-solving and contribute to continuous improvement**  
This could include an ability to:
- Establish users' requirements for improvement
  - Use marketing intelligence and knowledge of technological developments to promote and improve the effectiveness of engineering products, systems and services
  - Contribute to the evaluation and development of continuous improvement systems
- B Apply appropriate theoretical and practical methods to design, develop, manufacture, construct, commission, operate and maintain engineering products, processes, systems and services**
- B.1 Identify, review and select techniques, procedures and methods to undertake engineering tasks.**  
This could include an ability to:
- Select a review methodology
  - Review the potential for enhancing engineering products, processes, systems and services, using evidence from best practice
  - Establish an action plan to implement the results of the review
- B.2 Contribute to the design and development of engineering solutions**  
This could include an ability to:
- Contribute to the identification and specification of design and development requirements for engineering products, processes, systems and services
  - Identify problems and evaluate possible engineering solutions to meet client needs
  - Contribute to the design of engineering solutions
- B.3 Implement design solutions and contribute to their evaluation**  
This could include an ability to:
- Secure the resources required for implementation
  - Implement design solutions, taking account of cost, quality, safety, reliability, appearance, fitness for purpose and environmental impact
  - Identify problems during implementation and take corrective action
  - Contribute to the evaluation of design solutions
  - Contribute to recommendations for improvement and actively learn from feedback on results
- C Provide technical and commercial management**
- C1 Plan for effective project implementation**  
This could include an ability to:
- Identify the factors affecting the project implementation
  - Prepare and agree implementation plans and method statements
  - Secure the necessary resources are secured and confirm roles in project team
  - Apply the necessary contractual arrangements with other stakeholders (client, subcontractors, suppliers, etc)

**C.2 Manage the planning, budgeting and organisation of tasks, people and resources**

This could include an ability to:

- Operate appropriate management systems
- Work to the agreed quality standards, programme and budget
- Manage work teams, coordinating project activities
- Identify variations from quality standards, programme and budgets and take corrective action
- Evaluate performance and recommend improvements

**C.3 Manage teams and develop staff to meet changing technical and managerial needs**

This could include an ability to:

- Agree objectives and work plans with teams and individuals
- Identify team and individual needs and plan for their development
- Lead and support team and individual development
- Assess team and individual performance and provide feedback

**C.4 Manage continuous quality improvement**

This could include an ability to:

- Ensure the application of quality management principles by team members and colleagues
- Manage operations to maintain quality standards
- Evaluate projects and make recommendations for improvement

**D Demonstrate effective interpersonal skills**

**D.1 Communicate in English with others at all levels**

This could include an ability to:

- Contribute to, chair and record meetings and discussions
- Prepare letters, documents and reports
- Exchange information and provide advice to technical and non-technical colleagues

**D.2 Present and discuss proposals**

This could include an ability to:

- Prepare and deliver appropriate presentations
- Lead and sustain debates with audiences
- Feed the results back to improve the proposals

**D.3 Demonstrate personal and social skills**

This could include an ability to:

- Know and manage own emotions, strengths and weaknesses
- Be aware of the needs and concerns of others
- Be confident and flexible in dealing with new and changing interpersonal situations
- Identify, agree and work towards collective goals
- Resolve conflicts and create, maintain and enhance productive working relationships

**E Demonstrate a personal commitment to professional standards, recognising obligations to society, the profession and the environment**

**E.1 Comply with relevant codes of conduct**

This could include an ability to:

- Comply with the rules of professional conduct of own professional body
- Work constructively within all relevant legislation and regulatory frameworks, including social and employment legislation

**E.2 Manage and apply safe systems of work**

This could include an ability to:

- Identify and take responsibility for own obligations for health, safety and welfare issues
- Ensure that systems satisfy health, safety and welfare requirements
- Develop and implement appropriate hazard identification and risk management systems
- Manage, evaluate and improve these systems

**E.3 Undertake engineering activities in a way that contributes to sustainable development**

This could include an ability to:

- Operate and act responsibly, taking account of the need to progress environmental, social and economic outcomes simultaneously
- Use imagination, creativity and innovation to provide products and services which maintain and enhance the quality of the environment and community, and meet financial objectives
- Understand and encourage stakeholder involvement

**E.4 Carry out continuing professional development necessary to maintain and enhance competence in own area of practice**

This could include an ability to:

- Undertake reviews of own development needs
- Prepare action plans to meet personal and organisational objectives
- Carry out planned (and unplanned) CPD activities
- Maintain evidence of competence development
- Evaluate CPD outcomes against the action plans
- Assist others with their own CPD

### APPENDIX 3

#### A GUIDE TO THE COMPETENCE AND COMMITMENT TO BE DEMONSTRATED FOR PROFESSIONAL MEMBER (MIMMM) OR FELLOW (FIMMM) AND CHARTERED ENGINEER (CEng)

Chartered Engineers must be competent throughout their working life, by virtue of their education, training and experience, to:

