

Report for

The Metrology Society of Australia

**The Requirements for Professional Recognition
of Expert Metrologist**

by

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Contents

1. Introduction.....	3
2. Royal Charters and the Chartered Professional.....	3
3. Chartered Status in Australia.....	4
3.1 Obtain a Royal Charter	5
3.2 Affiliate with an existing Chartered organisation.....	5
3.3 Issue Chartered designations without formal approval.....	6
4 An alternative title	8
5 Implementation	8
5.1 Professional competence.....	8
5.1.1 Formal Qualifications	9
5.1.2 Experience.....	9
5.1.3 Personal and professional qualities.....	9
6 Summary and recommendations.....	10

1. Introduction

A proposal to introduce a **Chartered Metrologist** designation to the membership categories of the Metrology Society of Australia (MSA) was made by the Society's president (Dr Daniel Burke) in the April 2011 edition of *The Australian Metrologist*.

The president highlighted the complexity of metrology and observed that the general community is either unable or unwilling to deal with measurement issues. He pointed out that in many other fields facing similar problems, the solution is for the community to delegate complex issues to acknowledged experts (lawyers, engineers, surgeons, etc.). Professional associations or institutes, using independent and transparent systems that evaluate and endorse their members, typically assure the quality and expertise of these specialists.

The president argued that if a similar approach were adopted for Australian metrology, a system for ensuring and signifying the quality of metrologists would need to be established. This should be done by the MSA, as it is the only professional association for metrology in Australia. It follows that notwithstanding membership of the MSA is an important and fundamental qualification, there is a need for a mechanism within the MSA for recognising higher levels of metrological competence and expertise.

The president therefore proposed the introduction of a Chartered Metrologist category within the MSA. This would be evaluated by a panel of senior experienced metrologists as someone possessing the qualifications, experience, and capacity to perform high-level tasks such as reviewing measuring systems for traceability and fit-for-purpose uncertainty. The president hoped that by developing such a designation, the professional standing of metrologists in the community would be improved and the community would have confidence in engaging Chartered Metrologists to undertake complex measurement problems.

This report has been commissioned by the MSA to examine the implementation of such a system.

2. Royal Charters and the Chartered Professional

Samuel Johnson's Dictionary of the English Language published in 1828 includes a definition of a Charter, namely: "*A Charter is a written evidence of things done between man and man. Charters are divided into charters of the king, and charters of private persons. Charters of the king are those whereby the king passeth any grant to any person or more, or to any body politick.*" The Oxford Dictionary definition of Charter is a "*Written grant of rights (and privileges) by sovereign or legislature, especially creation of borough, company, etc.*". In this context, a Charter is also known as a Royal Charter.

The original purpose of a Royal Charter was to create public or private corporations (including towns and cities), and to define their privileges and purpose. Currently however most new Charters are granted to professional institutions and charities. These bodies must demonstrate pre-eminence, stability, and permanence in their

particular field. A Royal Charter changes a body from a collection of individuals into a single legal entity. Once incorporated by Royal Charter, amendments to the Charter and by-laws require government approval. According to the Privy Council, more than 900 organisations operate under a Royal Charter in Great Britain.

One of the basic and exclusive privileges granted to a professional body given a Royal Charter is the right to grant Chartered status to selected members. These members are known as “Chartered professionals”. They are normally members who have gained a high level of competence in the relevant field of work and having the title “Chartered” signifies professional competency. Examples of Australian professional bodies with a Royal Charter that are therefore able to grant Chartered Status are the Institute of Chartered Accountants in Australia (ICAA) and Engineers Australia (EA). Chartered status is normally only awarded by organisations that have been incorporated under Royal Charter by the British Monarch, hence its prevalent use in the UK and Commonwealth countries.

A notable and relevant example is the Science Council in the UK, established by Royal Charter in 2003 with the object of advancing science and its applications for public benefit. It currently has 39 member organisations, including the Institute of Biomedical Science, the Institute of Measurement and Control, the Institute of Physics, the Royal Society of Chemistry and the Society for General Microbiology. The Science Council has a Chartered Scientist (CSci) designation, with over 15,000 scientists having achieved this status since its launch in 2004. Chartered Scientists are typically in senior scientific or managerial roles, with postgraduate qualifications and experience in applying their knowledge in their workplace. They work in a diversity of settings, from food science to environmental waste management, health psychology to nuclear physics, and mathematical modelling to chemical engineering.

