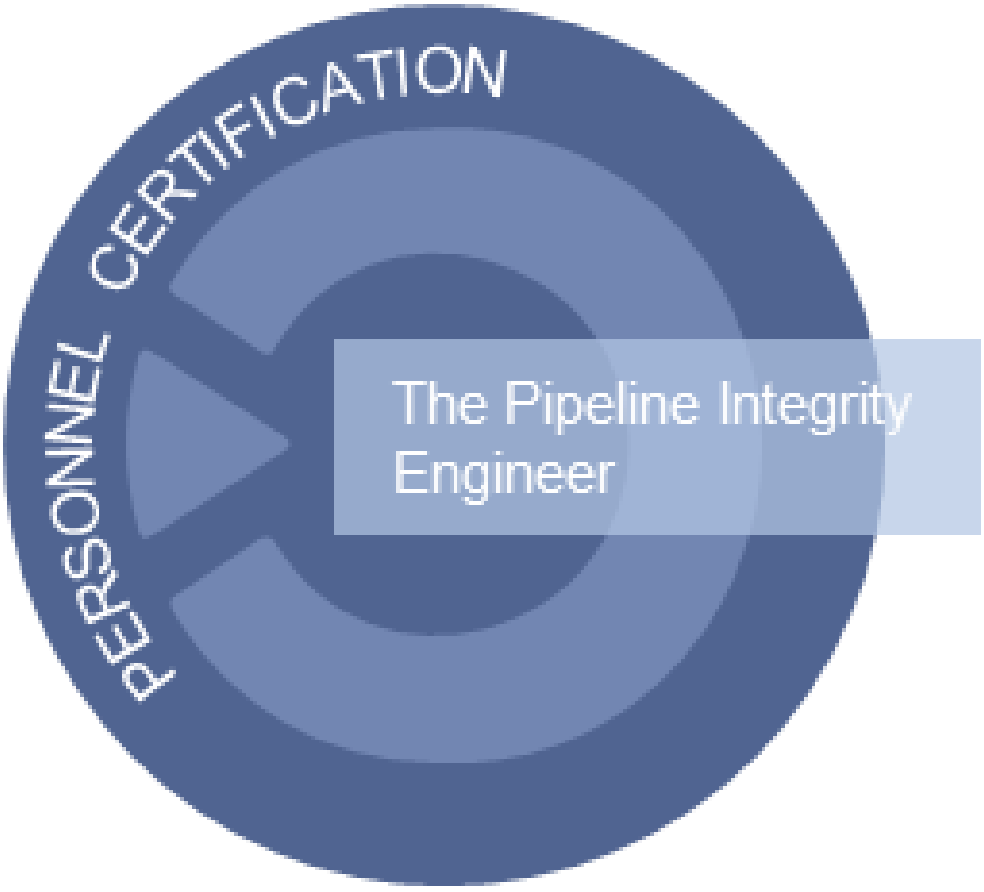
THE PIPELINE INTEGRITY ENGINEER CERTIFICATION
CANDIDATE HANDBOOK



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CANDIDATE GUIDE OVERVIEW

Review this guide thoroughly, it contains important details about the Pipeline Integrity Engineer Certification Exams candidates need to know before exam day administration including scheduling information, exam eligibility and exam day rules.

This guide provides candidates with everything required to apply, prepare for and take a Pipeline Integrity Engineer certification exam.

INTRODUCTION

Pipelines carrying gases and hazardous liquids are one of the safest forms of transportation; however, 'human error' is a contributing factor to some failures, and the training, testing, and qualification of pipeline employees is an important measure against failures caused by human error . Indeed, pipeline standards and regulations require pipeline staff to be both competent and qualified in all the tasks they perform.[1] [2]

The objective of this Pipeline Integrity Engineer certification program is the same as in the USA standard ASME B31Q [15]: '… to minimize the impact on safety and integrity of the pipeline due to human error that may result from an individual's lack of knowledge, skills, or abilities during the performance of certain activities.

The Pipeline Integrity Engineer Certification program is designed to identify engineers who can address pipeline integrity problems, with supervision as defined for each certification.

The duties, tasks, knowledge, skills, and attributes of a Pipeline Integrity Engineer can be summarized as:

- can assess defects reported in a pipeline, using and understanding best practices;
- give reasoned conclusions and recommendations on pipeline engineering critical assessment;
- write clear reports, understanding the objectives and consequences of his/her work; and,
- is able to engage with clients at meetings, and explain their work

The purpose of a certification is to ensure that an individual performing a job has sufficient and demonstrable capabilities (competencies) to perform correctly all tasks required of that job.

ROSEN & THE QPPI CERTIFICATION BOARD

The ROSEN Group is a privately held company that was founded in 1981 and believes that ensuring the proper authority and autonomy for the certification body is of utmost importance to the credibility and integrity of the certification program. ROSEN, the certification body, has granted to the Qualification Panel for the Pipeline Industry (QPPI) an independent panel of qualified subject matter experts (SMEs), to the development of all elements of the certification scheme, including but not limited to the eligibility criteria, recertification requirements.

The QPPI certification board is responsible for overseeing the development of a credible Pipeline Integrity Engineer Certification Program and for ensuring the credentials meet high standards of ethical and professional practice for the industry.

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[1] Anon., 'Pipeline Personnel Qualification', American Society of Mechanical Engineers. ASME B31Q-2016. 2016

[2] Anon., 'Pipeline Personnel Qualification', American Society of Mechanical Engineers. ASME B31Q-2016. 2016. Anon., 'Pipeline Transportation Systems for Liquids and Slurries', ASME B31.4 - 2016, American Society of Mechanical Engineers. New York USA. 2016. Anon., 'Gas Transmission and Distribution Piping Systems'. ASME B31.8 - 2016, American Society of Mechanical Engineers. New York USA. 2016. Anon., 'Oil and gas pipeline systems', CSA Z662-15, Canadian Standards Association. 2015. Anon., 'Petroleum and natural gas industries - Pipeline transportation systems - Recommended practice for pipeline life extension', Technical Specification. O/TS/12747. First edition. International Organization for Standardization. 2011. Anon., 'Pipeline systems. Part 4: Steel pipelines on land and subsea pipelines – Code of practice for integrity management', Published Document PD 8010-4:2012. British Standards Institution. 2012. Parfomak, P.W., 'DOT's Federal Pipeline Safety Program: Background and Key Issues for Congress', Congressional Research Service. 7-5700. R44201. May 20, 2016.https://fas.org/sgp/crs/misc/R44201.pdf. Also, http://dms.ntsb.gov/pubdms/ Anon., 'Pipeline Safety: Guidance on Training and Qualifications for the Integrity Management Program', 49 CFR Part 192. Docket No. PHMSA–2016–0067. Federal Register. Vol. 82. No. 67. April 10, 2017. http://www.viadata.com/rus32wdw/rus32.htm#t=RUS32%2FFederal_Register_Volume_82%2C_Number_67_(Monday%2C_April_10%2C_2017).htm https://primis.phmsa.dot.gov/comm/glossary/index.htm#Integrity

The exams for the Pipeline Integrity Engineer Certification program follow the specifications set forth in the exam blueprint in accordance with the weights and numbers of items defined for each task.

The QPPI Certification Board selected qualified Subject Matter Experts (SMEs) to write, review and revise the test questions under the guidance of a psychometric consultant. SMEs were selected based on their demonstrated expertise and have been working in the field of pipeline integrity, or a similar field, at any level within their organization, and have more than 10 years' experience.

Periodic job analysis studies are conducted to identify and validate the knowledge and skills measured by the exam on an ongoing basis. For each certification, a national job analysis study will be conducted periodically to ensure that the exam's Body of Knowledge specific to each certification remains relevant and current

Changes To Certification Scheme

- ROSEN will provide due notice to certificants any changes made to the any of the Pipeline Integrity Engineer Personnel Certifications due to due to changes in internal requirements or in response to changes in the relevant standards or regulatory requirements.
- ROSEN will communicate the changes made in the certification schemes and inform all certificants of the changes within thirty-(30) days of such changes being approved by the QPPI Certification Board. Changes will also be publicized on the ROSEN website, and in the candidate handbook well in advance of the effective date of the changes, which will also be published.
- Certificants will be required to demonstrate their competence of the new content. This verification will be done at recertification.