<b>A.</b> Use a combination of general and specialised engineering knowledge and understanding to optimise the application of existing and emerging technology.	1. Maintain and extend a sound theoretical approach in enabling the introduction and exploitation of new and advancing technology and other relevant developments
	2. Engage in the creative and innovative development of engineering technology and continuous improvement systems
<b>B.</b> Apply appropriate theoretical and practical methods to the analysis and solution of engineering problems.	1. Identify potential projects and opportunities
	2. Conduct appropriate research, and undertake design and development of engineering solutions
	3. Implement design solutions and evaluate their effectiveness
<b>C.</b> Provide technical and commercial leadership.	1. Plan for effective project implementation
	2. Plan, budget, organise, direct and control tasks, people and resources.
	3. Lead teams and develop staff to meet changing technical and managerial needs.
	4. Bring about continuous improvement through quality management.
<b>D.</b> Demonstrate effective interpersonal skills	1. Communicate in English with others at all levels.
	2. Present and discuss proposals
	3. Demonstrate personal and social skills
<b>E.</b> Demonstrate a personal commitment to professional standards, recognising obligations to society, the profession and the environment.	1. Comply with relevant codes of conduct
	2. Manage and apply safe systems of work
	3. Undertake engineering activities in a way that contributes to sustainable development
	4. Carry out continuing professional development necessary to maintain and enhance competence in own area of practice.

These are expanded on the following pages.

- A Use a combination of general and specialised engineering knowledge and understanding to optimise the application of existing and emerging technology**
- A1 Maintain and extend a sound theoretical approach in enabling the introduction and exploitation of new and advancing technology and other relevant developments.**  
This could include an ability to:
- Identify the limits of own personal knowledge and skills
  - Strive to extend own technological capability
  - Broaden and deepen own knowledge base through research and experimentation
- A.2 Engage in the creative and innovative development of engineering technology and continuous improvement systems**  
This could include an ability to:
- Establish users' needs
  - Assess marketing needs and contribute to marketing strategies
  - Identify constraints and exploit opportunities for the development and transfer of technology within own chosen field
  - Promote new applications when appropriate
  - Secure the necessary intellectual property rights
  - Develop and evaluate continuous improvement systems
- B Apply appropriate theoretical and practical methods to the analysis and solution of engineering problems**
- B.1 Identify potential projects and opportunities**  
This could include an ability to:
- Explore the territory within own responsibility for new opportunities
  - Review the potential for enhancing engineering products, processes, systems and services
  - Use own knowledge of the employer's position to assess the viability of opportunities
- B.2 Conduct appropriate research, and undertake design and development of engineering solutions**  
This could include an ability to:
- Identify and agree appropriate research methodologies
  - Assemble the necessary resources
  - Carry out the necessary tests
  - Collect, analyse and evaluate the relevant data
  - Draft, present and agree design recommendations
  - Undertake engineering design
- B.3 Implement design solutions and evaluate their effectiveness**  
This could include an ability to:
- Ensure that the application of the design results in the appropriate practical outcome
  - Identify the required cost, quality, safety, reliability, appearance, fitness for purpose and environmental impact of the outcome
  - Determine the criteria for evaluating the design solutions
  - Evaluate the outcome against the original specification
  - Actively learn from feedback on results to improve future design solutions and build best practice
- C Provide technical and commercial leadership**
- C1 Plan for effective project implementation**  
This could include an ability to:
- Identify the factors affecting the project implementation
  - Lead on preparing and agreeing implementation plans and method statements
  - Ensure that the necessary resources are secured and brief the project team
  - Negotiate the necessary contractual arrangements with other stakeholders (client, subcontractors, suppliers, etc)

- 
- C.2 Plan, budget, organise, direct and control tasks, people and resources**

This could include an ability to:

- Set up appropriate management systems
- Agree quality standards, programme and budget
- Organise and lead work teams, coordinating project activities
- Ensure that variations from quality standards, programme and budgets are identified and that corrective action is taken
- Gather and evaluate feedback and recommend improvements

- C.3 Lead teams and develop staff to meet changing technical and managerial needs**

This could include an ability to:

- Agree objectives and work plans with teams and individuals
- Identify team and individual needs and plan for their development
- Lead and support team and individual development
- Assess team and individual performance and provide feedback

- C.4 Bring about continuous improvement through quality management**

This could include an ability to:

- Promote quality throughout the organisation and its customer and supplier networks
- Develop and maintain operations to meet quality standards
- Direct project evaluation and propose recommendations for improvement

- D Demonstrate effective interpersonal skills**
- D.1 Communicate in English with others at all levels**

This could include an ability to:

- Contribute to, chair and record meetings and discussions
- Prepare letters, documents and reports
- Exchange information and provide advice to technical and non-technical colleagues

- D.2 Present and discuss proposals**

This could include an ability to:

- Prepare and deliver appropriate presentations
- Lead and sustain debates with audiences
- Feed the results back to improve the proposals

