

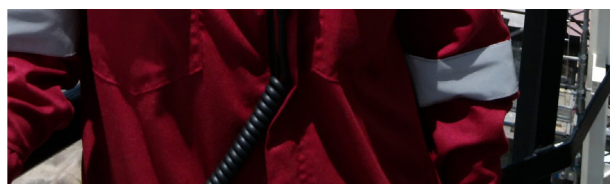
# IChemE

Institution of  
Chemical Engineers

## New C&C report

to be introduced in 2027

### Guidance for applicants



# Contents

Completing your C&C: general advice	4
What happens if the professional reviewers request a revision to my C&C report?	5
Confidentiality	6
Section-by-section guidance and examples	7
Position of responsibility	7
Section A – Evidence of applying your knowledge and understanding to practical situations	7
A1 Demonstrate you have maintained and extended a sound theoretical approach to enable you to develop as a Chartered Chemical Engineer	7
A2 Develop chemical engineering, technical, or scientific solutions to unusual or challenging problems, optimising products, processes, equipment, methods, projects etc against the requirements you identified, or the brief you were given, using your knowledge and understanding and/or dealing with complex technical issues or situations with significant levels of risk	7
Section B – Evidence of your ability to apply appropriate theoretical and practical methods to design, develop and solve chemical engineering problems	9
B1 Take an active role in the identification and definition of project requirements, problems, and opportunities	9
B2 Identify the appropriate investigations and research needed to undertake the design, development and analysis required to complete a chemical engineering task and conduct these activities effectively	11
B3 Implement chemical engineering tasks and evaluate safety and the effectiveness of engineering, technical, or scientific solutions	12
Section C – Evidence of your responsibility, management and leadership	13
C1 Plan the work and resources needed to enable effective implementation of a significant chemical engineering task or project	13
C2 Manage (organise, direct and control), programme or schedule, budget and resource elements of a significant engineering task or project including any commercial considerations	14
C3 Lead teams or technical specialisms and assist others, combining ideas and contributions of different people and disciplines, to meet changing technical, managerial, and commercial needs	15
C4 Bring about continuous quality improvement and promote best practice	16

Section D – Evidence of your communication and interpersonal skills	17
D1 Communicate effectively with others, at all levels, in English	17
D2 Clearly present and discuss proposals, justifications, and conclusions orally and in writing	18
D3 Demonstrate personal and social skills and awareness of diversity and inclusion issues	19
Section E – Evidence of your personal and professional commitment	20
E1 Understand and comply with relevant codes of conduct, including the IChemE Code of Conduct and Ethics	20
E2 Understand the principles of safety and their implications in your role, and manage, apply, and improve safe systems of work	21
E3 Understand the principles of sustainable development and apply them in your work	22
E4 Carry out and record the Continuing Professional Development (CPD) necessary over time (eg the past two years and future plans) to maintain and enhance competence in your area of practice, including the systematic acquisition of knowledge and skills, and the development of personal qualities	23
E5 Understand the ethical issues that may arise in your role and carry out your responsibilities in an ethical manner	24

# Completing your C&C: general advice

The C&C asks you to provide evidence of:

- how you apply your knowledge and understanding of **chemical engineering principles and skills** to practical situations;
- applying **chemical engineering principles** means undertaking a task which requires you to use chemical engineering methods, formulae, equations, calculations etc;
- applying **chemical engineering skills** means applying your broad knowledge and understanding to solve practical problems eg plant troubleshooting. It does not necessarily require you to undertake calculations etc;
- your ability to apply appropriate theoretical and practical methods to design, develop and solve chemical engineering problems;
- your responsibility, management and leadership;
- your communication and interpersonal skills;
- your personal and professional commitment.

You must:

- **keep to the word limit.** Applications that exceed the limit may be returned for revision. For the Chartered Chemical Engineer application, your C&C must be between 3,500 and 4,300 words, with each subsection roughly the same length;
- **emphasise your specific actions.** Focus on your responsibilities and contributions in each example. Make it clear what you did and your role in the task;
- **explain why you did what you did.** Use the Context, Action, and Result (CAR) or Situation, Target, Action, Result (STAR) approach to provide clarity. Focus on detailing your actions and their outcomes;
- **assign examples to the correct sections of the C&C.** Ensure your training and experience examples are placed appropriately to showcase your knowledge and competencies;
- **show how you applied chemical engineering or process safety principles and skills.** In Section A for the Chartered application and Sections A and B for both Chartered Chemical Engineer and Professional Process Safety Engineer application, demonstrate how you applied either chemical engineering or process safety principles. It is **essential** to explain why a chemical engineer or process safety expert was needed for the task;
- **provide one main in-depth example per subsection.** Supplement this with one or two supporting examples to show breadth of experience while offering depth in your primary example;
- **be concise and clear.** Use correct, clear English. Keep your writing concise across all sections, ensuring your communication is both professional and effective;
- **use bullet points only when appropriate.** Bullet points are useful for clarifying sequences of events or listing related examples, but full sentences are required for other content;
- **minimise abbreviations and acronyms.** Either explain abbreviations/acronyms fully when they first appear or clarify them in your CV;
- **write in the first-person singular.** Clearly state your actions and contributions by writing in the first person ("I did," "I designed," etc), avoiding passive voice ("it was decided", "the results were reviewed" ...etc);
- **check for consistency.** Ensure your report aligns with your CV and there are no discrepancies between the two (note that the CV is not assessed); and
- **provide an up to date CV.** Ensure your C&C report aligns with your CV, which should ideally be no longer than two pages and that there are no discrepancies between the two documents. It is recommended that you reference your employer in each of the examples described in your C&C report, so that the professional reviewers can link your example to your CV. Note that whilst your CV is not assessed, it will be reviewed by the professional reviewers to establish if they believe you have adequate experience (Initial Professional Development – IPD), particularly if sections of your C&C Report are deemed inadequate. You can also use your CV to explain abbreviations/acronyms that appear in your C&C report;
- **use of glossary.** You may include a glossary of terms; especially process safety has a range of technical terms which can have different meanings and applications from company to company and industry to industry. It is important that you and the assessors understand how specific terms are used in relation to your application.

If you decide to include a glossary of terms to aid understanding of your C&C report, it is recommended to include this in your CV.

You must not:

- **plagiarise the work of others.** For example, from the internet, IChemE website examples, or a colleague's application. Plagiarism is taken seriously by IChemE. This policy applies to existing members of all grades and applicants for chartership. No part of your membership application to IChemE may be plagiarised (eg C&C report, referee reports, CV). Should there be concerns with any of the material you have presented in an application, IChemE will investigate and you will be contacted that may lead to your application being terminated;
- **use more words than necessary.** The applications system won't allow you to submit applications exceeding the word count;
- **use AI to generate the entire report or entire examples.** The work should be in your own words although it is reasonable to use AI to rephrase a sentence, for example in order to clarify the English or to help you reduce the word count. Any unethical use of AI, such as generating generic or inaccurate evidence statements that do not detail (or directly relate to) your personal experiences, will be deemed inadmissible. All use of AI in applications must be declared;
- **write in the third person (singular or plural) or passive voice.** This makes your specific role and actions unclear;
- **use words like "we" or "they".** These can make your contribution unclear and less direct;
- **exaggerate your role or its importance.** Be honest and accurate about your contributions, as you'll need to support them in your interview;
- **spend excessive time explaining the context.** Focus more on the actions you performed. The context maybe found in your CV if necessary;
- **talk in generalities.** Avoid phrases like "I've been involved in many projects..." or "I have several examples..." Provide specific examples instead;
- **expect the professional reviewer to 'read between the lines'.** Be explicit about your experience and competence. Don't leave things to assumption;
- **forget to spell-check.** Proofread your application for spelling and grammatical errors before submission; or
- **have a large imbalance in the length of each subsection.** Ensure that each subsection is roughly the same length, maintaining balance throughout the report.

