

Competence Profiles – Guidance for applicants and Assessors

PART 2 – INDUSTRY CLASSIFICATION (U) – PROCESS INDUSTRIES

Introduction

To be able to appraise the competence and suitability of applicants in the process sector for election or transfer to Membership of the Institution, assessors will need to be aware of the major changes in that area which have taken place in recent years. These include:

- (a) Mergers and take-overs in the process industry: In some cases these have created large organisations covering a wide range of product formats and manufacturing processes. Such organisations are frequently trans-national with group management functions and local site operations. Such rationalisation, together with the increasingly European or global nature of regulatory standards across the sector, has driven the establishment and exchange of standardised best practice processes, specifications and operating principles, which have influenced engineer roles at both group and local level. Development engineering tends to be more focussed and operational engineers are engaged more in cost reduction and restructuring programmes with both areas closely geared to key business objectives.
- (b) The increasing use of automated plant: The drive to reduce operating costs whilst improving plant efficiency and asset utilisation has resulted in physically smaller but more complex and flexible process plants which deliver higher outputs with the capability to adapt quickly to market changes. This requires mechanical engineers involved in plant design, manufacture and operation to have a good knowledge of the application of associated technologies - such as electronics and controls. Roles may accordingly be highly technical but with little line management scope or broad with many interactions with other functions. Either may satisfy the professional requirements for membership.
- (c) Flatter organisations: In response to financial and regulatory pressures, all companies have introduced flatter management structures with responsibilities devolved down to smaller teams. Management and Project Engineering roles frequently cover several manufacturing sites and many firms merge mechanical and electrical engineering functions into one job at the operational level. A project management approach is used for both improvement and investment activities resulting in engineers working in, or leading, multi-functional teams. Assignments across numerous sites and countries are becoming increasingly the norm.
- (d) Contracting out: A reduction in permanent employees has resulted in more projects and maintenance work put out to contract. This can lessen the need for theoretical input from the engineer in charge but still requires practical knowledge and increases the need for commercial and management skills for both the contract engineer and the client.
- (e) Safety and Environment: There is increasing emphasis on safety and environmental awareness as part of the mechanical engineer's responsibilities, particularly with respect to current UK and EU regulations and standards. Formal risk assessments are an important and regular part of the mechanical engineer's function. It is important for assessors to satisfy themselves that an applicant is aware of the social and environmental implications of his/her actions.

Requirements for election or transfer to member

Within the Process Industry sector, the following work areas are likely to involve the application of a significant level of professional engineering expertise: -

1. Development Engineering (of new processes and plant)
2. Project Engineering (design, installation and commissioning of new process plant)
3. Operations
4. Maintenance and Reliability

Applicants for Membership of the Institution may have experience of one or more of the above work areas. The competence requirements for Member status in each must take into consideration the conditions within the particular process industry as roles and responsibilities vary widely.

Departmental heads in each of these areas will normally satisfy the professional criteria but subordinate roles may require more detailed assessment. Typical role titles are:

- Development Engineer
- Engineering/ Project Manager
- Project Engineer or Senior Project Engineer
- Shift Engineer
- Operations Engineer
- Area Maintenance Engineer

Development Engineers may work on processes or plant design and frequently transcend the border between mechanical and chemical engineer. They may have limited opportunities for managing others but a more detailed technical brief. Their ability to work closely with, and influence, other functions would be important in establishing professional credentials

Engineering or Project Managers usually have responsibility for developing, justifying and implementing major projects and so have extensive management experience built upon an engineering background. Evidence of ability to exercise significant technical judgement would be important to their application.

Project Engineers operate at a more detail level and are often industry specialists e.g. food or technology based e.g. packaging. The difference between technician and professional status is often a function of the level of responsibility and authority to make decisions.

Shift Engineers and Operational Engineers usually manage teams of technicians and operators and have some responsibility for assets within a short-term time horizon. At the professional level, involvement in strategic planning or wider responsibility for efficiency improvements would be important.