BEFORE YOU APPLY

ROSEN offers remotely proctored exams that you can take in the comfort of your home. At exam time, you are connected to a proctor over the internet, who will oversee your test. The connection will be via video, audio and remote screen share. The proctor can see, hear and see the screen of your computer during the entire time, and everything is recorded and, if required, can be reviewed later.

FAQ about Remote Proctored Exams

Upon registration, exam candidates have a **twelve (12) month eligibility period** to take their exam. This means that from the date you register, you have 12 months (365 days) to take your exam. It is important to note that the exam sitting fee must be paid in full before you can schedule and take an exam.

If your application is incomplete and/or any of the required documentation is missing, you will be notified by email. The email will include the list of discrepancies. You have thirty-(30) days to correct the discrepancies. Failure to correct these discrepancies within this time period, you will forfeit your application fee and be required to start the application process again which includes paying another application fee.

Please be aware that the exam eligibility and all fees paid will be forfeited in the event you do not take the exam during the 12-month eligibility period and if your appointment is missed or if you are more than 15- minutes late for a testing appointment.

STEPS TO CERTIFICATION

Step 1: Choose A Certification

Step 2: Read the handbook

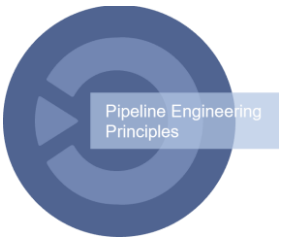
Step 3. Submit your The Certification Application

Step 4: Schedule Your Exam

Step 5: Prepare For The Exam

Step 6: Take the exam

PIPELINE INTEGRITY ENGINEER INDIVIDUAL CERTIFICATIONS

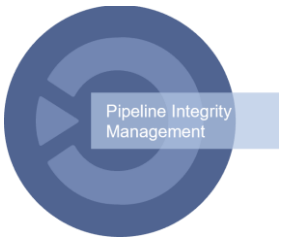


Certified in Pipeline Engineering Principles: CS001F

Designed for individuals working in pipeline integrity who are able to describe pipeline-engineering principles, discuss best practices, and explain their bases.

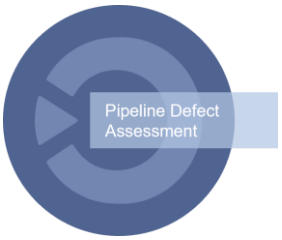
Certified in Pipeline Inspection and Surveillance: CS005F

Designed for individuals working in pipeline integrity who can describe differing pipeline inspection and surveillance methods and compare the best methods.



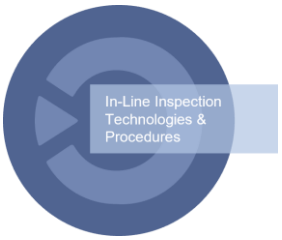
Certified in Pipeline Integrity Management: CS014F

Designed for individuals working in pipeline integrity who can define, and distinguish between, differing integrity management methods/techniques, particularly pipeline integrity management and systems, and can list the threats to pipeline safety, and the consequences of pipeline failure.



Certified in Pipeline Defect Assessment: CS020F

Designed for individuals working in pipeline integrity who can describe pipeline integrity and pipeline defect assessments (for all types of defects found in pipelines), and can summarize and give examples of fatigue assessment



Certified in In-line Inspection Technologies & Procedures: CS022F

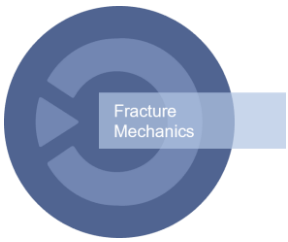
Designed for individuals working in pipeline integrity who can classify and summarize in-line inspection technologies and procedures

Certified in In-line Inspection Data Analysis & Reporting CS026F

Designed for individuals working in pipeline integrity who can explain ILI data analysis and reporting procedures

Certified in Stress Analysis: CS030F

Designed for individuals working in pipeline integrity who can describe and review pipeline stress analyses.



Certified in Fracture Mechanics: CS032F

Designed for individuals working in pipeline integrity can explain the history of fracture mechanics, its principles, models (elastic, elastic-plastic, and plastic), and differing models, defining the best assessment methods using fracture mechanics, and define and distinguish between the traditional approach to fatigue assessment, and the fracture mechanics approach to fatigue assessment

Pipeline Integrity Engineer Individual Certification Eligibility Requirements

Membership

ROSEN does **not** require membership in any other organization. Certification is open to all qualified candidates.

Education

Without a higher education degree:
Four (4) years of experience in the requires completed Experience In Lieu Of Degree Verification Affidavit Form. The form can be found within the application packets.
or
With a higher education degree:
Bachelor's degree or international equivalent from an accredited institution of higher education or engineering degree or international equivalent from an accredited institution of higher education
or
Professional Engineering Qualification

Evidence - a photocopy of transcripts or diploma certificates for any degrees earned or a photocopy of professional certifications acquired.

Mentoring

Applicants are required to have 36 hours of documented mentoring

Evidence - A mentoring verification affidavit must be submitted with the application. The affidavit can be found within the application packets.

A 'mentor' is a trusted adviser, with the necessary knowledge and wisdom to provide advice and guidance. He/she is a critical friend, or guide, who is responsible for overseeing the career and development of another person, outside the normal manager/subordinate relationship. Mentoring differs from coaching: coaching transfers knowledge, but it has a fixed agenda, related to a task, with a clear outcome, usually short term, and focused on a competency. Mentoring does not have a fixed agenda, it is related to the development of an individual, without a variable outcome, is long term, and focused on the individual. This means that mentoring can be a structured process but does not need to be formal.

Experience

- 100 hours of experience or self-learning under the supervision of a line manager.

Evidence - An experience affidavit must be submitted with the application. The affidavit can be found within the application packets.

Experience is defined as work activity accomplished under the direction of qualified supervision, but excluding time spent in organized training programs, training, and mentoring requirements.

Training

- 18 hours of training in the certification in which you are applying

Evidence - copies of training certificates or letters of completion with hours.

Training must have identified goals and objectives defined by a training department, or training provider.

Examples include classroom instruction, web-based training, e-learning courses, workshops, seminars, webinars, in-house training, etc. 1 CEU = 10 hours of participation.

Candidates are free to select any training they wish. Completion of any ROSEN Group's training courses will **not** provide any advantage over completion from any other training program.

CERTIFIED PIPELINE INTEGRITY ENGINEER CERTIFICATION

The Pipeline Integrity Engineer certification scheme is for individuals who deal with pipeline integrity problems, and it ensures that an individual performing a task has sufficient and demonstrable capabilities (competencies) to perform the task correctly, with some supervision. The duties, tasks, knowledge, skills, and attributes of an individual certified by this program can be summarized as:

- Can assess defects reported in a pipeline, using and understanding best practices;
- Give reasoned conclusions and recommendations on pipeline engineering critical assessment;
- Write clear reports, understanding the objectives and consequences of his/her work; and,
- Is able to engage with clients at meetings and explain their work.

Certified Pipeline Integrity Engineer Eligibility Requirements

Membership

ROSEN does **not** require membership in any other organization. Certification is open to all qualified candidates.

Education

A higher education degree:
An engineering degree or international equivalent from an accredited institution of higher education or

Professional Engineering Qualification

Evidence - a photocopy of transcripts or diploma certificates for any degrees earned or a photocopy of professional certifications acquired.