## What happens if the professional reviewers request a revision to my C&C report?

The professional reviewers might decide that one or more sections of your C&C report are inadequate and require them to be clarified or expanded, in which case you will be informed by email with feedback to explain what changes are required.

To accommodate the requested revision, the word limit can be extended to 5,100.

You will do this by logging in to the application portal and updating the specified sections which will be made editable for you. Note that sections assessed as adequate will not be available to you to change.

Sections deemed inadequate must be updated within two weeks of receipt of the email request for revision. Failure to do so will mean that your application will be terminated in which case you would need to submit a new application at a future date. In case of extenuating circumstances, please contact [applications@icheme.org](mailto:applications@icheme.org)

If you are asked to update one or more sections of the report, the professional reviewers will provide detailed feedback by email on the clarifications required – please take careful note of this and ensure you address each of their points, as you will only have one opportunity to revise your report. If you do not fully understand the feedback, or need additional information on the changes asked for, please contact [applications@icheme.org](mailto:applications@icheme.org)

You will be required to obtain re-verification of any revised sections. Where the original verifier is unavailable within the timeframe, you may approach an alternative verifier, providing they fulfil the criteria listed in the verification section of this guidance. If you are unable to obtain verification of the revised sections of your C&C report within the required timeframe, please contact [applications@icheme.org](mailto:applications@icheme.org)

If any revised sections of your C&C report are still deemed inadequate, your application will be withdrawn and sent to the Registration Sub-committee who will determine the next step. The most likely outcome is that your application will be terminated and you will need to re-apply. You will be provided with feedback on the reasons why your report was deemed inadequate.

## Confidentiality

You must use the C&C report to demonstrate to IChemE that your individual competence meets the required level expected of a Chartered Chemical Engineer. The professional reviewers need to understand the technical aspects of your work and the engineering challenges involved, so while you should be specific about what you did, you should not disclose confidential information contrary to your employer's confidentiality policy. This also applies to the contents of your CV. It is therefore advisable for you to seek your employer's permission to use the examples in your report and CV before submission.

Note that professional reviewers are bound by the IChemE Code of Conduct and Ethics and the Data Protection Act 2018.

# Section-by-section guidance and examples

## Position of responsibility

At the start of the C&C report you need to provide a brief explanation of how the roles currently or previously held demonstrate a position of responsibility. A position of responsibility does not necessarily mean one that involves formally leading or managing others, or budget holding, although you may have these responsibilities in roles you hold or have held.

A position of responsibility is one in which you have a level of self-direction and autonomy about how you perform your work and that you are individually responsible for the technical consequences of your own work and technical judgements. It is expected that you will normally be managed by others and that your work will be subject to appropriate checks and approvals.

You should describe, for one or more roles, those attributes which demonstrate your self-standing and accountability for your work. Should you have them, you can include responsibilities such as checking or approving work of others, coaching/mentoring others, supervisory and budget holding duties.

## Section A – Evidence of applying your knowledge and understanding to practical situations

### A1 Demonstrate you have maintained and extended a sound theoretical approach to enable you to develop as a Chartered Chemical Engineer.

Maintain and continually develop your knowledge to ensure a strong theoretical foundation and approach to the work you do in the role you have been assigned. A key aspect of this process is how you record and evidence your Continuing Professional Development (CPD). Your CPD records should clearly demonstrate a structured approach to identifying technical development needs and acquiring relevant chemical engineering principles and skills. This should support the ongoing enhancement of your professional technical competence (note that competence in non-technical areas should be covered in section E4).

*Applicants for RPEQ registration should demonstrate that they are meeting the specific CPD requirements for ongoing registration.*

Examples of evidence could be the following types of CPD activity:

- formal training related to your role via in-house/external training;
- understanding the current and emerging technology and technical best practice in your area of expertise, for example by attending/delivering activities run by IChemE member groups or special interest groups;
- learning and developing new **chemical engineering principles and skills** in the workplace via on-the-job learning;
- learning and developing new engineering knowledge in a different industries or roles for example by gaining experience of working in different disciplines within chemical engineering;
- developing a broader and deeper knowledge base through research and experimentation. Explain what it was, why you did the research and what was the outcome – how did you use the research within your role?

If you are logging your CPD either in mycareerpath or your company's own career development tool, extracting the required information may be straightforward.

### A2 Develop chemical engineering, technical, or scientific solutions to unusual or challenging problems, optimising products, processes, equipment, methods, projects etc against the requirements you identified, or the brief you were given, using your knowledge and understanding and/or dealing with complex technical issues or situations with significant levels of risk.

Clearly demonstrate the application of your **chemical engineering skills** at an appropriate level of complexity to develop practical, cost-effective solutions to challenging problems. These may involve you dealing with complex technical issues or situations with significant levels of risk. While applying skills in related disciplines may be included, the emphasis must be on your practical application of **chemical engineering principles** and your **chemical engineering skills**.

Awareness of methodologies, use of standard formulae, or entering data into models or spreadsheets without demonstrating an understanding of the underlying principles is not sufficient. If using modelling tools you should explain how results were validated.

Provide examples that demonstrate knowledge of more than one **chemical engineering principle**. It is recommended that where possible you describe the specific methodologies, equations/theories et. used. Examples lacking sufficient detail regarding the **chemical engineering principles** being applied are unlikely to be deemed adequate. Avoid more than two examples, as this may limit the depth of detail required. Focus your example on how you reached a solution, keeping background and outcomes brief. You will have the opportunity to expand on the context and results during the interview.

Examples must relate to the application of **chemical engineering principles** and may include, but are not limited to:

- laws of conservation (heat and material balancing);
- fluid dynamics;
- thermodynamics;
- mathematical modelling;
- economic evaluation;
- understanding of process technologies;
- understanding of underlying chemistry;
- systemic approach to the engineering analysis of complex engineering systems.

#### Examples of evidence:

- Carrying out technical research and development to develop new designs, processes or systems based on new or evolving technology.
  - You may have experience of working in process development considering new process designs and/or improvements and modifications to existing ones. Describe the specific work you've undertaken – such as developing designs, proposing technical solutions, reducing costs, improving efficiency, or enhancing existing processes.

You are not expected to register patents or invent new formulae. Instead, focus on the value your research or design brought, and how you approached novel or unfamiliar challenges in your role. Highlight the specific outcomes of your work and reflect on the creativity and innovation you applied to complete the task.
- Carrying out complex and/or non-standard technical analyses.
  - Describe how you have applied **chemical engineering principles** to develop practical, cost-effective solutions to challenging problems – either in response to a defined brief or through issues you identified yourself. These situations may involve complex technical challenges or situations with significant level of risk.

Be specific about any calculations, research, analysis, modelling, or other methods you used, especially where they demonstrate complexity. (You should not include detailed workings or calculations).

You might consider examples such as:

  - designing experiments to study heat transfer in a fluidised bed combustion chamber.
  - selecting design conditions for a hydraulic design involving a vacuum vessel and pipework.
  - specifying process or equipment modifications, for example, in a pharmaceutical water system upgrade.
  - identifying thermal cycling issues and developing an improved control system.
- Developing solutions involving complex or multidisciplinary technology.
  - Describe how you sought and obtained technical input from other engineering or specialist disciplines, how you applied their advice to progress your work, and where relevant, how you re-engaged with them to achieve the outcome. Explain how you identified the appropriate people to consult, how you gathered the necessary information or advice, and how their expertise contributed to achieving results that could not have been delivered independently.