Maintenance Engineers also work with teams of technicians in sustaining reliable plant. Evidence of developing maintenance and/or asset management strategies to meet business objectives would be necessary for professional status.

Assessment of Competence's

Roles and responsibilities within an organisation vary considerably dependent upon the industry, the scale of company/group and the size of the operating unit.

It is important to establish the organisation structure and reporting links to take a view on levels of responsibility and interaction with other functions of the business, especially where matrix management systems are employed.

Competence statements A & B

Successful applicants will be able to demonstrate a combination of general and specialist engineering knowledge and the ability to optimise process applications through exploitation of emerging technologies and a practical knowledge of what makes processes work.

Those engaged in development or project engineering should be expected to have responsibility for developing original technical specifications together with the use of sound practical experience to adapt and develop new plant and equipment to meet operational requirements.

Operational and maintenance engineers should be involved in the evaluation and monitoring of technical solutions against defined targets and demonstrate creative problem solving with a sound appreciation of engineering principles.

Examples which satisfy these requirements are :-

- Design/development of new processes or process plant using research generated data and pilot scale trials to establish an original solution to a defined business need
- Significant plant modifications / refurbishment resulting in a process change or performance enhancement
- Plant performance assessments leading to proposals for improved efficiency or reduced costs
- Successful problem solving on a major plant breakdown or malfunction using first principles

Competence statements C

Development of new processes requires a logical progression of thought and careful planning. Where applicable, the control of staff and their training must be shown to be effective.

Engineers involved in projects and large scale plant outage works may undertake plans for others to implement or be engaged in managing the installation, rectification and commissioning phases. In either case, successful co-ordination of all involved parties must be demonstrated together with a structured approach to controlling budgets, timescales and information.

Applicants would be expected to have a high degree of autonomy in planning and monitoring the activities under their control and demonstrate an ability to achieve defined results.

In all cases a professional engineer will need to assess the competence of staff and contractors employed to carry out the work defined safely and successfully and invoke suitable training where appropriate.

Examples which satisfy these requirements are :-

- Planning and supervision of plant outages and maintenance projects
- Leading, or active participation in, design reviews for new process plant
- Project management of a the engineering aspects of a new facility or significant process change
- Planning the implementation of a new maintenance strategy for existing plant
- Instigating a programme of upgrading the skills of junior engineers or technicians engaged in projects, plant operations or maintenance

Competence Statement D

Communications and IPS may be assessed from the presentation of the Professional Review Report and the interview. Written communications should be well structured, concise and develop the portfolio of evidence with well-chosen examples.

Verbal communications should illustrate an ability to explain and clarify technical concepts without unnecessary detail or jargon and with an understanding of the recipient's knowledge of the subject. This may be backed up by evidence of presentations to management or client groups

Evidence of an ability to work effectively in project groups or review teams should be demonstrated along with involvement in contract negotiations or workplace discussions such as the establishment of safe working procedures.

Competence statement E

Applicants should illustrate an awareness of the increasing need for compliance with national and international standards and regulations covering the design, manufacture and continued use of process plant and equipment. They should be able to show familiarity with the applicable codes for their particular industry and a commitment to observing and promoting them.

Commitment to on-going development of the candidate's own competence should be illustrated by a structured personal Development Action Plan covering CPD and career targets together with a willingness to support the profession through liaison with other professional engineers or the encouragement / development of young people.

Election or transfer to Fellow

From the achievement of corporate status, if a progressive development programme is followed it is not unreasonable for a candidate to qualify for promotion to fellow within 8 to 10 years.

It would be expected that the candidate would have sufficient knowledge and experience to be able to influence, or be regarded as an authority in, the process field concerned. This may be applied through active links with similar fields in the industry.

Applicants would hold a senior post within their organisation and have significant responsibility for resources (financial and human) and for strategic and commercial decisions.