



applying for



A Guide to Applying for  
Professional Simulation Engineer Certification





PSE (Professional Simulation Engineer) Certification allows engineers and analysts within the international simulation community to demonstrate competencies acquired throughout their professional career. Independently assessed by NAFEMS, the international association of the engineering analysis, modelling and simulation community, the certification enables individuals to gain recognition for their level of competency and experience as well as enabling industry to identify suitable and qualified personnel.

The Certification incorporates an extensive range of competencies across various analysis types. It is multi-level, supporting the philosophy of lifelong learning and continuous professional development. PSE Certification is suitable for both experienced engineers/analysts and those in the early stages of their professional career.

Providing a standard of competency for the international simulation community, successful applicants receive recognition as a Professional Simulation Engineer (PSE) at Entry, Standard or Advanced Level. As competencies are developed, PSEs will advance to the next level.

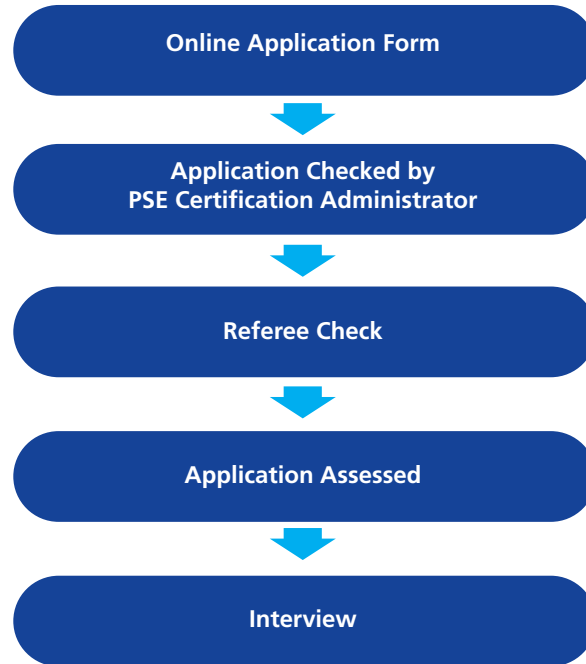
# introduction

This document contains all of the necessary information in order to apply for PSE (Professional Simulation Engineer) Certification. It is important that applicants understand the current requirements for becoming a certified Professional Simulation Engineer. Applicants should be confident that they meet these requirements before making an application. These guidance notes will clearly outline what is required and will provide useful examples for applicants' reference.

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# PSE certification application process

In summary the application process is as follows:



# PSE certification online form

The following pages detail the various items of information that applicants must supply within the online form in order to demonstrate the appropriate PSE competencies.

## personal details

### **Applicants are required to provide the following personal details:**

- Surname (Family Name)
- Other Names (Forenames/First Names)
- Title (please select from the drop down list provided)
- Home Address
- Home telephone number
- Cell / Mobile phone number
- Personal email address
- Nationality
- Gender

### **Applicants are required to provide current employment details including:**

- Position currently held
- Organisation / company name
- Business postal address
- Business telephone number
- Work email address

# referees

It is the applicant's responsibility to secure the consent of at least two referees to their names being given before the application is submitted. The referees will be confirming the applicant has acquired the competencies claimed.

For the experienced analyst whose career spans several companies, applicants should nominate sufficient referees (by selecting the 'Add Referee' tab on the online application) to ensure that all entries of workplace competencies and performance are covered.

Referees must be of high professional standing. For example, in Europe the professional qualification Eur. Ing., in the USA Professional Engineer / P.E. and in the UK Chartered Engineer / C.Eng, or their equivalent would be appropriate.

The referees provided in the PSE Certification application may be contacted by NAFEMS and asked to confirm that they are aware of the application and are willing to confirm relevant details and competencies claimed in the application.

## **For each referee the following is required:-**

- Full name of the referee.
- Any academic qualifications gained during the referee's lifetime.
- Any professional qualifications gained during the referee's lifetime.
- The relationship between the applicant and the referee.
- Full postal address of referee, **including contact telephone number and email address.**

**The referees provided in the application may be contacted by the NAFEMS office and asked to confirm that they are aware of the application and that they are able to attest relevant details and competencies provided in the application.**

# education

Although a degree is not mandatory, applicants must possess the foundation knowledge of a first degree or equivalent. They are generally expected to have undertaken a minimum level of further training and attendance at courses, seminars and workshops aimed at increasing general background engineering knowledge and, especially, the knowledge of the theory associated with numerical analysis and its application to practical engineering problems.

Recognising that some academic institutions give relevant courses at undergraduate and postgraduate level covering basic aspects of the theory associated with numerical analysis and its application to practical engineering problems, the certification scheme allows an applicant to claim recognition for such courses.