If working as part of a team, clearly define your own contribution, particularly the chemical engineering tasks you performed, and explain how these integrated with the work of others to achieve the team's objective. Emphasise your application of **chemical engineering principles** and demonstrate your ability to collaborate effectively within an interdisciplinary team, which may include other engineers, scientists, public authorities, finance, sales, or marketing professionals, to develop an appropriate engineering solution.

You might consider examples such as:

- collaborating with chemists, biologists, and control engineers to solve a fermentation issue in protein packaging.
- contributing to a cross-functional team to commission an automated chemical analysis system.
- consulting reservoir engineers for operating forecasts and uncertainties to inform process design.

#### ■ Developing solutions in safety-critical industries or applications.

- You can use an example where you have developed a chemical engineering solution in a process unit that has particularly onerous safety requirements. This could be related to the chemicals involved (eg carcinogens or highly flammables) or the process conditions (eg high pressure and/or temperature). You would be expected to make clear the particular safety aspects of concern and how you addressed these in arriving at your solution.

Topics you could consider:

- reviewing the design conditions and therefore the design integrity of a piping system carrying a hazardous fluid.
- defining the requirements for a safe environment for the production of a new pharmaceutical facility.

#### ■ Evaluating data to analyse a system for improvement or optimisation.

- Explain your analysis of operating data to identify how a process or design can be improved or optimised.

Topics you could consider:

- reviewing operating data from an operating distillation column to identify why the bottom product is off-spec.
- analysing data from a heat exchanger (eg in a cooling water system) to establish the degree of fouling and therefore underperformance.

## Section B – Evidence of your ability to apply appropriate theoretical and practical methods to design, develop and solve chemical engineering problems

### B1 Take an active role in the identification and definition of project requirements, problems, and opportunities.

Describe your role in shaping and delivering chemical engineering projects, specifying whether you acted as the discipline or technical lead. You should demonstrate how you actively contributed to identifying project requirements, defining problems, and recognising opportunities at various stages of the project lifecycle – such as planning, research, development, implementation, and potentially through to manufacturing, marketing, or sales.

Provide examples that highlight your input in shaping project direction, validating or confirming designs and planned activities, and how your actions influenced overall project outcomes, particularly in relation to planning and execution. Discuss how your work – along with that of any team members you managed – fits into the broader project framework, referencing any company or project-specific processes, procedures, or governance you followed.

Explain how you planned and executed your own tasks, and where relevant, how you oversaw the work of others, taking into account typical project constraints such as budget, schedule, and resource availability. You may also reference specific project management skills you applied to manage delivery, but your examples must clearly demonstrate the application of **chemical engineering principles**. It is recommended that where possible you should describe the specific methodologies, equations/theories etc used. Examples describing only generic project management/planning, without the application of chemical engineering principles, are likely to be deemed inadequate.

Examples of evidence:

- Identifying projects or technical improvements to products, processes, or systems.
  - defining a testing programme to optimise a unit operation in a process.
  - defining the work required to validate an air handling and gas filtration system design as part of a programme to build a new cleanroom manufacturing facility.
  - devising changeover procedures to transition to new control hardware, aligned with planned plant downtime for implementation.
  - developing a proposal to integrate heat recovery into an existing process to improve energy efficiency and reduce operating costs.
  - identifying and addressing a material compatibility issue that was affecting product quality, leading to a redesign of equipment specifications and cleaning procedures.
  - creating a series of case studies based on real-world industrial applications, developing laboratory exercises for students to simulate process optimisation, and introducing software tools for process simulation.
- Preparing specifications, taking account of functional and other requirements. Establishing user requirements.
  - defining the required operating envelope of a new compression system.
  - preparing a duty specification for a water treatment package.
  - drafting a functional specification for an automated dosing system, incorporating process performance, safety interlocks, and maintenance access requirements.
  - designing a user requirement specification (URS) for a research-scale catalytic reactor to be used in a university lab for testing various catalysts under different reaction conditions, ensuring compatibility with safety protocols, research objectives, and providing precise control over variables like temperature, pressure, and flow rates.
- Reviewing specifications and tenders to identify technical issues and potential improvements.
  - undertaking a technical bid analysis for a package unit (eg a boiler).
  - collaborating with an R&D department to improve the selectivity of a catalyst.
  - evaluating vendor proposals for a heat exchanger system to identify discrepancies in thermal performance guarantees.
  - reviewing design specifications for a solvent recovery unit and recommending changes to improve energy efficiency and compliance with environmental regulations.
  - reviewing tender submissions for a new membrane filtration system in a water treatment research project. Identifying discrepancies in the proposed materials' resistance to fouling, recommending a revision to include higher-performance polymer membranes that would better handle the expected contaminant load and extend the system's operational lifespan.
- Carrying out technical risk analysis and identifying mitigation measures.
  - planning the work required to increase the throughput of a process including identification of technical risks and potential mitigation strategies.
  - defining the technical risks involved in a 'hot tap' on an operational pipeline.
  - assessing the risk of equipment failure in a high-pressure system and specifying redundancy measures and pressure relief systems.
  - conducting a risk analysis for a new experimental setup in a university laboratory. Identifying hazards, such as chemical spills and toxic gas release, and implementing mitigation measures like automated ventilation systems and regular safety training.
- Considering and implementing new and emerging technologies.
  - developing performance tests and acceptance criteria for a new plant and integrating them into the project plan and schedule.
  - defining how a new AI-based control system would be incorporated into a batch process.
  - commissioning an acid plant conversion section and comparing results with the design.
  - evaluating the feasibility of using membrane separation in place of traditional distillation to reduce energy consumption.

- integrating a digital twin simulation tool into process development to enhance real-time monitoring and predictive maintenance strategies.
- Implementing a pilot-scale experiment using a new green solvent to replace traditional solvents in a chemical reaction. Evaluating the environmental and economic benefits, monitoring the reaction kinetics, and comparing the performance with conventional methods.

## B2 Identify the appropriate investigations and research needed to undertake the design, development and analysis required to complete a chemical engineering task and conduct these activities effectively.

Describe the remit or objectives of your task and how you planned and carried out a technical investigation, optimisation, or evaluation to meet those requirements. Explain how you applied **chemical engineering principles** to analyse influencing factors, assess available variables, and work within practical, contractual, or commercial constraints to develop an effective solution.

Demonstrate how you conducted research or data analysis to understand how materials, processes, or equipment behave in practice – particularly if you had access to operational data. Highlight how your investigative approach allowed you to test or optimise a process, product, or system against a given requirement.

Clearly outline how you ensured your proposed solution was both safe and feasible before implementation. Emphasise the **chemical engineering principles** you used to evaluate performance, identify risks, and validate your conclusions.

You should also address any limitations – technical, commercial, or otherwise – and show how you factored these into your decision-making and design process.

*If in an academic context, then explain how you identified and agreed your approach to your research programme. How did you identify the methodology to use?*

### Examples of evidence:

- Identifying and agreeing appropriate research methodologies.
  - selecting between experimental and computational approaches (eg CFD vs. lab-scale testing) for analysing flow behaviour in a novel reactor design.
  - conducting a literature review and gap analysis to support the choice of a kinetic modelling framework for catalyst degradation.
  - determine the methodology for investigating process variability using historical plant data.
  - developing a computational fluid dynamics (CFD) model to simulate the mixing behaviour of non-Newtonian fluids in a stirred tank reactor, choosing the model parameters based on previous research and experimental data.
- Investigating a technical issue, identifying potential solutions, and determining the factors needed to compare them.
  - identification of credible overpressure scenarios for a compressor and calculation of relief rates required for each to determine the controlling case for design.
  - analysis and assessment of operating data to identify a problem or trend in performance of process plant.
  - evaluating multiple heat integration options to improve energy efficiency in a distillation process, using pinch analysis and economic assessment to select the optimal solution.
  - analysing data from a pilot plant to identify factors affecting the yield of a biofuel production process and proposing potential process modifications for optimisation.
- Identifying and carrying out physical tests or trials and analysing and evaluating the results.
  - modelling and analysis of distillation column operating conditions and controller set points to maximise recovery of high-value products.
  - carrying out sludge dewatering trials to select the most appropriate processes.
  - conducting pilot-scale trials to evaluate the performance of a new flocculant in wastewater treatment and analysing results to determine optimal dosage rates.
  - performing bench-scale combustion tests to assess fuel blend behaviour and emissions characteristics, with results informing full-scale implementation.
  - performing fluid dynamics simulations and lab-scale tests to evaluate the mixing efficiency in a new reactor design, analysing the impact of different impeller configurations.