Obtained the following Pipeline Integrity Engineer Individual Certifications

- Certified in Pipeline Engineering Principles: CS_001F
- Certified in Pipeline Inspection and Surveillance: CS_005F
- Certified in Pipeline Integrity Management: CS_014F
- Certified in Pipeline Defect Assessment: CS_020F
- Certified in In-Line Inspection Technologies & Procedures: CS_022F
- Certified in In-Line Inspection Data Analysis & Reporting: CS_026F
- Certified in Stress Analysis: CS_030F
- Certified in Fracture Mechanics: CS_032F

All individual certifications must be valid and not within of 60 days from expiration.

Minimum Language Recommendations

Applicants should have a minimum IELTS score of 6.0 before attempting to take any of the Pipeline Integrity Certification exams.

CEFR	IELTS	Cambridge English Scale	TOEFL iBT	TOEFL PBT	TOEFL CBT	TOEIC	Global Scale of English
C2	9.0	209+	118-120	667-677	290-300	975-990	86-90
	8.5	205-208	115-117	653-663	281-287	955-970	83-85
	8.0	200-204	110-114	637-650	270-279	905-945	79-82
C1	7.5	191-199	102-109	610-633	254-267	835-900	73-78
	7.0	185-190	96-101	590-607	242-252	785-830	65-72
	6.5	176-184	79-95	548-588	212-241	685-780	58-64
B2	**6.0**	**169-175**	**60-78**	**498-546**	**171-211**	**570-680**	**50-57**
	5.5	160-168	46-59	453-496	133-169	450-560	42-49
B1	5.0	154-161	35-45	417-450	107-131	365-440	36-41
	4.5	147-153	32-34	400-413	97-103	345-355	29-35
	4.0	140-146	28-31	387-398	87-95	310-335	
A2	3.5		25-27	337-383	80-85	290-305	n/a
	3.0		21-24	353-373	67-77	265-280	
A1	2.5	100-119	17-20	333-350	57-65	235-260	n/a

Figure 1: Minimum Language Recommendations

FEES & REFUND POLICY

Fees

Application Fee: $150 USD

Application fees are the **non-refundable fees** paid for the processing, review, and data management for each certification application. This is paid when the application is submitted. The application fee must be paid every time you apply to any of the certification programs.

If your application is incomplete and not corrected within thirty-(30) days of notification, you will forfeit your application fee and will be required to repay the application once if they restart the application process.

Exam Sitting Fee : $350 USD

You must pay the exam-sitting fee within thirty-(30) days of acceptance into the program and schedule their exam within the one-(1) year of paying the exam-sitting fee. Failure to do so, you will **forfeit** all fees paid.

Exam Retake Fee : $250 USD

Examination retake fees are the **non-refundable**. If you fail an exam, they are allowed to retake the exam for a total of three-(3) attempts. The examination retake fee must be paid for each attempt. Refer to the Retake Policy within this manual.

Recertification Fee: $350 USD

In order to maintain active certification status, candidates must apply for renewal of certification to the Certification Committee every five (5) years. Refer to the RECERTIFICATION process within this handbook.

Certificate Replacement: $150 USD

Certificants who lose or damage their certificate and wish to replace their certificate shall incur a certificate replace fee.

Fee & Refund Policy

ROSEN reserves the right to assess fees for all services connected to the Pipeline Integrity Certification program. This includes applications, examinations, recertification, and duplicate certificates. Fees are subject to change, and it is the applicant / candidate's responsibility to submit the current fee for any aspect of the certification. All fees shall be published in the candidate's handbook.

Application fees are non-refundable; candidates are encouraged to review the eligibility requirements prior to applying.

Applicants whose applications are incomplete and fail to correct any and all discrepancies within thirty-(30) days of notification, forfeits their application fee.

Candidates arriving thirty-(30) minutes after the scheduled start exam time will be considered absent and will forfeit their exam fee.

Candidates who are a no show, forfeits their exam fee.

Candidates who fail to take their exam within the one-(1) year timeframe, which begins at the time of payment for the exam, forfeits all fees paid.

Refunds are not granted to candidates who forfeit or fail the examination; this includes candidates who cannot produce the required identification for exam admittance. Under these circumstances candidates will be considered absent, will forfeit the full examination fee, and will be required to repay the examination fee.

Refunds and partial refunds for examination fees are granted at ROSEN's discretion for extenuating circumstances only.

THE CERTIFICATION APPLICATION

Instructions for the Individual Certification Application

- The application has seven-(7) parts which must be filled out in its entirety and must include either a physical or electronic signature.
- Submit your completed application with eligibility evidence to certifications@rosen-group.com
- Pay the application fee. Applications will not be reviewed without payment.
- Upon submittal of their application, you will be notified by email.

1. Applicant Information

- The contact information you provide will be used for all correspondence with the email address the main form of communication. The address may be either your personal address or business address
- If any of your contact information, e.g. name, mailing address, email address, and/or telephone number entered on application changes during the application process, applicants must send an email to certifications@rosen-group.com within 7 days of the change of information
- In addition, applicants must notify the ROSEN in case of a legal name change. Your legal name must match the name on the government-issued photo identification you will be presenting to the proctor in order to be admitted take the certification examination.

2. Special Testing Accommodations

- Test accommodations are individualized and considered on a case-by-case basis. Consequently, no single type of test accommodation (e.g. extra time) would necessarily be appropriate for all individuals with disabilities. Simply demonstrating that an individual meets diagnostic criteria for a particular disorder does not mean that the person is automatically entitled to test accommodations.

- Applicants who wish to do so must (1) indicate on their application they are applying for special testing accommodations and (2) submit the completed Special Testing Accommodation Request form with the required documentation.
- A licensed professional, i.e. physician, psychologist, psychiatrist must complete the Professional Evaluation section. The documentation requires a clear explanation of the current functional limitation and a rationale for the requested accommodations.
- Certificants, who received testing accommodations on previous certification exams, will receive the same accommodation previously provided. However, if additional testing accommodations are required, certificants must follow the requirements for requesting testing accommodations as First-Time Applicants

The Special Testing Accommodations Application Form can be found on the personnel certification website.

3. Certificate and Certificants Registry

- You must enter your name exactly how you wish it to appear on their certificate. This does not have to match their government issued ID.
- You must opt in or opt out of the certificate registry.
- Inclusion in the registry is voluntary.
- The Certification Registry is an online up-to-date record of individuals who have earned a certification and those who have chosen to keep it active. No personal contact information, such as email, physical address, or phone number, will be included in the registry.
- Certificants can opt out of the having their name published in the online registry during the application process. Stakeholders may contact us either in writing or by phone to verify if a certificants credentials are current. No other information will be provided
- The certification registry will only include the following information:
- Certification holder's first and last name, Certification Type, Certificate ID, expiration date.

4. Fees, Payment information and Refund Policy

- You must acknowledge that you have read and understand the refund policy. If you have any questions, please contact us certifications@rosen-group.com

5. Evidence of Eligibility

- You must acknowledge that you understand that your application will **NOT** be approved until all required documentation is submitted

6. Code of Conduct

A CANDIDATE AGREEMENTS

Code of Conduct establishes the basic ethical standards for the professional behavior of certificants. Although a Code of Conduct cannot include rules for every imaginable situation, it is designed to provide both appropriate ethical practice guidelines and enforceable standards.

ROSEN sets forth a Code of Conduct to guide the professional and personal conduct of its certification holders. Applicants are required to sign agreeing to abide by the Code of Conduct. Certified individual who failed to comply can result in an investigation and disciplinary measures including but not limited to exam score nullification or certification revocation.

7. Candidate Agreement and Statement of Acknowledgment

You must acknowledge and agrees to the provisions stated in the Candidate Agreement and Statement of Acknowledgment

Instructions for the Certified Pipeline Integrity Engineer Certification Application

- The application has seven-(7) parts which must be filled out in its entirety and must include either a physical or electronic signature.
- Submit your completed application with eligibility evidence to certifications@rosen-group.com
- Pay the application fee. Applications will not be reviewed without payment.
- Upon submittal of their application, you will be notified by email.