Through the breadth and depth of their experience some analysts may well prove they have an adequate understanding of underlying theory, thus meeting this fundamental requirement of PSE Certification.

## **The following information is required:-**

- Title of award, e.g. BSc Hons, Dipl. Ing, BTec, etc.
- Subject title of degree/diploma, etc.
- Grade or class of degree/diploma, etc.
- Date the award was completed/given.
- Name of the establishment who granted the award.

# professional qualifications

Applicants should provide details of any memberships they may have of professional bodies.

**When stating membership of a professional body or association, the following information is required:-**

- The name of the professional body, e.g. AIAA (The American Institute of Aeronautics and Astronautics), IMechE (Institution of Mechanical Engineers), VDI (Verein Deutscher Ingenieure – the Association of German Engineers) etc.
- The grade of membership, e.g.P.E, C.Eng, Fellow.
- The date that membership was confirmed.
- The method of entry, i.e. normal admission, special examination, exemption, etc.
- If an examination took place, details of the subjects covered in the examination.
- Referee that can be contacted for attestation of the professional qualifications gained.

# training

Applicants must provide details of any relevant external courses that they have attended that have contributed to their Continuing Professional Development (CPD).This may include vendor/software courses, NAFEMS training courses or any other courses undertaken.

University courses leading to the award of a formal qualification should be included in the 'Education' tab.



## career summary

### **A summary of the applicant's career is also required, including:**

- Date started in the role and date position left. For current role, state 'to date'.
- The job title, occupation or position held during that time.
- A brief list of bullet points detailing the main activities and responsibilities for each role.
- Organisation / company name.
- Type of business / industry sector.
- Employer postal address.
- Employer telephone number.
- Company website.

Add separate entries for each relevant post occupied, starting from the most recent position.

# simulation experience

PSE Certification requires applicants to be competent in the Technical Areas included. At the heart of the system is a requirement that these competencies have been developed in an industrial environment.

Applicants should complete the table, noting that there is a requirement to make the link between analysis type and product type (see appendix) and the level claimed in simulation areas.

The information supplied in this table should be sufficient to satisfy the assessors that the competencies claimed by the applicant are reasonable in terms of:

## Analysis Type (from list below)

- Core Finite Element Analysis
- Mechanics, Elasticity and Strength of Materials
- Materials for Analysis and Simulation
- Fatigue
- Flaw Assessment and Fracture Mechanics
- Nonlinear Geometric Effects and Contact
- Beams, Membranes, Plates and Shells
- Dynamics and Vibration
- Optimisation
- Plasticity
- Core Computational Fluid Dynamics
- Thermo-Mechanical Behaviour
- Management General
- Verification and Validation
- PLM Integration and CAD-CAE Collaboration
- Simulation Process & Data Management
- Buckling and Instability
- Multi-physics Analysis
- Composite Materials and Structures
- Fundamentals of Flow, Porous Media, Heat Transfer
- Creep and Time-Dependency
- Multi-Scale Analysis
- Probabilistic Analysis
- Noise, Acoustics and Vibro-Acoustics
- Electromagnetics
- Multi-body Dynamics

**Software used** (e.g. the name of the FEA, CFD etc. commercial packages)

**Product types worked with** (e.g. pressure vessels, aircraft landing gear, bridges etc.)

**Please note:**

- Client details do not have to be divulged if confidentiality is an issue.
- Simulation experience directly links to applicants' requested competencies claimed. Applicants' competencies claimed should not contain any analysis types not covered in this table, for example.
- Given the competencies required for the various analysis types, it is not expected that an analysis type be included in the competencies claimed, purely on the basis of a single project, lasting a few weeks, for example.
- The point above also applies for both product type and software tools, where competencies are being claimed.

## competencies claimed

Click the dropdown box to select the technical area, then the level being claimed (Entry, Standard or Advanced) and then choose the appropriate statements – this will then be the applicant's competencies claimed for this particular simulation area.

Please note that competencies claimed should be advised for simulation areas, generic product types and software tools, by selecting the appropriate competency statements.

### GENERIC STATEMENTS (applicable to all analysis types included within competencies claimed)

- The competencies on the following pages provide the basis for the NAFEMS Professional Simulation Engineer Certification.
- At the present time, the various competencies of the scheme will be attested to by suitable referees supported by online interview. In the future, these competencies may also be assessed by formal examination.