It should also be noted that because of the prestige of the Chartered designation, some non-UK organisations issue Chartered designations without Royal or Parliamentary approval.

3. Chartered Status in Australia

A search of professional organisations currently granting Chartered Status in Australia reveals two categories; the first consists of Chartered organisations with an international membership, typically based in the UK, but able to grant Chartered status to members worldwide. For example, the Society for the Environment (SoE), based in the UK, is able to award the title Chartered Environmentalist (CEnv) to Australian members.

The second category consists of organisations based in Australia with their own Royal Charter, able to grant Chartered Status directly to its members. Engineers Australia (EA) was granted a Royal Charter in 1910 and grants Chartered Status to 3 different occupational groups; and the Royal Australian Chemical Institute (RACI), granted Royal Charter in 1931, has both Chartered Member and Chartered Fellow designations.

There are therefore only three ways the MSA could grant Chartered Status to its members; (Option 1) obtain its own royal Charter, (Option 2) affiliate with an

organisation that already has a Royal Charter, (Option 3) issue chartered designations without formal approval.

3.1 Obtain a Royal Charter

Royal Charters are granted by the sovereign on the advice of the Privy Council in the UK. The requirements an institution or organisation must satisfy to obtain its own Royal Charter are;

- (a) the institution concerned should comprise members of a unique profession, and should have as members most of the eligible field for membership, without significant overlap with other bodies.*
- (b) corporate members of the institution should be qualified to at least first degree level in a relevant discipline;*
- (c) the institution should be financially sound and able to demonstrate a track record of achievement over a number of years;*
- (d) incorporation by Charter is a form of Government regulation as future amendments to the Charter and by-laws of the body require Privy Council (i.e. Government) approval. There therefore needs to be a convincing case that it would be in the public interest to regulate the body in this way;*
- (e) the institution is normally expected to be of substantial size (5,000 members or more).*

The main stumbling block for the MSA to become a Chartered Organisation is the requirement of substantial size. The RACI, for example, has over 6000 members and the EA has over 85,000 members, whereas the MSA counts its membership in the hundreds. This requirement makes it extremely unlikely that the MSA could obtain a Royal Charter. Additionally, there would be substantial resourcing required to apply for and maintain a Royal Charter as well as some loss of independence and organisational control.

3.2 Affiliate with an existing Chartered organisation

Affiliating with an existing organisation with a Royal Charter is another strategy, but finding the appropriate national or international organisation is a major problem. An important but difficult to satisfy requirement is that the Chartered organisation must be general enough to include the diversity of fields found in the MSA, including physics, chemistry, biology, engineering, and law. The Science Council mentioned above would be an ideal choice, but its membership is restricted to UK organisations. An extensive search of Australian and international scientific and professional organisations identified only two possible organisations, namely Engineers Australia and the Institute of Measurement and Control (IMC), based in the UK.

Engineers Australia (EA) is the national forum for the advancement of engineering and the professional development of its members. With more than 85,000 members embracing all disciplines of the engineering team, Engineers Australia is the largest and most diverse professional body for engineers in Australia.

The EA has a well-established and sophisticated system for granting chartered status to its members. The EA Director of Engineering Practice and Continuing Professional

Development (Mr John Anderson) was contacted with the aim of exploring the possibility of an affiliation between the MSA and EA. His comments below, while not the official position of the EA, illustrate some of the issues.

EA is essentially an individual based organisation concentrating on engineers only. It does not affiliate with other non-engineering organisations. Mr Anderson is currently investigating mechanisms by which the EA can be raised to the status of a learned body. He mentioned that the inclusion of organisations like the MSA would be consistent with this development, but that it was too early to say if this will eventuate. Even if the MSA were affiliated with the EA in this way, it would be unlikely that the EA would or could grant Chartered status to MSA members.