1. Applicant Information

- The contact information you provide will be used for all correspondence with the email address the main form of communication. The address may be either your personal address or business address
- If any of your contact information, e.g. name, mailing address, email address, and/or telephone number entered on application changes during the application process, applicants must send an email to certifications@rosen-group.com within 7 days of the change of information
- In addition, applicants must notify the ROSEN in case of a legal name change. Your legal name must match the name on the government-issued photo identification you will be presenting to the proctor in order to be admitted take the certification examination.

2. Evidence of Eligibility

- For each of the pipeline integrity engineer individual certifications, you must enter the certification number and the expiration date.

Certifications must not be within 60 days of expiration.

3. Certificate and Certificants Registry

- You must enter your name exactly how you wish it to appear on their certificate. This does not have to match their government issued ID. You must opt in or opt out of the certificate registry.

Refer to the section above for details.

4. Code of Conduct

- You must agree to abide the code of conduct.

Refer to the section above for details.

5. Candidate Agreement and Statement of Acknowledgment

- You must acknowledge and agrees to the provisions stated in the Candidate Agreement and Statement of Acknowledgment

6. Pay the application fee.

How we review applications

Applications and submitted documentation will go through two reviews: an initial review and a verification review. The initial review confirms the completeness of the application and receipt of all required eligibility documentation.

You will be notified within ten-(10) business days if your application is (1) complete and moving to verification review process.

If your application is incomplete and/or any of the required documentation is missing, you will be notified by email. The email will include the list of discrepancies.

You have **thirty-(30) days** to correct the discrepancies. Failure to correct these discrepancies within this time period, you will forfeit their application fee and be required to start the application process again which includes paying another application fee.

Note: if your application is denied you have the right to APPEALS the decision.

Prepare For The Exam

Body of Knowledge

To be awarded a certification, you must pass a comprehensive examination consisting of forty-(40) multiple-choice questions. The importance of each knowledge, and skills areas(KSA) within it, determines the specifications of the exam. The relative order of importance of the KSAs determines the percentage of the total exam questions. The exam blueprint for each certification can be found at the end of this handbook.

Recommended Learning

Individuals need some technical knowledge before commencing this certification program, particularly if an individual is new to, or inexperienced in, pipeline integrity. Each certification scheme contains a list of recommended awareness level competencies (knowledge and skills) which cover basic terminologies, principles, and practices in pipeline integrity competencies.

This list of awareness level competencies can assist in understanding the foundation level competency prior to assessment. These competencies are only a recommendation but are **NOT** required. The recommended competencies can be found at the end of this handbook.

Preparing For Exam Day

There is a three-step process for preparing for exam day. Candidates must confirm or book their exam three-(3) days in advance of exam day. Candidates who do not complete this process three-(3) days in advance will be considered a no-show and will not be able to sit their exam.

1 Download the TestReach application.
2 Complete the system check.
3 Confirm or book your exam.

Setting Up your TestReach Account

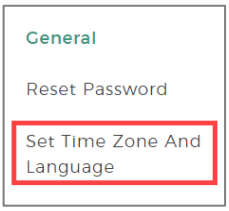
Once you have paid your exam-sitting fee, you will be registered for the exam and notified of the registration through an email from TestReach The email will contain a username, password and any specific instructions for the exam, inviting you to login to the system.

1 Click on the link provided in your email, which will open in a browser
2 Enter your email address and the assigned password that you have received via email.

If it is your first time taking an exam on TestReach, you will need to download the TestReach application to your computer. You will then be guided through a procedure to download and install the TestReach Candidate Application and carry out a short system check, which ensures your computer is all set for exam day.

Please refer to TestReach website for more information about this process and minimum system requirements. https://www.testreach.com/exam-candidate-testreach.html

NOTE: It is very important that you set the correct time zone and time zone name to ensure your exam starts at the correct time.



Note: If you have, any difficulties with regard to logging on for your exam please contact:
+353 (1) 699 1385 or **+44 (0)20 34758685** or US (toll-free) **+1 (833) 202 2819**
https://www.testreach.com/candidate-support.html support@testreach.com

Schedule Your Exam

You must then schedule your exam time. **This is not done for you** – and it is a very important step to allow you to take your exam. The exam times available to you will be displayed on the screen and will be shown in the same time zone that your computer is set to.

The dates and times available are on a first come first serve basis. The maximum candidates per day is five-(5). The available dates are shown in sixty-(60) days calendar blocks.

On Exam Day

Login into TestReach using your User ID and Password.
It is advised that all candidates enter exam 15 minutes before start time in order to allow the candidate to go through pre - validation process with their Supervisor.

Note: Candidates will be permitted to commence the exam up to 30 minutes after the scheduled start time. The duration of their exam remains the same. If a candidate has not connected within 30 minutes, their exam will expire and they will not be able to do the exam.

Select "Connect to Supervisor". Please note that the connection to the Supervisor

- May **not** be immediate but that the Supervisor is aware that you are ready to start your exam.
- Once you are connected, Supervisor can immediately see: the candidate's desktop / screen, a 'chat box' for any Instant messages between the supervisor and candidate and a live audio/ video of the candidate via webcam.
- Supervisor will advise candidate of pre-validation process before they begin their exam via audio

Examination Administration Rules

1. No other person is allowed to enter the room while you are taking the proctored exam.
2. The lighting in the room must be bright enough to be considered "daylight" quality. Overhead lighting is preferred. If overhead lighting is not available, the source of light must not be behind you.
3. You must sit at a clean desk or table.
4. The desk or walls around you must not have any writing.
5. The room must be as quiet as possible. Sounds such as music or television are not permitted.
6. The following items must not be on your desk or used during your proctored exam, unless posted rules for the exam specifically permit these materials: Books, Paper, Pens, Calculators, Textbooks, Notebooks, Phones
7. You are not allowed to use headphones, ear buds, or any other type of listening equipment.
8. You must not communicate with any other person by any means.

Please refer to the Protocol Document for Remote Invigilated Exams at the end of this candidate handbook for the validation and monitoring protocols as well as example infringements.

Retake Policy

Candidates have three-(3) attempts to pass any of the Pipeline Integrity Exams, Candidates who do not achieve a passing score on their first attempt must wait ninety-(90) days before retaking the exam. Candidates who do not achieve a passing score on their second attempt, the candidate must wait one-(1) year from the date of their last attempt before retaking the exam.

To illustrate:
After taking and not passing the exam (attempt 1):

- Retake 1 (attempt 2): Candidates must wait ninety-(90) days from the date of their first attempt
- Retake 2 (attempt 3): Candidates must wait one-(1) year days from the date of their second attempt

How to apply to retake an exam

1. Complete the 'Applying to Retake a Certification Examination Application form in its entirety which can be found on the personnel certification website.
2. Save the document in a PDF format using the following naming format: Last_First_RR.pdf
3. Email the signed application to: certifications@rosen-group.com

You will be notified within ten-10 business days if you application is approved. At that time, you will be advised to pay the retesting fee.

The retesting fee of $150 USD must be paid for each attempt. Failure to take the exam within the one-(1) year of paying the exam-sitting fee, you will **forfeit all fees paid**.

NOTE: Candidates, who received testing accommodations on previous certification exams, will receive the same accommodation previously provided. However, if additional testing accommodations are required, certificants must follow the requirements for requesting testing accommodations as First-Time Applicants.

Exam Results

At the end of the exam, candidates are notified immediately after submitting their exam computer generated preliminary passed or failed score is issued. The results are considered provisional until the testing center has confirmed no suspicious activity took place during the examination.

I PASSED THE EXAM, NOW WHAT?

It is only after confirmation of no exam irregularities have taken place will the certification be awarded. The certification office will notify you via email within ten-(10) business days following the exam of your result with your certification certificate.

Usage of Marks, Logos & Certificates

ROSEN(UK) Limited is the owner of the mark(s) and the certificate and provides individuals who have met the eligibility requirements and have successful passed the certification exam with a certificate suitable for framing and a digital seal. Certificants must comply with the following policy. The certificate holder must contact ROSEN(UK) Limited in case of questions regarding the use of the certification mark in accordance with the rules.