- Carrying out technical simulations or analysis.
  - evaluating alternative control schemes for a pasteuriser using a simulation system.
  - developing a process simulation model to assess the impact of raw material quality changes on expected plant performance.
  - running dynamic simulations to assess the stability and response of a chemical reactor under varying feed conditions.
  - running molecular dynamics simulations to explore the interactions of nanoparticles with solvent molecules in a novel solvent extraction process, aiming to optimise selectivity.
- Preparing, presenting, and agreeing design recommendations, with appropriate analysis of risk, and taking account of cost, quality, safety, reliability, accessibility, appearance, fitness for purpose, security (including cyber security), intellectual property constraints and opportunities, and environmental impact.
  - following on from an earlier example in this section, explain how you reviewed the results and formulated recommendations considering any or all of the above perspectives.
  - developing the example further to cover how you formally presented your work to gain agreement for your recommendations.
  - conducting a preliminary risk assessment to identify key hazards in a new chemical plant design, balancing safety and cost while proposing effective mitigation strategies.
  - presenting a proposal for securing the plant's automation and control systems against cyber threats, including an evaluation of potential vulnerabilities, recommended software and hardware solutions, and associated costs to ensure data integrity and system reliability.

### B3 Implement chemical engineering tasks and evaluate safety and the effectiveness of engineering, technical, or scientific solutions.

In this section, focus on demonstrating your knowledge and experience in identifying, evaluating, and managing process safety and environmental issues in research, design or operation from a **chemical engineering skills**. Your examples should primarily involve the implementation of engineering or scientific tasks related to process safety and environmental concerns – do not include occupational safety examples, as these are covered in a later section (E2).

Show awareness of environmental, public, or societal impacts, highlighting your ability to address sustainability by applying your **chemical engineering skills**. This includes identifying, evaluating, controlling, or mitigating such issues in research, design, or operation.

Provide clear examples of systematically assessing either new designs or existing processes to identify and mitigate process safety and environmental hazards. Describe your role in ensuring safety and health in process operations, whether at the development, pilot, or full scale, including laboratories where relevant. Explain how you applied chemical engineering skills and adhered to relevant legislation and design standards.

If you work internationally, discuss how you navigate differences in compliance, regulation, and legislation, and how you apply your chemical engineering skills in the context of these differences.

Highlight the sustainability aspects of your role by showing how you manage environmental risks and societal concerns. Examples may include reducing waste (air, water, or other pollutants), managing emissions, conducting impact assessments, or performing sustainability analyses.

#### Examples of evidence:

- Ensuring that the application of the design results in the appropriate practical and safe outcome.
  - demonstrating experience of direct involvement in a structured process for hazard and risk assessment (eg classical techniques like HAZOP, HAZID, and LOPA) for a modification to an operating facility or pilot plant.
  - ensuring the process relief system for a modified part of an operating plant remains adequate from the perspectives of design integrity and relief capacity.
- Implementing design solutions, taking account of critical constraints and risks, including due concern for safety, sustainability, environmental aspects, public concern (if relevant) and disposal or decommissioning.
  - designing a system to ensure an aqueous discharge from a water treatment facility meets required specifications.
  - managing a hazardous catalyst handling system for loading and discharge to minimise environmental impact and ensure the safety of operations personnel.
  - conducting a comprehensive risk assessment and safety review during the design phase of a new chemical plant to ensure compliance with industry standards and regulatory requirements.

- applying quantitative risk analysis (QRA) to assess the impact of potential chemical spills in a manufacturing facility, recommending additional containment measures and safety protocols to mitigate risks.
- Identifying and implementing lessons learned to show how you are actively learning from feedback on results to improve future design solutions and build best practice.
  - capturing lessons identified from a process safety review and resolving these or ensuring other staff follow through on specific actions arising.
  - running a training course for design engineers and/or operating personnel to explain lessons learned from other similar plants.
  - incorporating feedback from a post-commissioning review into the redesign of a process control system, leading to improved performance and reduced downtime in subsequent projects.
  - analysing the operational performance of a recently implemented energy-saving system, documenting lessons learned, and sharing recommendations with other teams to enhance efficiency in future installations.
- Evaluating existing designs or processes and identifying faults or potential improvements including risk, safety, and life cycle considerations.
  - undertaking a review of an existing relief system to fully document the operating scenarios for each relief valve.
  - evaluating the energy usage of a process unit to identify improvements and savings.

## Section C – Evidence of your responsibility, management and leadership

### C1 Plan the work and resources needed to enable effective implementation of a significant chemical engineering task or project.

While this topic is related to B1, the focus here is on planning the work and identifying the resources needed to complete a significant chemical engineering task or project (including the projected total contract value, if available), rather than on the detailed execution of the work itself. Demonstrate how you planned a specific task or project, considering priorities, contingencies, budgets, and resource allocation to successfully achieve the desired outcome. Ensure that your examples demonstrate evidence of 'project management' skills.

#### Examples of evidence:

- Preparing budgets and associated work programmes for projects or tasks.
  - providing assistance to a team leader/lead engineer in resource planning for a project.
  - planning a performance test programme leading to acceptance of a new plant.
  - preparing a detailed project budget, including resource allocation and timeline, for the installation of a new process unit, ensuring all financial and staffing requirements were met.
  - developing a work breakdown structure for a large-scale process upgrade, identifying key milestones and dependencies to ensure efficient resource utilisation and project delivery.
- Systematically reviewing the factors affecting the project implementation including safety, sustainability and disposal or decommissioning considerations.
  - identifying all factors involved in planning the commissioning of a plant modification/upgrade, including personnel safety, to ensure a timely start-up schedule.
  - devising changeover procedures to convert to new control hardware aligned with planned plant downtime.
  - conducting a risk assessment of a chemical plant decommissioning project, considering environmental impacts, waste disposal, and worker safety to ensure compliance with regulatory standards.
  - evaluating the sustainability of a new process design, incorporating energy efficiency, water usage reduction, and waste minimisation strategies, to align with the company's ESG (Environment – Social – Governance) goals.
- Carrying out a task or project risk assessment and identifying mitigation measures.
  - undertaking a risk assessment for replacing a pump during normal plant operation and identifying mitigation for safety, environmental, and operating risks.
  - reviewing the risks involved in relocating pharmaceutical equipment to a new clean room.