He also mentioned EA Technical Societies, which are a bridge between engineers and other practitioners, providing a forum for mutual technical development, networking, expanding, and sharing knowledge with like-minded professionals. Each Technical Society is governed by a committee, responsible to and under the direction of the EA. The EA Royal Charter and by-laws, regulations and policies bind EA technical societies. However, technical society members are not obliged to be members of Engineers Australia.

While it would be possible for the MSA to become an EA technical society, this would still not allow people to obtain chartered status without first becoming members of the EA, and membership of the EA for chemists, physicists, biologists, etc. would be problematical.

The **Institute of Measurement and Control**, based in the UK, was granted Royal Charter in 1975 for those engaged in the science and practice of measurement and control technology. The objects of the IMC, expressed in the Royal Charter, are:

"To promote for the public benefit, by all available means, the general advancement of the science and practice of measurement and control technology and its application."

The IMC is a licensed member of Engineering Council UK, registering candidates as chartered engineers, incorporated engineers, and engineering technicians. It also grants all of its members the title Chartered Measurement and Control Technologist (MInstMC). The criteria and procedures for these qualifications are underpinned by an ISO 9001:2008 certified quality management system. Membership is open to qualified people worldwide. Indeed there is an Institute of Measurement and Control New Zealand Inc. Nevertheless, the IMC does not have formal affiliations with international organisations, and the MSA would therefore be unable to affiliate and so grant chartered status. In addition, the IMC is primarily for those working in the automation and measurement and control industries.

3.3 Issue Chartered designations without formal approval.

This option is for the MSA to simply declare itself a Chartered Organisation while not actually being one. This option is unethical and deceptive. Additionally, the MSA is an incorporated society in the State of Victoria, and as such is forbidden to use of the term "Chartered" if it does not have a Royal Charter by Section 3 of the Federal

Guidelines for Ministerial Consent to Body Corporate names under the corporations Act 2001.

Federal Guidelines for Ministerial Consent to Body Corporate, Section 3

3. WORDS SUGGESTING ROYAL PATRONAGE ETC.

**GUIDELINES FOR THE USE IN BODY CORPORATE NAMES OF THE WORD
'CHARTERED'**

Regulation

Subregulations 2B.6.01(2) and 5B.3.01(2) respectively of the Corporations Regulations provide that, for paragraphs 147(1)(c) and 601DC(1)(c) of the Corporations Act, a name is unacceptable for registration if it is unacceptable under the rules set out in Part 2 of Schedule 6 of the Regulations.

Rule 6203(b) provides that a name is unacceptable for registration if the name contains a word or phrase specified in an item in Schedule 6 of the Regulations, an abbreviation of that word or phrase, or a word or phrase or an abbreviation having the same or a similar meaning. Item 6306 in Part 3 of Schedule 6 specifies the word 'Chartered'.

The intention of this rule is to prevent bodies corporate giving the misleading impression that they have been created under Royal Charter.

Criteria for the Assessment of Applications

Consent will normally be granted to the use of the word 'Chartered' in a body corporate name where:

- (a) no misleading impression is given about the creation of the body corporate by Royal Charter; or*
- (b) the body corporate is very closely connected with a body corporate that has been incorporated by Royal Charter.*

This effectively prevents the MSA from arbitrarily changing its name to the Chartered Metrology Society of Australia and therefore using the word "Chartered" for a member designation.

4 An alternative title

Assuming that the MSA wishes to improve the professional standing and raise the profile of metrologists by developing a formal structure for signifying professional competence, it is apparent that using the term “Chartered” is problematical.

An alternative strategy is to simply to use another title. This title should be easily recognisable and blend well with “metrologist”. Examples include *expert, master, specialist, licensed, certified, qualified, distinguished, eminent, superior, and skilled*.

However, there is one designation already existing in the MSA that would be a suitable choice, namely that of “**Fellow**”. Fellows are the highest grade of membership of most professional or learned societies. The MSA has a Fellow grade that is described as “having either held a position of considerable responsibility for metrology activities or made a significant contribution to metrology”. This is not currently strong enough or described in sufficient detail to signify high levels of professional competence, but it would not be difficult to arrange. The medical professions use the “Fellow” designation in this way. For example, the FRACS suffix indicates a Fellow of the Royal Australian College of Surgeons demonstrating that the person has reached specified levels of skill and professional standards.