Authorized Persons

Use of the Pipeline Integrity Engineer Certification Program marks and logos is limited to those persons who have been granted the certification by ROSEN(UK) Limited and who satisfy all maintenance and re-certification requirements established by the QPPI Certification Board. Use of the mark and logo by individuals who have not been granted and maintained the certification is expressly prohibited.

Non-Assignability & Non-Transferable

Permission to use the certification mark is limited to the certified person, and shall not be transferred to, assigned to, or otherwise used by any other individual, organization, or entity.

Acceptable Usage

ROSEN(UK) Limited permits the use of certification marks (certificate and seal/logo) exclusively in direct connection with the certified scope of application. It may be used on websites, information and advertising material. The certified organization is allowed to advertise with the following marks during the period of validity of the certification:

- Seal/logo;
- Certificate. The certificate may be used for external presentation as a PDF document.

Certification marks (certificate and seal/logo) of ROSEN(UK) Limited may not be passed on to customers of the certified organization for use. The certificants may use the certification certificates issued by ROSEN(UK) Limited only in their entirety and not in extracts or modified.

The certification mark may only be shown in the standard size and design. Standard size and design can be provided by ROSEN(UK) Limited upon request. The size and colors of the certification mark may not be changed. The certification mark must always be shown in its entirety.

The user of the mark must comply with the requirements of ROSEN(UK) Limited when referring to his certification status in communication media.

ROSEN(UK) Limited requires its certificants not to make or permit misleading statements regarding its certification. This includes that the certified organization does not use or permit the use of the certification documents or parts thereof in a misleading manner.

The use of the mark is limited to the scope of the certification. This requires:

- Mention of the certification standard applied;
- The presentation in connection with the certified scope and avoid misleading reference to noncertified areas, activities, sites, products or services;
- The mention of the certification body.

The certification mark may not be used on test reports, calibration certificates or certificates. The marks may not be used on products or product packaging, nor may they be used in any other way that could be interpreted as marking product conformity. ROSEN(UK) Limited requires all certificants not to use the ROSEN(UK) Limited certification in a manner that brings ROSEN(UK) Limited and/or the certification system into disrepute.

The certificate holder must contact ROSEN in case of questions regarding the use of the certification mark in accordance with the rules.

All advertising materials must be modified accordingly if the scope or validity of the certification has been changed. In the event of suspension or withdrawal of certification, the instructions of ROSEN must be complied with and, if necessary (e.g. in the event of withdrawal or expiry), the use of all advertising material containing references to certification status must be terminated immediately.

ROSEN(UK) Limited remains the owner of the mark(s) and the certificate.

Suspension or Revocation of Permission to Use Mark or Logo

The mark or logo may not be used in any manner that could bring the ROSEN(UK) Limited into disrepute or in any way be considered misleading or unauthorized. The mark or logo may not be used in any manner that would imply an invalid connection between ROSEN and the certified person's business. This includes any use of the mark or logo that the public might construe as an endorsement, approval, or sponsorship by the ROSEN of a certified person's business or any product or service thereof.

The right to use the marks automatically expires when the validity of the certification expires. The right to use the mark also expires after suspension or withdrawal of certification. In such cases, the user of the mark may no longer use any existing documents, records, etc., bearing the marks from the date of expiry.

Actions by ROSEN to suspend or revoke use of the certification mark shall be communicated in writing to the person whose privileges are being suspended or revoked and to all other persons affected by the decision. ROSEN(UK) Limited may also publicize its actions on its website and any other of its publications. Should any person continue use of ROSEN's mark or logo after notice of suspension or revocation, ROSEN(UK) Limited shall seek full equitable and/or legal remedies through a court of competent jurisdiction.

Amendments to the Regulation on the Use of Signs

ROSEN shall inform the user of the mark without delay of any changes to the regulations governing the use of the mark.

Appealing Suspension or Revocation of Certification

Individuals whose certification has been suspended or withdrawn may APPEALS this decision. The reason(s) why you believe the suspense or withdrawal has been made in error need to be explained in detail on the appeals form.

RECERTIFICATION

Recertification is an essential part of an accredited certification process. Standards, technologies, methodologies, and regulations change with time, and the recertification requirement is designed to ensure certificants are keeping up to date with those changes. Recertification demonstrates a commitment to maintain competency.

Recertification Policy

The Pipeline Integrity Engineer Certifications are valid for five-(5) years from date of issue. This five-(5) year period should mitigate the risks resulting from an incompetent person. It is consistent with changes in standards in the oil and gas industry, and allows for changes in:

- Regulatory requirements
- normative documents

- requirements of interested parties; and,
- the relevant scheme requirements.

It will also accommodate the nature and maturity of the industry or field in which the certified person is working, ongoing changes in technology, and requirements for certified persons.

Recertification Eligibility

Each certified professional is required to obtain Continuing Education Units (CEU) or Professional Development Hours (PDH) each renewal period. Professional Development Hour (PDH) is defined as one contact hour of instruction, presentation, or study. Continuing Education Unit (CEU) is a nationally recognized and uniform unit of measure for continuing education and training.

- Individual Certifications require 10 renewal credits per year for a total of 50 renewal credits.
- Certified Pipeline Integrity Engineer certificants must complete 24 credits per year with 3 credits in each of the certification topics for a total of 120 credits.

NOTE: All professional credits must be accumulated during the renewal period.

How to Apply for Recertification

1. Obtain the required renewal credits.
2. Complete the 'Recertification Application form in its entirety
3. Email your application and your activity log to certifications@rosen-group.com
4. Pay the recertification fee

Activities Applicable as Credits for Certification Renewal

- Employment in the industry - 1 credit per year - 5 max.
- Membership in a professional engineering society- 1 credit per year - 5 max. Only **individual** memberships in national organizations qualify.
- Present to your peers at industry event - 2 credits. Credit will **not** be given for workplace presentations.
- Industry Award- 2 credits (For team leader, or team member awarded)
- Write a technical peer-reviewed paper or article–2 credits. Only professional editorial content is accepted. (No blogs or YouTube videos)
- Hold an office in professional engineering society - 1 credit per year – 5 max.
- Continuing education in the field of your certification (includes in-person and/or on-line.

NOTE: Credits are only granted one time for the same presentation or publication within the same renewal cycle. For publications, the certificate holder must be the author or co-author. The certification body will not pre-approve courses or course providers. The decision of what course or activity is to be submitted for credit is up to the judgment of the certified professional.

Keep documentation of the activities as proof in the case of an audit. Do not send in certificates or the alike with your renewal application. If you are randomly selected for an audit, you will be notified after your renewal date.

APPEALS

Appeal Policy

ROSEN is committed to a fair, impartial and timely appeals process. In fulfilling this commitment, no appeal is reviewed by the personnel involved in the adverse certification decisions. ROSEN's Quality Management is responsible for conducting a constructive, impartial review and to deliver a timely decision.

Adverse certification decisions include denial of eligibility for initial certification, denial of recertification, suspension of certification or revocation of certification, accusations of exam irregularities and/or special testing accommodations denial.

Information submitted during the appeals process is considered confidential and shall be handled in accordance with the ROSEN's Confidentiality Policy. The decision rendered shall be final. The maximum number of appeals is one per adverse decision.

How to file an Appeal

(a) Complete the appeal form in in its entirety. The appeal form can be found on the personnel certification website.

(b). Email the appeal form to: certifications@rosen-group.com with any evidence within **fourteen (14) calendar days** from the date of the denial

Appeal Process

(a) When an appeal is received, ROSEN Certification Management will notify ROSEN's Quality Management to conduct an investigation.

(b) No persons who are included with the process involving interaction with appeals will not be the same persons reviewing or making a decision on the appeal.