- D.3 Demonstrate personal and social skills**

This could include an ability to:

- Know and manage own emotions, strengths and weaknesses
- Be aware of the needs and concerns of others
- Be confident and flexible in dealing with new and changing interpersonal situations
- Identify, agree and work towards collective goals
- Resolve conflicts and create, maintain and enhance productive working relationships

- E Demonstrate a personal commitment to professional standards, recognising obligations to society, the profession and the environment**
- E.1 Comply with relevant codes of conduct**

This could include an ability to:

- Comply with the rules of professional conduct of own professional body
- Work constructively within all relevant legislation and regulatory frameworks, including social and employment legislation

- E.2 Manage and apply safe systems of work**

This could include an ability to:

- Identify and take responsibility for own obligations for health, safety and welfare issues
- Ensure that systems satisfy health, safety and welfare requirements
- Develop and implement appropriate hazard identification and risk management systems
- Manage, evaluate and improve these systems

**E.3 Undertake engineering activities in a way that contributes to sustainable development**

This could include an ability to:

- Operate and act responsibly, taking account of the need to progress environmental, social and economic outcomes simultaneously
- Use imagination, creativity and innovation to provide products and services which maintain and enhance the quality of the environment and community, and meet financial objectives
- Understand and encourage stakeholder involvement

**E.4 Carry out continuing professional development necessary to maintain and enhance competence in own area of practice**

This could include an ability to:

- Undertake reviews of own development needs
- Prepare action plans to meet personal and organisational objectives
- Carry out planned (and unplanned) CPD activities
- Maintain evidence of competence development
- Evaluate CPD outcomes against the action plans
- Assist others with their own CPD

## APPENDIX 4

### **A GUIDE TO THE COMPETENCE AND COMMITMENT TO BE DEMONSTRATED FOR PROFESSIONAL MEMBER (MIMMM) AND CHARTERED SCIENTIST (CSci)**

**A MIMMM CSci must be competent throughout their professional lives using a combination of their knowledge, training and experience to be able to:**

- A Deal with complex scientific issues, both systematically and creatively, make sound judgements in the absence of complete data and communicate their conclusions clearly to specialist and non specialist audiences.**
- A1 Use a combination of general and experiential knowledge, understanding and skills to be able to optimise and engage in the application of existing and emerging science and technology. Typically, this will include the ability and commitment to:
- Identify potential projects and opportunities through a knowledge of the field of practice and current market needs
  - Conduct appropriate research to enable the design and development of scientific projects/processes
  - Know and manage personal strengths and weaknesses
  - Identify the limits of own personal knowledge and skills
  - Be confident and flexible in dealing with new and changing situations
- A2 Use theoretical and practical methods in the analysis and solution of problems. Typically, this will include the ability and commitment to:
- Carry out experimental work and/or advise on and manage the work of others.
  - Collect, analyse and evaluate relevant data and offer solutions
- A3 Communicate effectively. Typically, this will include the ability and commitment to:
- Present solutions to technical and non-scientific audiences
  - Communicate with colleagues at all levels
  - Exchange information and give advice to scientific and non-scientific audiences
  - Prepare and deliver appropriate presentations
  - Prepare letters, reports and proposals
- B Exercise self-direction and originality in solving problems, and exercise substantial personal autonomy in planning and implementing tasks at a professional level.**
- B1 Plan and organise projects effectively. Typically, this will include the ability and commitment to:
- Identify potential projects and opportunities through a knowledge of the field of practice and current market needs
  - Identify factors affecting project implementation
  - Ensure the necessary resources are in place for effective project implementation
  - Gather and evaluate feedback, acting where appropriate
- B2 Work effectively in a team. Typically, this will include the ability and commitment to:
- Organise and lead work teams, coordinating project activities
  - Identify, agree and work towards collective goals
  - Create, maintain and enhance productive working relationships
  - Be aware of the needs and concerns of others
- B3 Use effective influencing and negotiating skills. Typically, this will include the ability and commitment to:
- Conduct appropriate research to influence the design and development of scientific projects and processes
  - Have sound knowledge of project costs and the ability to negotiate appropriate project funding

**C Continue to advance their knowledge, understanding and competence to a high level.**

**C1 Demonstrate a commitment to CPD**

Typically, this will include a commitment to:

- Extend own knowledge, understanding and scientific capability
- Broaden own knowledge base
- Undertake reviews on own development needs
- Maintain evidence of professional competence development

**C2 Demonstrate an understanding and commitment to Health & Safety and environmental issues related to employment.**

Typically, this will include the ability and commitment to:

- Operate and act responsibly, taking account of environmental and socio-economic factors

**C3 Comply with the relevant codes of conduct.**

Typically, this will include the ability and commitment to:

- Comply with the rules of professional conduct of own professional body
- Work constructively within all relevant legislation and regulatory frameworks including social and employment legislation
- Apply professional work ethics