# PSE competency statements

For the range of analysis types covered by the applicant's Competencies claimed, employ available software tools in an effective manner, under the supervision of a person(s) with appropriate competency in these analysis and product types.	Entry	Referee-attestation
For the range of analysis types covered by the applicant's Competencies claimed, have sufficient knowledge and comprehension of theory to allow safe and effective use of application software tools, as specified by the competency statements at STANDARD and ADVANCED level in the relevant PSE Competency technical areas.	Standard	Self-attestation
For the range of analysis types and product types covered by the applicant's Competencies claimed, employ available software tools in a safe and effective manner, without supervision.	Standard	Referee-attestation
For the range of analysis types and product types covered by the applicant's Competencies claimed, conduct appropriate engineering analysis of the results from simulation, without supervision.	Standard	Referee-attestation
For the range of analysis types and product types covered by the applicant's Competencies claimed, plan analysis strategies and validation studies for simulation, without supervision.	Standard	Referee-attestation

<p><b>For the range of analysis types covered by the applicant's requested Competencies claimed,</b> have sufficient knowledge and comprehension of theory to allow safe and effective use of application software tools, as specified by the competency statements at STANDARD and ADVANCED level in the relevant PSE Competency technical areas.</p>	Advanced	Self-attestation
<p><b>For the range of analysis types and product types covered by the applicant's Competencies claimed,</b> employ available software tools in a safe and effective manner, without supervision.</p>	Advanced	Referee-attestation
<p><b>For the range of analysis types and product types covered by the applicant's Competencies claimed,</b> conduct appropriate engineering analysis of the results from simulation, without supervision.</p>	Advanced	Referee-attestation
<p><b>For the range of analysis types and product types covered by the applicant's Competencies claimed,</b> plan analysis strategies and validation studies for simulation, without supervision.</p>	Advanced	Referee-attestation
<p><b>For the range of analysis types covered by the applicant's Competencies claimed,</b> provide effective advice on all aspects of simulation, including theory, application, hardware &amp; software infrastructure and staff development.</p>	Advanced	Referee-attestation

# assessment

Once applicants have completed the online application form, the PSE Certification Administrator will then check the application form for completeness and consistency. Applicants will receive a note from the NAFEMS office confirming receipt of the form and advising of the approximate timeline for their application.

The Administrator will check with the referees supplied that they are aware of applicant's submission and support their application for NAFEMS Professional Simulation Engineer Certification.

Applications will be forwarded to two independent PSE Certification Assessors who will assess the competencies claimed against the experience noted. Assessors will check the matrix linking competencies claimed and experience, however the referees supplied in the application will be attesting to the relevant high level competency statements.

An interview will then be arranged by the Administrator, with the applicants and the assessors, at a convenient time. This interview may be undertaken by telephone, video call over the web, or in person where possible.

Following the interview, the assessors will make their final recommendation for the PSE Certification application and this will then be discussed with the PSE Certification Coordinator. The PSE assessors will make one of four recommendations. These are: recommend successful application and grant certification; defer with guidance regarding submission; not recommended or more information requested. NAFEMS will be advised of the results and applicants will receive notification accordingly. If the applicant has not been recommended for certification by the assessors, feedback will be given to assist with future applications. If successful, applicants will receive a certificate, including details of competencies gained and assessed and their name will be entered into the Record of Certified PSEs.

# the interview

Interviews are a vital part of Professional Simulation Engineer Certification. The purpose of the interview is to give the NAFEMS Assessors a chance to assess applicants suitability for the certification, at the level applied for and the competencies claimed.

Once applications are processed by NAFEMS, applicants will be invited to attend an interview. The PSE Certification Administrator will contact the applicant to arrange a convenient time.

## **What is it?**

The interview is based on the information provided in the online application and is used to determine the level of competency demonstrated. Applicants should prepare for the interview by reading through their application form thoroughly.

The interviewers will focus on the most recent and relevant experience. Judgements will be based solely on the information provided in the application form and the applicant's performance and discussions during the interview.

## **Who will be there?**

Two trained and experienced assessors, PSE Certified at Advanced Level, will conduct the interview. The PSE Certification Administrator will also be present. Assessors are experts in numerical analysis over a broad range of topic areas and disciplines. They will be professionals with many years of experience in FEA, CFD and related disciplines. They may not necessarily be matched to the applicant's industry sector or area of expertise, but will give a very brief introduction of themselves for the applicant's benefit before the interview.

The PSE Certification Administrator is an experienced representative assisting with the co-ordination of applications and the smooth running of the interview process. They will ensure that standards are maintained and interviews are conducted fairly and consistently. The Administrator will have been in contact with applicants prior to interview and will answer any questions they have regarding the process.

**How long does it take?**

The interview will take approximately 45 minutes.

**What is the format?**

The interview will take place by teleconference call, via video call over the web or in person, depending on the location of the applicant.