- conducting a risk assessment for implementing a new chemical reactor in an existing facility, considering potential hazards, emergency response, and necessary control measures.
- assessing the environmental and operational risks of integrating a new waste treatment system into an existing process line, recommending mitigation strategies to ensure minimal disruption.
- Leading on preparing and agreeing implementation plans and method statements.
  - validating air handling and gas filtration system design as part of a programme to install a new clean room manufacturing facility.
  - preparing a proposal plan in response to a project enquiry.
  - leading the development of an implementation plan for the installation of a new filtration system in an existing production line, ensuring compliance with safety and operational standards.
  - overseeing the preparation of a method statement for the construction and commissioning of a new chemical reactor, outlining safety procedures, quality control, and resource scheduling.
- Negotiating and agreeing arrangements with customers, colleagues, contractors, and other stakeholders, including regulatory bodies.
  - working on a client proposal requiring external liaison with a third party (eg an environmental authority).
  - developing a project procurement plan for a task or project.
  - negotiating a contract with a vendor for the supply of critical equipment, ensuring alignment with project specifications, budget, and delivery timelines.
  - coordinating with regulatory agencies to secure necessary permits and approvals for a new chemical plant, ensuring compliance with local and international standards.
- Ensuring that information flow is appropriate and effective.
  - planning the review programme and resources for a set of piping and instrumentation diagrams (P&IDs) for a new project.
  - acting as the client representative in a contractor's office and establishing communication protocols.
  - coordinating with cross-functional teams to ensure timely and accurate sharing of design specifications and project updates across multiple departments.
  - implementing a document control system to streamline the flow of technical drawings, specifications, and project schedules, improving collaboration between stakeholders.

## C2 Manage (organise, direct and control), programme or schedule, budget and resource elements of a significant engineering task or project including any commercial considerations.

Provide evidence of your involvement in commercial and economic activities, such as sales, business management, or incorporating commercial considerations into evaluations, project management, and operational support. For example, you could demonstrate your experience in economic evaluation of processes or plant designs, or procurement activities including cost estimation, tendering, budget management, or resource allocation. Explain how you ensure plant operations comply with relevant commercial agreements and legal requirements.

### Examples of evidence:

- Operating or defining appropriate management systems including risk registers and contingency systems.
  - carrying out an insurance risk assessment for a manufacturing process.
  - undertaking an environmental audit of a waste treatment facility and identifying risks.
  - implementing a management system to track and mitigate risks associated with the supply chain for a critical process component, ensuring timely delivery and quality standards.
  - creating and managing a risk register for a chemical plant expansion project, addressing risks related to equipment procurement, contractor performance, and regulatory compliance.
- Managing the balance between quality, cost, and time.
  - how you completed a cost-benefit analysis of a new piece of equipment in an appropriate time-scale.
  - explaining to a plant shutdown crew the need to ensure timely completion of their work to avoid delays and additional costs.
  - overseeing the procurement and installation of a critical process component, balancing cost efficiency with quality requirements to meet production timelines.

- developing a project schedule for a plant upgrade, considering both operational downtime and cost constraints, and successfully completing the project within the allotted time frame.
- Monitoring progress and associated costs and cost forecasts, taking appropriate actions when required.
  - experience in a cost estimating and/or procurement role.
  - developing the start-up sequence for a plant to balance competing issues of efficient start-up operations and commercial agreements.
  - tracking project progress against budget, identifying cost overruns, and adjusting resource allocation to ensure the project stayed within financial targets.
  - overseeing the implementation of a cost control system for a large-scale process plant, regularly reviewing cost forecasts and adjusting project scope as necessary to stay within budget.
- Establishing and maintaining appropriate quality standards within legal and statutory requirements.
  - experience of working as a quality assurance engineer on a project.
  - working with laboratory personnel to monitor plant effluent samples to identify if they meet legal requirements.
  - establishing and monitoring quality assurance protocols for the safe handling and disposal of hazardous chemicals, ensuring compliance with environmental regulations and safety standards.
  - coordinating with suppliers to ensure that all raw materials used in production meet the required specifications, conducting regular inspections to ensure compliance with legal and quality standards.
- Interfacing effectively with customers, contractors, and other stakeholders.
  - engaging with a new team to establish professional working relationships.
  - addressing a conflict between yourself and a customer, or between two other team members, and how you resolved it.
  - negotiating project scope adjustments with a client, ensuring both technical feasibility and customer satisfaction while maintaining project timelines.
  - facilitating regular progress meetings with a key client to provide updates, manage expectations, and ensure continuous alignment on project goals.

### C3 Lead teams or technical specialisms and assist others, combining ideas and contributions of different people and disciplines, to meet changing technical, managerial, and commercial needs.

Give evidence of mature technical leadership, demonstrated by taking ownership beyond your formal remit, resolving identified problems, or being accountable for the work of others. While team management can support your case, the focus should be on your specific leadership actions, the skills and techniques used, and why they were appropriate for the situation.

You should show how you made informed decisions in a leadership role – whether technical, managerial, or commercial – often by combining input and contributions from others. Leadership may also be demonstrated through mentoring junior engineers, supervising projects, or guiding teams.

You don't need to formally manage a team to show leadership. For example, you might demonstrate leadership by:

- proactively initiating projects or improvements;
- delegating tasks and providing direction to peers, operators, or technicians;
- training or mentoring junior staff;
- leading community outreach, school engagement, or promotional activities related to chemical engineering.

Highlight how your leadership made a measurable impact and reflect the level of maturity expected of a chartered chemical engineer.

#### Examples of evidence:

- Agreeing objectives and work plans with teams and individuals.
  - organising and managing a graduate training programme.
  - organising and managing an equipment testing programme to obtain performance data.
  - leading a cross-functional team to develop and implement a new process improvement, setting clear objectives and timelines for each team member.

- coordinating a team of engineers and technicians to troubleshoot and resolve a production issue, ensuring everyone understood their individual tasks and the overall project goals.
- Reinforcing team commitment to professional standards.
  - ensuring that variations from quality standards, schedule and budgets are identified and agreed and that corrective actions are taken.
  - leading an observational safety programme for shift teams.
  - mentoring junior engineers to ensure adherence to safety and technical standards, and providing guidance on best practices in process design and troubleshooting.
  - organising regular workshops to reinforce the importance of professional standards and safety practices within the team, ensuring all members are up-to-date with relevant guidelines and best practices.
- Leading and supporting team and individual development.
  - running a team development programme at an external venue.
  - organising a training course for the implementation of new computer software.
  - mentoring a junior engineer through a technical certification process, providing guidance on technical challenges and career development.
  - facilitating a series of knowledge-sharing sessions within the team to enhance technical expertise and promote best practices in process design and safety.
- Assessing team and individual performance and providing feedback.
  - providing feedback to an operating shift team on their performance during a plant shutdown.
  - preparing annual appraisal notes on direct reports for your line manager.
  - conducting post-project reviews with team members to evaluate performance against objectives and identify areas for development.
  - giving real-time performance feedback to junior engineers to support their growth and improve team effectiveness.
- Seeking input from other teams or specialists where needed and managing the relationship.
  - leading a technical review on an operating problem by gathering information from specialists.
  - leading a safety review for a new or modified plant or section.
  - engaging with the instrumentation and control team to resolve issues during system integration, ensuring clear communication and alignment across disciplines.
  - working with procurement and legal teams to ensure contract specifications reflected technical and operational needs, balancing commercial and engineering perspectives.
- Providing specialist knowledge, guidance, and input in your specialism to engineering teams, engineers, customers, management, and relevant stakeholders.
  - leading the development of a process simulation model for a new process.
  - defining the scale-up requirements of a new process being developed in a research programme.
  - guiding a multidisciplinary team on solvent recovery optimisation, to reduce emissions and improve cost efficiency.
  - supporting the procurement team by reviewing vendor technical specifications to ensure equipment suitability for corrosive service conditions.
- Demonstrate an appreciation of commercial matters during technical tasks or projects.
  - reviewing the cost-benefit analysis of selecting a replacement piece of equipment offered by different vendors.
  - working with the estimator during a project proposal and reviewing vendor quotations.
  - evaluating the long-term operating costs of a proposed process modification to support a capital expenditure request.
  - advising on the selection of process technologies by comparing not only technical suitability but also licensing fees, operating costs, and potential return on investment.
- Developing and delivering a technical teaching module at Higher Educational Institution, or leading a University research programme.
  - leading a pilot plant research programme.