(c) The investigation must be completed, and the appellant informed in writing of the decision within **ten-(10) working days** of the acknowledgement of receipt

COMPLAINTS

Complaint Policy

A complaint is a formal request for resolution of an issue related to ROSEN's certification activities or to a certified person's behaviors.

In order to maintain the credibility of the Pipeline Integrity Engineer Certification scheme, ROSEN has adopted procedures to allow individuals and/or entities to file complaints for but not limited to the following:

- Misuse or misrepresentation of certification(s);
- Unethical behavior of certificants, candidates or applicants to the Pipeline Integrity Engineer
- Certification program;
- The examination invigilators/ the testing center.

All complaints must be submitted in writing using the complaint form completed in its entirety.
Information submitted during the complaint and investigation process is considered confidential and shall be handled in accordance with the ROSEN's Confidentiality Policy.

Individuals and/or entities who bring forth complaints are not entitled to any relief or damages by virtue of this process, although they shall receive notice of the actions taken.

The complaint form, policy and process are available to the public without request via the ROSEN website and in the candidate handbook.

Ethics Complaint

How to file a Complaint

(a) Anyone who witnesses a violation of the Pipeline Integrity Engineer Code of Conduct (please see the candidate handbook) can report it by filling out the Ethics Complaint Form. The complaint form can be found on the personnel certification website.

(b) In order for a complaint to be valid, the Complaint Form must be fully completed, signed by the Complainant, and submitted to certifications@rosen-group.com

Complaint Process

(a) Complaint Received.

When a Complaint is received, ROSEN will coordinate with the QPPI Certification Board to conduct a preliminary investigation into the merit of the Complaint. In conjunction with legal counsel as deemed appropriate, the QPPI Certification Board will make a recommendation based on initial findings as to whether the Complaint has merit to proceed in forty-five (45) calendar days.

(b) Complaints without Merit and Notification.

ROSEN shall have forty-five (45) calendar days from receiving the QPPI Certification Board recommendation to concur that a Complaint should be dismissed, or if it has merit. If the recommendation is accepted, the matter will be closed, and notice of this decision will be sent to the complainant and to the respondent, only when the respondent has been contacted or has knowledge of the complaint.

General Complaints

How to file a Complaint

(a) Complainants must complete the complaint form in in its entirety.

(b) Email the complaint form to: to certifications@rosen-group.com with any evidence.

Complaint Process

1. Complaint Received.

When a Complaint is received, ROSEN Certification Management will notify ROSEN's Quality Management to conduct a preliminary investigation into the merit of the Complaint to determine the validity of the complaint. No persons who are the subject of the complaint shall be involved in the handling of the complaint. Quality Management will decide if the complaint has merit within thirty (30) calendar days. Complaints with merit, Quality Management shall communicate the details of the findings and/or proposed resolution to the complaint.

2. Complaints without Merit and Notification.

ROSEN's Quality Management will close the complaint and notice of this decision will be sent to the complainant.

POLICIES

Impartiality Policy

ROSEN(UK) Limited is committed to acting impartially in relation to its applicants, candidates, and certified persons. Certification decisions shall be made in accordance with policies and procedures. Policies and procedures affecting applicants, candidates, and certified persons shall be made public and shall fairly and accurately convey information about the certification program.

ROSEN(UK) Limited understands the threats to impartiality that include, but are not limited to, self-interest, activities from related bodies, and relationships of personnel, financial interests, favoritism, conflict of interest, familiarity, and intimidation. In upholding its commitment to maintain the highest level of impartiality and objectivity in its practices and decision- making,

Non-Discrimination Policy

ROSEN discrimination against its applicants, candidates, certified persons and employees on the bases of race, color, national origin, age, disability, sex, gender identity, religion, and where applicable, political beliefs, marital status, or sexual orientation.

Confidentiality Policy

ROSEN is committed to protecting confidential and/or proprietary information related to applicants, candidates, certificants and the examination development, maintenance, and administration process. The confidentiality policy applies to all ROSEN personnel, the QPPI Certification Board and committee members, contractors, and other individuals who are permitted have access to confidential information.

Confidential information includes but is not limited to:

- Applicant and candidates' records
- Examination development documentation (including JTA reports, technical reports, exam questions, answer keys, examination scores, etc.
- Disciplinary investigations and/ or actions

ROSEN personnel, the QPPI Certification Board and committee members shall keep confidential all applicants', candidates', and certified persons' information (including name, address, telephone numbers, and other confidential records) unless authorized for release by the applicant, candidate, or certified person.

ROSEN will only release confidential information when required by law and will be notified the candidate/certificants to the extent, which is permitted by law.

Misconduct & Disciplinary Actions Policy

ROSEN has the authority to suspend, reduce and/or withdrawal certification from certificants. Additionally, ROSEN shall ensure any issues about certificants' practice and conduct are fairly and reasonably investigated and determined and protect the public against unprofessional and unethical conduct by certified persons.

General causes for suspension or withdrawal include, but are not limited to fraud, deceit, failure to follow the policies and procedures of the Pipeline Integrity Certification program, including submission of inaccurate data to obtain and/or maintain certification.

Specific examples of violations that are grounds for certification suspension and withdrawal include:

- Falsifying information or misrepresentation
- on an initial or recertification Pipeline Integrity Engineer Certification program application.
- Releasing confidential examination materials or participate in fraudulent test-taking practices.
- Conviction of a felony under federal or state law.
- Misusing or misrepresenting the certification mark or logo.
- Violation of the Code of Conduct.
- Violation of established personnel certification policies, rules and requirements

Signature / E-Signature Policy

ROSEN requires that the candidate fulfill the signature requirements of the e-signature/signatures according to the Pipeline Integrity Engineer Certification Program certification process.

ROSEN abides by the international standards of security procedures for e-signatures/ signatures as well as other regional identification practices.

Individuals who falsify e-signatures/signatures may subjected to disciplinary action, cancellation of certification, and legal actions.

Verification Of Applicant Eligibility Policy

ROSEN reserves the right to verify any and/or all information submitted with an application attested to by the applicant through phone interviews and authentication of transcripts or training certificates.

Additionally, the ROSEN reserves the right to request further information or documentation from the applicant as needed.

CANDIDATE AGREEMENTS

Code of Conduct

- Exercise a reasonable industry standard of care in the performance of professional duties
- Perform professional duties with trust, integrity, and verity
- Respect human rights
- Hold paramount the health and safety of the public in the performance of professional duties.
- Work in a manner consistent with all applicable laws and regulations; demonstrate integrity, honesty, and fairness in all activities; and strive for excellence in all matters of ethical conduct.
- Act with integrity in any relationship that involves an employer or client and disclose fully to an affected employer or client any conflicts-of-interest resulting from business affiliations or personal interests.
- Voluntarily and immediately report any felony convictions or other legal dispositions that would constitute violations of this Code of Conduct that have not already been disclosed,
- regardless of when they occurred, and report any conditions that prohibit fulfillment of duties as set forth in the competence requirements

Candidate Agreement and Statement of Acknowledgment

1. the competence assessment and all related materials sent to the applicant/candidate are copyrighted and strictly confidential, and shall not be shared with any third party;
2. the applicant / candidate has seen and understands the relevant Competence Standard(s), contents, requirements, and criteria, and believes he/she meets these;
3. the applicant / candidate agrees to notify the ROSEN(UK) LIMITED in a timely manner of changes concerning the information they have provided, including my current address and telephone number;
4. the applicant / candidate agrees to notify ROSEN(UK) LIMITED without delay, of any matter that affects the individual's ability to continue to fulfil the Personnel Certification requirements once Personnel Certification is granted;
5. the applicant/candidate accepts and agrees with the assessment and its criterion (subject to item 10);
6. the applicant/candidate will act in a truthful and honest manner at all times and declares that all information and documentation he/she submits is correct and an honest record of his/her education, qualifications and experience;
7. the applicant/candidate will not participate in fraudulent test taking practices;
8. the applicant/candidate will submit all required information and documentation prior to any award or certification, and that all materials submitted become the property of ROSEN(UK) LIMITED , and are not required to return the materials;
9. information related to the participation in this assessment may be used in an anonymous manner for research purposes only;
10. the applicant/candidate is aware of the grievance and appeal process, and will accept the final outcome of such process;
11. the applicant/candidate will comply with all applicable provisions of this assessment and any resulting certification scheme;
12. the applicant/candidate will immediately cease the use of all claims to the assessment or certification that contain any reference to the Assessment, ROSEN(UK) Limited or any award by such ROSEN upon suspension or withdrawal of such certification, and to return all certificates issued by the ROSEN(UK) Limited ;
13. the applicant/candidate will only make claims regarding this assessment only with respect to the scope for which the certification has been granted;