The term “Fellow” could therefore be used as an alternative to “Chartered” to provide the means by which the professional standing and awareness of the MSA and metrology in Australia is increased and professional competence is denoted.

5 Implementation

5.1 Professional competence

Regardless of which title is used, it will be essential that the MSA develop a detailed definition of professional competence in metrology and the means for assessing it. Such a definition would need to include levels of ability and skill, from the basic entry level to the highest level. This would then be used to frame the requirements for those with the highest levels of competence.

The EA, for example, has a set of competency standards used as the basis of assessment for chartered membership. These competency standards provide a benchmark against which the engineering profession may confirm that the engineering practitioner is capable of working unsupervised, independently or under general direction. The revised standard comprises sixteen Elements of Competence, none of which is optional. These Elements are each supported by a number of indicators of attainment, any of which might provide satisfactory evidence of the competence. The Elements include the comprehension and application of knowledge, problem analysis, professional conduct, communication, initiative, competence, and judgement. The system being introduced by EA is a complex one, involving sophisticated and non-prescriptive assessment methods, including online applications, interviews, and references and “blind” assessments by two assessors.

A **Chartered Physicist**, awarded by the Institute of Physics in the UK, must be appropriately qualified (an Master of Science or Master of Physics undergraduate

master's degree is standard, although experience leading to an equivalent level can be counted), have had a minimum of two years of structured training and a minimum of two years responsible work experience, have demonstrated a commitment to continuing professional development, and have gained a number of competencies.

The Institute of Chartered Accountants Australia requires a **Chartered Accountant** to hold a recognised degree, be employed in mentored accounting employment, and complete the Graduate Diploma of Chartered Accountants program. The latter program is organised and operated by the Institute. The program includes a mix of professional development modules and a module that integrates learning and develops skills, attitudes and professional competencies and the application of technical knowledge and strategic and critical thinking.

A survey of many other professional organisations shows that their requirements for those with high levels of competence are typically a combination of **formal qualifications, experience, personal and professional qualities**. It is suggested that the MSA definition of competence should include these elements. For simplicity, the following discussion of the elements of professional competence for metrologists and suggested assessment methods will use the term “Fellow” as the signifier of the highest levels of competence.

5.1.1 Formal Qualifications

A primary academic qualification is common to all professions. It is suggested that the MSA require a Fellow to have a science or engineering degree from a recognised institution in a relevant field. There should also be a minimum period of additional formal and successful professional development in a relevant metrological field and in the more generic fields such as uncertainty analysis, laboratory quality systems, trade measurement systems, and legal metrology.

5.1.2 Experience

It is suggested that a Fellow should have worked at the highest levels in a relevant field for a minimum period of time, probably somewhere between 2 – 5 years. Evidence of this work would need to be submitted.

5.1.3 Personal and professional qualities

It is suggested that a Fellow should be required to successfully complete professional development in fields such as time and project management, leadership, critical thinking, ethics, communication, creativity, etc. Evidence for these attributes would need to be submitted. Personal interviews could be considered as part of the assessment process.

6 Summary and recommendations

A system for ensuring and signifying the quality of metrologists needs to be established in Australia. It has been proposed that the best way for this to occur is for the MSA to introduce a Chartered Metrologist category.

Such a person should possess the qualifications, experience, and capacity to perform high-level tasks in metrology. The community should have confidence in such a person to resolve or comment on the most complex measuring issues in an independent and efficient manner.

The designation “Chartered” does indeed successfully indicate high levels of professional competence in many fields. However, the use of the term “Chartered Metrologist” by the MSA is problematical as it is subject to significant limitations and conditions. Modification of the existing term “Fellow” is therefore proposed as an alternative.

It is recommended that the MSA put this proposal to its members and if agreed to, should proceed by establishing a Working Party on this proposal.

The Working Party should define high-level competence in metrology and use this definition to develop and document the requirements for a Fellow of the MSA, based on formal qualifications, experience and personal and professional qualities. The Working Party should develop a system for evaluating prospective MSA Fellows.

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