- designing and delivering a guest lecture series on process safety management for postgraduate chemical engineering students.
- supervising a student research project focused on the optimisation of a bioengineering process in collaboration with industry partners.

#### C4 Bring about continuous quality improvement and promote best practice.

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

Provide specific evidence of how you uphold and apply professional standards in your work and your commitment to quality. Show how you ensure that your own work – and that of others – is to a recognised professional standard and how you actively support and promote best practices within your team or organisation.

Illustrate your commitment to continuous improvement by demonstrating how you strive for excellence, seek feedback, and apply lessons learned to enhance your performance. Highlight any engagement with the wider profession – such as participation in professional bodies, working groups eg IChemE Special Interest Groups), or technical forums – that reflects your dedication to advancing both your own capabilities and those of the wider profession.

You should reference the application of relevant technical and engineering standards in your examples. Avoid general statements – focus instead on clear, specific instances that reflect your personal commitment to professional conduct and ongoing development and not simply general statements of compliance.

##### Examples of evidence:

- Promoting quality throughout the organisation as well as its customer and supplier networks.
  - adherence to your organisation or company quality management system and its approved procedures and their promotion as appropriate to its customers.
  - explaining the quality management system to new starters in your company.
  - leading a series of workshops to educate suppliers on quality standards, ensuring alignment with the company's procedures and expectations.
  - conducting regular audits of supplier processes to verify compliance with quality assurance standards, ensuring products meet the required specifications.
- Developing and maintaining operations to meet quality standards eg ISO 9000, EQFM.
  - mentoring or encouraging others to maintain required competence levels.
  - ensuring that calculations are checked and approved in accordance with written procedures.
  - implementing a structured process for monitoring and reviewing compliance with ISO 9001 standards in project delivery.
  - conducting internal audits to ensure that operational procedures align with established quality standards and identifying areas for improvement.
- Supporting or directing project evaluation and proposing recommendations for improvement. Implementing and sharing the results of lessons learned.
  - identifying and providing feedback and lessons learned to improve technical standards.
  - evaluating the outcome of a plant turnaround and sharing lessons learned.
  - leading a post-project review to identify key areas for improvement and proposing changes to processes based on the findings.
  - conducting a root cause analysis of a recent project failure, documenting lessons learned, and proposing actionable improvements to prevent recurrence.

## Section D – Evidence of your communication and interpersonal skills

### D1 Communicate effectively with others, at all levels, in English.

Provide evidence of how you communicate effectively in English to build, manage, and sustain professional relationships – whether within teams, or with juniors, peers, managers, clients, or vendors. Highlight the

communication techniques you used, why they were appropriate for the situation, and how they helped achieve successful outcomes.

Demonstrate your interpersonal and leadership skills through examples where your communication had a clear impact – such as resolving technical issues, training others, delegating tasks, or guiding multidisciplinary teams. These could be in project settings, operating environments, or academic contexts.

Evidence of decision-making and team supervision should show maturity and sound judgment, particularly in technical, managerial, or training contexts and describe why your chosen communication approach was effective for the scenario.

Consider the different ways you communicate effectively – for example, when delegating tasks, training peers, or providing instructions to operators or technicians. You might also include experience in mentoring junior engineers or supporting the development of less experienced staff. Additionally, highlight any involvement in promoting chemical engineering through outreach activities, such as at schools, universities, or community events.

#### Examples of evidence:

- Preparing reports, drawings, specifications, and other documentation on complex matters.
  - working in a project team and preparing written reports or process descriptions.
  - preparing a technical proposal for a client.
  - creating a comprehensive operations manual for a newly commissioned chemical plant, ensuring it meets regulatory requirements and operational efficiency goals.
- Leading, chairing, contributing to and/or recording meetings and discussions.
  - leading a safety review.
  - active involvement in a technical meeting with a supplier or customer.
  - chairing a cross-functional project meeting to discuss the integration of new technologies and resolving technical challenges.
  - contributing to a technical workshop on process optimisation, facilitating discussions and documenting action points for follow-up.
- Exchanging information and providing advice to technical and non-technical colleagues.
  - agreeing objectives and work plans with teams and individuals.
  - engaging with a new team to establish professional working relationships providing technical advice to non-engineering staff on process changes to ensure smooth integration with existing systems.
  - explaining complex technical concepts to senior management to aid decision-making regarding an investment.
- Engaging or interacting with professional networks.
  - being an active member of an IChemE SIG, and describing your role/work.
  - having an active role in promotion of chemical engineering through STEMNET.
  - participating in industry conferences, presenting on process optimisation techniques, and networking with peers.
  - collaborating with a university to mentor students and promote the chemical engineering profession.

#### D2 Clearly present and discuss proposals, justifications, and conclusions orally and in writing.

Provide evidence of your ability to communicate effectively with professionals and others at various levels by conveying ideas, plans, facts, and technical data through both written reports and oral presentations. Explain how and why you adapted the style, content, and format of your communication to suit the audience and the purpose.

Clear and concise communication is a key skill for a professionally qualified engineer. You should include examples of writing and editing reports or delivering presentations – whether technical or non-technical – for different audiences, such as clients, regulators, funders, or internal stakeholders. Highlight how you adjust your approach for each audience, such as tailoring a technical sales pitch or simplifying information for a non-specialist group. Relevant experience from academic work, such a post graduate qualification, may also be included.

#### Examples of evidence:

- Contributing to scientific papers or articles as an author.
  - writing a technical paper for a seminar or conference.
  - preparing a technical paper based on work done during a PhD or other technical or research work.

- contributing to an industry whitepaper that discusses emerging technologies in chemical engineering.
- contributing to a collaborative industry report on the latest trends in sustainable chemical engineering technologies.
- Preparing and delivering presentations on strategic or important matters or subjects.
  - delivering a presentation to peers/supervisors.
  - presenting alternative design options to senior management.
  - presenting a business case for the adoption of a new process technology to a board of directors.
  - leading a presentation on project milestones and risk mitigation strategies to key stakeholders during a project review meeting.
- Preparing bids, proposals or studies.
  - preparing a scope of work to update screen displays for a plant conversion to computer control.
  - supporting a sales presentation by presenting a new product or technology to a potential client.
  - preparing the detailed scope of a feasibility study for a potential upgrade to a manufacturing facility to accommodate increased production capacity.
  - writing a feasibility study for the introduction of a new energy-efficient cooling system in a plant, highlighting technical, financial, and environmental aspects.
- Identifying, agreeing, and leading work towards collective goals.
  - leading a cross-functional team to develop a new process scheme for a plant upgrade, ensuring alignment between engineering, operations, and safety requirements.
  - facilitating a collaborative approach between R&D and production teams to scale up a new chemical formulation, ensuring targets for efficiency and cost reduction were met.
  - coordinating efforts between external contractors and internal engineers to meet the scheduled timeline for the installation of a new heat exchanger system.
  - leading a task force to implement energy-saving initiatives across multiple production units, aligning goals with corporate sustainability targets and driving continuous improvement.

### D3 Demonstrate personal and social skills and awareness of diversity and inclusion issues.

Describe how you apply personal and social skills when interacting with others in your day-to-day work. This could involve working in teams, engaging with suppliers, clients, or experts, or collaborating with colleagues such as operators, peer engineers, new graduates, or senior managers. Provide specific examples that demonstrate the approaches and techniques you used and explain why they were appropriate for the situation.

You should also show an awareness of diversity and inclusion, including how you adapt your approach to be inclusive to diverse individuals eg people from different cultures, backgrounds, or experiences.

Consider how you manage team challenges, resolve conflicts, and adapt your communication or working style to achieve shared objectives. Highlight situations where you've built or maintained effective one-to-one relationships, handled disagreements, or adjusted your approach to suit others. Show how diversity and inclusion considerations influence your conduct and the impact this has on your work.