14. the applicant/candidate hereby releases, discharges and indemnifies ROSEN(UK) LIMITED, QPPI Certification Board, ROSEN Swiss AG, all related ROSEN entities, its directors, officers, members, examiners, employees, attorneys, representatives and agents from any actions, suits, damages, claims or obligations arising out of or in connection with this application and the awarded competency or qualification. The applicant/candidate further agrees and understands that all decisions regarding competency or qualification award rest solely in the discretion of Body;
15. the applicant/candidate agrees not to use the use the certification in such a manner as to bring the certification body into disrepute, and not to make any statement regarding the certification which the certification board considers misleading or unauthorized;
16. the applicant/candidate agrees not to use the certificate in a misleading manner;
17. Information about applicants / candidates / certificants and their application status and examination results are considered confidential. Personal information submitted by the applicants / candidates / certificants with an application is considered confidential. Confidential information will not be released unless a signed release is provided or is required by law. When required by law, the applicants / candidates / certificants will be notify to the extent permitted by law.
18. The applicant/candidate understands the certification exam is proctored by an invigilator and will be monitored via a webcam.
19. The applicant/candidate understands during the validation process, they will be required to pan their monitor / camera around the room to get a 360° view.

Any violation of the above provisions may result in the immediate suspension or withdrawal of the assessment or certification. The candidate can appeal the suspension or withdrawal in accordance with the discipline policy. If the candidate does not appeal or the suspension / withdrawal is upheld, then the assessment and/or certification will be immediately rescinded.

CERTIFIED IN PIPELINE ENGINEERING PRINCIPLES: CS001F

Designed for individuals working in pipeline integrity who are able to describe pipeline-engineering principles, discuss best practices, and explain their bases.

To be awarded the Certified in Pipeline Inspection and Surveillance designation, a candidate must pass a comprehensive examination consisting of forty-(40) multiple-choice questions. The importance of each knowledge, and skills areas (KSA) within it, determines the specifications of the Pipeline Inspection and Surveillance examination. The relative order of importance of the KSAs determines the percentage of the total exam questions.

Please note that questions from the various content areas will be mixed throughout the examination. The questions will **NOT** be presented in content area order on the examination. All questions are only offered in English.

Knowledge of:

1. Pipeline economics and pipeline safety statistics. (10%)
2. Pipeline standards, including their bases and development, linkage to Regulations, key content, purposes, location classification, high consequence areas, design factors, and inherent safety. (12.5%)
3. Line pipe manufacture, types, standards, and choice of coatings. (12.5%)
4. Fluid flow, fluid phases. (10%)
5. Material properties including strength, ductility, toughness, weldability, and metal fatigue. (12.5%)
6. Practical aspects of pipeline routing, and the pipeline construction process. (10%)
7. Pipeline operation, including control rooms, control systems, and leak detection. (10%)
8. Calculation of stresses on pipelines, including principal stresses, thermal stresses, and equivalent stresses. (10%)
9. Practical aspects of pipeline integrity management, including risk assessment, and management, pressure testing, in-line inspection and pipeline repair. (12.5%)

Preparing for the Exam

Individuals need some technical knowledge before commencing this certification program, particularly if an individual is new to, or inexperienced in, pipeline integrity. Each certification scheme contains a list of recommended awareness level competencies (knowledge and skills) which cover basic terminologies, principles, and practices in pipeline integrity competencies.

This list of awareness level competencies can assist in understanding the foundation level competency prior to assessment. These competencies are only a recommendation but are **NOT** required.

CS001A: Pipeline Engineering Principles

Knowledge of

1. History of pipelines, types and uses of pipelines, and benefits.
2. Pipeline standards
3. Line pipe and coatings.
4. Pressure, pipeline fluids, pipeline hydraulics.
5. Material strength and ductility.
6. Pipeline integrity management.
7. Cause of stresses on pipelines, hoop stress design factor, operating and design pressure

CS009A: Pipeline Risk Management

Knowledge of

1. Risk management and risk assessment codes and standards.
2. Pipeline failure hazards for onshore and offshore pipelines.
3. Consequences of pipeline failure, for gas and liquid lines (onshore and offshore).
4. Risk tolerability and risk acceptance criteria.
5. Risk mitigation measures and industry best practice

CS008A: Pipeline Hydraulics
Knowledge of
1. Flow assurance
2. States of matter and phases.
3. Fluid mechanics.
4. Pipeline economics.
5. Pressure and ‘head’.
6. Compressibility.
7. Resistance to flow.
8. Fluid flow.
9. Wax and hydrate formation.
10. Increasing pressure (pumps and compressors).

CS018A: Onshore Pipeline Construction
Knowledge of
1. History of pipeline construction and the ‘spread’ method.
2. Construction project planning, management, and overall project costs and timescales.
3. Laws and regulations.
4. Routing and permits.
5. Line pipe, fittings, and installations.
6. Crossings.
7. Working width, right of way (ROW).
8. Pipeline construction sequence (planning to completion) and construction activities.
9. Environmental considerations.
10. Safety considerations

CS030A: Stress Analysis
Knowledge of
1. Loads, forces, moments.
2. Pressure, stress.
3. Stresses in pipelines caused by internal pressure and external loadings.
4. Stress versus strain.
5. Mechanical properties (strength, deformation, fracture).
6. Stressing guidelines in pipeline standards, including allowable stresses and design factors.
7. Effect of subsea environment, and stresses in risers.
8. Effect of ground movement on pipelines.

CS035A: Pipeline Testing
Knowledge of
1. Pressure testing components.
2. Pressure testing pipelines: history, methodology, types, procedures, purposes.
3. Pneumatic versus hydrostatic.
4. Mill testing of line pipe.
5. Pre-service testing and in-service testing.
6. Safety considerations.
7. Pressure testing levels (pressure/stress and hold

CS036A: Onshore Pipeline Routing
Knowledge of
1. Basis of pipeline route selection, including environmental.
2. Laws, regulations, permissions, consultation, and approvals for pipeline routing.
3. Pipeline routing in standards (e.g., ISO 13623).
4. Pipeline routing methodologies (corridors, routes, rights of way).
5. Pipeline routing considerations (including beneficial features, and constraints).
6. Locating above ground installations

CERTIFIED IN PIPELINE INSPECTION & SURVEILLANCE: CS005F

Designed for individuals working in pipeline integrity who can describe differing pipeline inspection and surveillance methods and compare the best methods.

To be awarded the Certified in Pipeline Inspection and Surveillance designation, a candidate must pass a comprehensive examination consisting of forty-(40) multiple-choice questions. The importance of each knowledge, and skills areas (KSA) within it, determines the specifications of the Pipeline Inspection and Surveillance examination. The relative order of importance of the KSAs determines the percentage of the total exam questions.

Please note that questions from the various content areas will be mixed throughout the examination. The questions will **NOT** be presented in content area order on the examination. All questions are only offered in English.