The interview is a discussion between peers, designed to evaluate and assess the applicant's level of competency. As in any interview, there are no trick questions based on the applicant's individual contribution opposed to the overall contribution of a team or department.

Applicants are expected to play a leading role in the discussion, and provide detailed and specific answers about actual events to demonstrate their competencies. They may also be asked to expand on some of their answers, and highlight how processes or tasks might have been done differently.

Applicants are encouraged to develop answers and explain things clearly and concisely. Answers should be structured to demonstrate good communication skills. Applicants should also avoid the use of acronyms, company jargon or slang.

Applicants can expect a level of technical questioning. Interview panel members may take the opportunity to develop a particular technical issue or aspect of their responsibilities. This could take the form of an in-depth question-and-answer exchange of the engineering principles involved, or the development of an innovative process review to establish applicants' theoretical understanding of the issues concerned.

Applicants can bring supporting evidence to back up any discussion, but should be aware of the time constraints. They may find items such as technical drawings, photographs, sketches, calculations and design drawings can quickly clarify a technical point.

Applicants may wish to also provide samples of work at interview; this will supply the basis for exploring experience. The relevant scope statement, analysis types and level (entry, standard and advanced) will provide the basis for theoretical understanding. Interview questions will be based on any of the detailed technical area competencies claimed.



NAFEMS recognises that there is an increasing use of technology within the engineering industry. When assessing someone who employs a significant amount of technology in their role, interviewers will seek evidence that the technology, program or software is being applied in an engineering environment. For example, design engineering, testing and assessment of equipment or processes, product development. In this case it is essential that the evidence supports the application of engineering, skills and expertise to develop the product or process. Examples can include CAD and CAE engineers, computer modellers, IT engineers, CFD specialist and stress, metallurgical or thermodynamic analysts.

The final few minutes of the interview are thrown open to applicants. This is their opportunity to talk about anything that they think is important to their application, that has not yet been mentioned.

### **what happens next?**

The PSE assessors will make one of four recommendations. These are: recommend successful application and grant certification; defer with guidance regarding submission; not recommend; or more information requested.

Neither the Administrator nor the Assessors are able to advise applicants about the decision that they make, as their recommendation must be approved by the PSE Certification Coordinator.

If applicants are successful, they will receive a letter and a certificate from the NAFEMS Chief Executive confirming their achievement. Their name will then be included in the Record of Certified Professional Simulation Engineers, located on the NAFEMS website.

Unsuccessful applicants will be written to with an explanation and reason for the decision. They will also be given some guidance as to how they may wish to address the concerns raised, in order to resubmit their application at a later date.

Any applicant can request a copy of their interview paperwork, scores and feedback.

NAFEMS has an arbitration and appeals process, whereby applicants who are dissatisfied with the process may appeal within a given timeframe. All documentation will be made available to the Arbitration Panel for their consideration. More information about this process is available on request.

## entry-level PSEs

Once accepted as an Entry-Level PSE and if working towards standard level, the trainee works under the guidance of a Mentor of professional standing. The Mentor monitors the trainee PSE's accumulation of workplace experience and, equally importantly, their accumulation of competency.

The Entry-Level PSE is required to keep a logbook to record the accumulation of workplace experience and competency. The Mentor must attest each entry in the logbook. When the Mentor considers the analyst to have accumulated sufficient competency to qualify for certification, the Entry-Level PSE applies for assessment by submitting the logbook for examination by the NAFEMS' Assessment Panel and by paying an assessment fee. NAFEMS' assessors have the right to contact the Mentor or referees to question any entry in the logbook.

Entry-Level PSE applicants are expected to find a suitable Mentor who is of professional standing. In the instance that an applicant cannot find an appropriate mentor, NAFEMS may be able to assist with this.

## maintenance & renewal

Any assessment resulting in certification has limited currency. It is recommended therefore that an up-date assessment be made after three years, either to reflect competency in new product or analysis types or, where applicable, to upgrade the level of certification.



# appendix: product types

The scope of analysis experience should be defined in terms of product types. Some examples are given below, but this is an incomplete list and candidates are strongly advised to specify categories that better define their activities.

- Aircraft
- Bridges
- Building/frames/masonry
- Chemical plant/containment/machinery
- Dams
- Docks and harbours
- Electronics
- Engine & propulsion system
- Fixed track transport
- Highways and tunnels
- Industrial Machinery
- Mechanical transmission system
- Medical Devices
- Nuclear plant/containment/machinery
- Offshore structures
- Pharmaceutical
- Power generating machinery
- Pressure vessels
- Road & land vehicles
- Spacecraft
- Submersibles
- Surface ships



[www.nafems.org/pse](http://www.nafems.org/pse)