#### Examples of evidence:

- Knowing and managing own emotions, strengths, and weaknesses.
  - addressing a conflict between yourself and another person, or between two other team members.
  - dealing with a safety issue where others have taken a different position that you believe to be unsafe. Having the confidence to raise the issue with senior personnel.
  - managing stress during a tight project deadline by recognising early signs of pressure, taking brief moments to refocus, and communicating with your team to ensure you stayed on track while maintaining quality.
  - recognising your limited experience with a specific technology and proactively seeking guidance from a senior engineer to ensure you made informed decisions, while also providing updates to your team on progress and gaps.
- Being confident and flexible in dealing with new and changing interpersonal situations.
  - welcoming and acknowledging a range of opinions in a team discussion irrespective of where the opinions originated leading to an agreed solution.

- encouraging everyone to speak up in a meeting being careful to not allow a few to dominate and explaining how you managed a situation where someone did dominate the discussion.
  - adjusting your communication style during a cross-cultural collaboration with international team members by being mindful of cultural and language differences in communication preferences, ensuring effective and respectful exchanges.
  - managing an evolving project with a team where roles were shifting due to unforeseen circumstances. You maintained clear communication and flexibility, helping team members adjust to new tasks without losing motivation or focus.
- Identifying, agreeing, and working towards collective goals.
- preparing a project co-ordination plan that recognises all the interfaces and needs of other team members.
  - leading a brainstorming session to identify key project deliverables, ensuring that all team members have a clear understanding of their responsibilities and how their work contributes to the overall project goals.
  - collaborating with colleagues from various departments to develop a joint strategy that aligns the company's vision with the practical constraints of different teams, ensuring a unified approach towards achieving the business's objectives.
- Creating, maintaining, and enhancing productive working relationships, and resolving conflicts.
- handling a disruptive team member who is upsetting other team members.
  - visiting another office eg a new 'low cost' operating centre in another country to establish working relationships.
  - mediating a conflict between two team members by actively listening to both sides, identifying the underlying issues, and facilitating a solution that aligns with team objectives and organisational values.
  - encouraging open communication within a cross-functional team to prevent misunderstandings and ensuring that each team member feels heard and valued, thereby strengthening the overall team cohesion.
- Being supportive of the needs and concerns of others, especially where this relates to diversity and inclusion.
- being mindful of the diversity of the team and avoiding planning team building events in locations eg where alcoholic drink might be available as this may make some members of the team feel uncomfortable.
  - managing the interfaces between your own office and one or more offices abroad in a project team eg by arranging meetings at reasonable times for all parties.
  - supporting team members from diverse backgrounds by creating a respectful and inclusive environment where everyone feels comfortable sharing their ideas, fostering an atmosphere of collaboration and innovation.
  - ensuring that team members feel heard and valued by actively seeking their input on important decisions and promoting an open-door policy where everyone can voice their concerns in a safe, respectful manner.

## Section E – Evidence of your personal and professional commitment

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

### E1 Understand and comply with relevant codes of conduct, including the IChemE Code of Conduct and Ethics.

Give evidence of your understanding and application of professional standards, your commitment to quality, and your adherence to the **IChemE Code of Conduct and Ethics**.

Demonstrate how you ensure that your own work – and that of others – meets recognised technical and engineering standards. Show your commitment to continuous improvement, both individually and through active engagement with the wider profession. Include specific examples of how you apply relevant technical and engineering standards in practice.

#### Examples of evidence:

- Demonstrating compliance with IChemE Code of Conduct and Ethics.
  - demonstrating integrity and honesty when promoting activities in an IChemE Special Interest Group (SIG) or local members' group.

- raising concerns about danger, risk, malpractice, or wrongdoing that affects others (ie whistleblowing).
  - consistently maintaining confidentiality and handling sensitive information with care, following the ethical guidelines outlined by the IChemE Code of Conduct and Ethics and respecting the professional integrity of colleagues, clients, and stakeholders.
  - acting in a manner that upholds the reputation of the chemical engineering profession by addressing any potential conflicts of interest, ensuring transparency, and prioritising the welfare of the public and the profession over personal or financial gain.
- Identifying aspects of the Code which are particularly relevant to your role.
    - applying sound knowledge of health and safety legislation, such as HASAWA 1974, CDM Regulations, ISO 45001, and company safety policies.
    - recognising the importance of maintaining confidentiality, and respecting and protecting personal information and intellectual property.
    - ensuring compliance with environmental regulations such as the Environmental Protection Act, local emissions standards, and best practices for sustainable operations in your engineering work.
    - adhering to the requirement to maintain professional competence by continuously updating your skills and knowledge to ensure that you meet the high standards required for your engineering tasks, while also guiding others in your team to do the same.
  - Being aware of the legislative and regulatory frameworks relevant to your role and how they conform to them.
    - adhering to your organisation's procedures (eg Code of Business Conduct, Diversity, Equality and Inclusion policy).
    - complying with environmental protection legislation in your role within your industry sector, ensuring compliance with the local Health and Safety regulations and taking appropriate actions to mitigate risks associated with chemical processes in line with industry standards.
    - ensuring compliance with chemical safety regulations such as REACH (Registration, Evaluation, Authorisation, and Restriction of Chemicals) and advising colleagues on safe handling and disposal practices to meet environmental and safety standards.
  - Leading work within relevant legislation and regulatory frameworks, including social and employment legislation.
    - following employment legislation when managing staff redundancies.
    - being aware of your company's rules on promoting new technologies on social media.
    - ensuring compliance with environmental regulations during a project involving the discharge of wastewater, by conducting an environmental impact assessment and implementing mitigation measures to meet local environmental laws.
    - guiding a project team in the implementation of accessibility standards in a facility design, ensuring compliance with the Equality Act and other relevant social legislation to make the plant fully accessible to all employees.

## E2 Understand the principles of safety and their implications in your role, and manage, apply, and improve safe systems of work.

Demonstrate your knowledge and breadth of experience in identifying, evaluating, and addressing occupational safety issues in research, design, or operational environments. You should show a clear understanding of relevant legislation and the broader impact of safety-related matters.

The primary focus of your examples should be on occupational safety but may briefly touch on technical process safety. Provide specific examples of how you contributed to ensuring health and safety in process operations – whether at the development, pilot, or full scale stage, including laboratory settings.

Show how you apply key health and safety principles, legislation, and best practices. If your work involves international projects, explain how you manage differing compliance requirements and regulatory standards. Include examples of how you select and apply appropriate safety standards to maintain a safe working environment.

### Examples of evidence:

- Identifying and taking responsibility for your own obligations and ensuring that others assume similar responsibility for health, safety, and welfare issues.

- managing risk registers, conducting safety inspections, and ensuring compliance with relevant regulations and legislation.
- auditing the safety compliance of a university pilot plant used for teaching.
- establishing a safety committee within a project team, ensuring that all members, from engineers to contractors, are aware of and contribute to safety audits, risk assessments, and compliance with both local and international safety standards conducting safety hazard identification for a laboratory setup used for research purposes, performing regular risk assessments to identify new safety concerns, and providing recommendations for improving safety measures, such as the installation of fume hoods and proper chemical storage facilities, in line with relevant standards.
- Ensuring that systems satisfy health, safety, and welfare requirements.
  - delivering training on the correct application of safety principles and procedures in practical settings (eg operating sites, construction sites, laboratories).
  - applying safety management systems during construction, commissioning, and operation, including permit-to-work systems, CDM regulations, hazardous material handling, and safety risk assessments.
  - designing and delivering safety training programs for operators on new machinery, ensuring they are proficient in the use of personal protective equipment (PPE), emergency response procedures, and hazard identification to promote a culture of safety.
  - managing compliance with safety regulations during the commissioning phase of a new industrial project, implementing permit-to-work systems and safety sign-offs for all contractors, and coordinating with safety inspectors to ensure the facility meets all local environmental and safety laws.
- Developing and implementing appropriate hazard identification and risk management systems and culture.
  - leading a site safety review to identify potential physical hazards in a chemical plant, implementing control measures based on the results of a comprehensive hazard analysis, and promoting a culture of risk awareness through team training and safety briefings.
  - conducting a root cause analysis after a workplace incident to identify underlying hazards, and implementing corrective actions such as updated standard operating procedures (SOPs), additional safety training, and the installation of safety barriers to prevent future occurrences.
  - reviewing and improving the maintenance procedures for high-risk equipment by conducting a failure modes and effects analysis (FMEA), and updating preventive maintenance schedules to address potential hazards and ensure worker safety during operations.
- Managing, evaluating, and improving these systems.
  - leading a cross-functional team to develop and implement an Operational Safety Management (OSM) program for a refinery unit, which included the integration of safety-critical tasks such as emergency shutdown procedures, physical hazard analysis, and operator training programs.
  - leading efforts to update an operating facility's emergency response plan based on lessons learned from a recent incident.
- Applying a sound knowledge of health and safety legislation, for example: HASAWA 1974, CDM regulations, ISO 45001, and company safety policies.
  - demonstrating understanding of legislation such as the Health and Safety at Work Act, COMAH, COSHH, or local equivalents, as well as ISO 45001.
  - implementing and adhering to company safety policies.

### E3 Understand the principles of sustainable development and apply them in your work.

Provide evidence that you understand and address environmental, societal, and sustainability impacts in your work. Demonstrate how you apply **chemical engineering skills** to identify, evaluate, control, or mitigate these issues within research, design, or operational settings.

Show how you manage sustainability aspects of your role, including reduced resource use, environmental protection, risk recognition, and consideration of public and societal concerns. Examples may include reducing waste (air, water, or other pollutants), lowering emissions, conducting impact assessments, or performing sustainability analyses.

You should also consider how your work affects communities living or working near your facility or operation, and how you have responded to or managed those concerns.

#### Examples of evidence:

- Operating and acting responsibly, taking account of the need to progress environmental, social, and economic outcomes simultaneously.
  - engaging with the public to resolve an environmental issue of concern.
  - demonstrating awareness of environmental impacts and mitigation measures in the design and implementation of a new project.
- Providing products and services which maintain and enhance the quality of the environment and community and meet financial objectives.
  - designing solutions to address solid, liquid, or gaseous effluent issues.
  - contributing to sustainability through waste reduction or improved utilisation of waste materials or energy streams.
- Recognising how sustainability principles can be applied in your day-to-day work.
  - implementing and monitoring an ISO 14001 environmental management system at an oil refinery.
  - investigating and analysing ways to reduce energy consumption.
- Understanding and securing stakeholder involvement in sustainable development.
  - participating in an Environmental Impact Assessment (EIA) to meet stakeholder expectations.
  - presenting an energy integration plan for an operating site to reduce external energy use and water consumption.
- Using resources efficiently and effectively in all activities.
  - conducting a water consumption study.
  - reviewing pump seal system designs handling flammable or hazardous chemicals to minimise fugitive emissions.
  - taking steps to reduce environmental impact within your area of responsibility.
- Completion of works to satisfy environment permits.
  - investigating bioremediation of contaminated soil.
  - preparing Environmental Impact Assessment documents for a solvent plant.
- Creating technical content for a MATTE (major accident to the environment) assessment.
  - assisting in the preparation of a Major Accident Prevention Policy (MAPP) for a Lower Tier COMAH site.

#### E4 Carry out and record the Continuing Professional Development (CPD) necessary over time (eg the past two years and future plans) to maintain and enhance competence in your area of practice, including the systematic acquisition of knowledge and skills, and the development of personal qualities.

Provide evidence of your ongoing commitment to Continuing Professional Development (CPD). This includes how you identify your development needs, set specific CPD objectives, and translate those objectives into a realistic, well-resourced plan for the coming period.

This process will naturally vary based on your personal circumstances. You may wish to reference your employer's annual development review processes or tools, where relevant. Where appropriate, you should also demonstrate how your CPD plan aligns with your longer-term career goals.

#### Examples of evidence:

- Undertaking reviews of your own development needs.
  - briefly describe the method and approach/tools that you use to identify your CPD development objectives, and how they are turned into an actionable plan.
  - you should include as appropriate (a) how your CPD needs are identified and prioritised, (b) how and with whom they are agreed (if required), and (c) how those objectives are then turned into a plan which can be put into action.
- Planning how to meet personal and organisational objectives.
  - give a brief outline of the process/steps you follow to create your CPD objectives and create a viable plan.
  - describe the development objectives that you have identified to be addressed in the next one-two years and the purpose of each one.

- Carrying out planned and unplanned CPD activities.
  - for each objective, please provide brief details of the activities you will undertake to complete each one, the benefits to be gained and an indicative timescale for each objective.
  - inevitably, CPD activities will arise that were unplanned. How do you assess whether these will be beneficial or not to undertake?
- Maintaining evidence of competence development. Evaluating CPD outcomes against any plans made.
  - explain how you record your CPD and how this aligns with your career development.
  - explain how you evaluate the CPD completed in comparison with your original development plans eg as discussed in an annual appraisal.
- Assisting others with their own CPD.
  - any evidence of providing advice and guidance of appropriate CPD to junior staff early in their careers.
  - acting as a mentor (formal or informal) to other engineers regarding their CPD.

### E5 Understand the ethical issues that may arise in your role and carry out your responsibilities in an ethical manner.

Provide evidence of your integrity as an engineer, particularly in the decisions you make and how you apply ethical reasoning in work-related or professional scenarios. You should explain the most relevant ethical issues you've encountered in your role, including any conflicts that arose or could have arisen, and how you applied ethics-based learning to address these situations.

Provide direct, personal examples that demonstrate your commitment to working in accordance with the ethical and professional standards set by IChemE, your employer or organisation, and the wider community.

#### Examples of evidence:

- Knowledge and application of company codes of conduct/standards/behaviours/values.
- Understanding the ethical issues that you may encounter in your role.
  - give evidence of where you have faced issues of commercial confidentiality.
  - give evidence of where you have faced issues of personal confidentiality.
- Giving an example of where you have applied ethical principles as described in the Engineering Council's Statement of Ethical Principles (ie 1. Honesty and integrity; 2. Respect for life, law, the environment and public good; 3. Accuracy and rigour; and 4. Leadership and communication).
  - evidence of implementing a safety related decision on a site eg to stop unsafe work.
  - promoting equality, diversity and inclusion in your workplace.
- Giving an example of where you have applied or upheld ethical principles as defined by your organisation or company.
  - declaring a conflict of interest when being required to review a bid for a new piece of equipment from a company owned by a family member.
  - being asked to approve an expense receipt from a colleague for an unauthorised company expense.

## Contact us for further information

UK

☎ +44 (0)1788 578214

✉ [membersupport@icheme.org](mailto:membersupport@icheme.org)

Australia

☎ +61 (0)3 9642 4494

✉ [austmembers@icheme.org](mailto:austmembers@icheme.org)

Malaysia

✉ [malaysianmembers@icheme.org](mailto:malaysianmembers@icheme.org)

New Zealand

☎ +64 (0)4 473 4398

✉ [nzmembers@icheme.org](mailto:nzmembers@icheme.org)



[www.icheme.org](http://www.icheme.org)

Incorporated by Royal Charter 1957. The Institution of Chemical Engineers (trading as IChemE) is a registered charity in England and Wales (214379) and Scotland (SC039661). The Institution also has associated entities in Australia, Malaysia and New Zealand.