Knowledge of:

1. Project plan and cost budget for standard projects involving inspection and surveillance activities. (12.5%)
2. Able to recognize the different requirements and available solutions for different project applications (e.g. offshore vs. onshore / buried vs. above ground). (15%)
3. Able to select or specify appropriate inspection and surveillance techniques and services for
1. different project applications. (15%)
4. Interpretation of inspection and surveillance activity findings, assessing their significance,
2. and identify shortcomings. (15%)
5. Pipeline threats and solutions. (15%)
6. Future inspection and surveillance methods. (15%)
7. On-line monitoring of threats. (12.5%)

Preparing for the Exam

Individuals need some technical knowledge before commencing this certification program, particularly if an individual is new to, or inexperienced in, pipeline integrity. Each certification scheme contains a list of recommended awareness level competencies (knowledge and skills) which cover basic terminologies, principles, and practices in pipeline integrity competencies.

This list of awareness level competencies can assist in understanding the foundation level competency prior to assessment. These competencies are only a recommendation but are **NOT** required.

CS005A: Pipeline Inspection and Surveillance

Knowledge of

1. External inspection methods (coating and cathodic protection, excavation, etc.).
2. External surveillance methods (aerial, walking, subsea (ROVs, etc.), etc.).
3. Internal inspection methods (in-line inspection tools)
4. Awareness methods of damage prevention (one-call, markers, etc.).
5. Threats to pipeline integrity.

CS027A: Pipeline Inspection Data Management

Knowledge of

1. External inspection methods (coating and cathodic protection, excavation, etc.).
2. Internal inspection methods (including inline inspection tools)
3. Threats to pipeline integrity.
4. Pipeline inspection reporting and data management.

CS021A: Non-Destructive Testing Technologies
Knowledge of
1. Material properties (mechanical, and magnetic for metals).
2. Screening principles.
3. Inspection (for geometry defects, metal loss, and cracks).
4. Magnetic particle testing.
5. Liquid penetrant testing
6. Other techniques (e.g., visual).
7. Radiographic testing (methods).
8. Electromagnetic testing (methods, general EC).
9. Ultrasonic testing (methods, piezo-electric UT).

CS022A: In-Line Inspection Technologies and Procedures
Knowledge of
1. History of pigging, and in-line inspection.
2. Pipelines, pigs and ILI: current and future.
3. Associated market including understanding the number of service providers and supply vs demand issues.
4. Components of an ILI (the pipeline, its environment, the vehicle, the mechanics and electronics of the vehicle, and the data gathering, analysis, interpretation, and reporting) and how they affect performance.

CS023A: Pipeline Inspection Technologies and Procedures
Knowledge of
1. External pipeline inspection principles (techniques, technologies).
2. Internal pipeline inspection principles (techniques, technologies).
3. Environmental influences on pipeline integrity.
1. Threats to pipeline integrity.

CS035A: Pipeline Testing
Knowledge of
1. Pressure testing components.
2. Pressure testing pipelines: history, methodology, types, procedures, purposes.
3. Pneumatic versus hydrostatic.
4. Mill testing of line pipe.
5. Pre-service testing and in-service testing
6. Safety considerations.
7. Pressure testing levels (pressure/stress and hold

CS_026A: ILI Data Analysis and Reporting
Knowledge of
1. Pipeline basics.
2. Overview of pipeline features and anomalies.
3. Overview of ILI technologies (UT, MFL, EMAT, etc.) and their respective application fields (geometric, volumetric and planar anomalies).
4. Pipeline tracking.
5. Understanding of ILI distance references, and the correlation to pipeline data.
6. Data quality and acceptance criteria.
7. Detection and sizing capabilities of the ILI technology (including sizing tolerances).
8. Overview of ILI anomaly classification,
9. Basics of anomaly interaction rules and pressure assessment.
10. Structure and content of ILI reports (Data Quality Report, Preliminary and Final Inspection Reports, etc.).
11. Applied in-ditch NDE technologies
12. Data quality and acceptance criteria

CS046A: Pipeline Inspection Principles

Knowledge of

1. External pipeline inspection principles (techniques, technologies).
2. Internal pipeline inspection principles (techniques, technologies).
3. Environmental influences on pipeline integrity.
4. Threats to pipeline integrity.

CS048A: Pipeline Defects

Knowledge of

1. Line pipe welds (longitudinal and spiral), welding processes, inspection methods ,and defects (e.g. lack of fusion, laminations, hook cracks, porosity).
2. Pipeline welds (circumferential): standards, inspection methods, and defects (including geometric defects such as misalignment).
3. Common pipeline construction related defects (e.g., misalignment) and their causes.
4. Common types of internal and external corrosion (e.g., pitting, general) and their causes.
5. In-service defects (e.g., mechanical damage, stress corrosion cracking and fatigue cracking)

CERTIFIED IN PIPELINE INTEGRITY MANAGEMENT: CS014F

Designed for individuals working in pipeline integrity who can define, and distinguish between, differing integrity management methods/techniques, particularly pipeline integrity management and systems, and can list the threats to pipeline safety, and the consequences of pipeline failure.

To be awarded the Certified in Pipeline Integrity Management designation, a candidate must pass a comprehensive examination consisting of forty-(40) multiple-choice questions. The importance of each knowledge, and skills areas (KSA) within it, determines the specifications of the Pipeline Integrity Management examination. The relative order of importance of the KSAs determines the percentage of the total exam questions.

Please note that questions from the various content areas will be mixed throughout the examination. The questions will **NOT** be presented in content area order on the examination. All questions are only offered in English.

Knowledge of:

1. Different approaches to pipeline integrity management. (10%)
2. Standards' requirements (including ASME B31.8S, API 1160, API 1173, CSA Z662, DNV RP F116, BSI 8010-4, EN 16348). (10%)
3. Interpreting inspection and survey reports, and inspection, testing, maintenance, and surveillance options (all methods). (10%)
4. Risk reduction options, preventive measures and mitigations. (10%)
5. Establishing baseline inspection and testing intervals. (10%)
6. Defect assessment, including fatigue assessment.(10%)
7. Pipeline repair and rehabilitation, and repair program design. (10%)
8. Threats to pipeline integrity and the consequences of pipeline failure. (10%)
9. Critical data, missing data, treatment of uncertainty. (10%)
10. Emergency preparedness, emergency response, site investigations. (10%)

Preparing for the Exam

Individuals need some technical knowledge before commencing this certification program, particularly if an individual is new to, or inexperienced in, pipeline integrity. Each certification scheme contains a list of recommended awareness level competencies (knowledge and skills) which cover basic terminologies, principles, and practices in pipeline integrity competencies.

This list of awareness level competencies can assist in understanding the foundation level competency prior to assessment. These competencies are only a recommendation but are **NOT** required.

CS005A: Pipeline Inspection and Surveillance
Knowledge of

1. External inspection methods (coating and cathodic protection, excavation, etc.).
2. External surveillance methods (aerial, walking, subsea (ROVs, etc.), etc.).
3. Internal inspection methods (in-line inspection tools)
4. Awareness methods of damage prevention (one-call, markers, etc.).
5. Threats to pipeline integrity.

CS006A: Onshore Laws, Regulations and Standards
Knowledge of

1. What are laws and regulations, processes, their differences, and importance?
2. Pipeline laws and regulations and standards: history, and development.
3. Pipeline standards and specifications, and linking them to regulations. 4. Minimum requirements in regulations and standards.
4. Typical contents of laws and regulations for pipelines.
5. Pipeline standards: purposes, intent

CS014A: Pipeline Integrity Management
Knowledge of

1. Pipeline integrity management system.
2. Safety Management Systems (SMS) and the role they play in Pipeline Integrity Management.
3. Threats to pipeline integrity (pipeline defects and their causes).
4. Inspection, testing, maintenance, and surveillance options (focus on in line inspection, above ground and subsea surveys and patrols).
5. Risk assessment (probability of failure, failure consequences).
6. Integrity management planning (prescriptive, risk based).
7. Pipeline integrity data management, data quality.

CS022A: In-Line Inspection Technologies and Procedures
Knowledge of

1. History of pigging, and in-line inspection.
2. Pipelines, pigs and ILI: current and future.
3. Associated market including understanding the number of service providers and supply vs demand issues.
4. Components of an ILI (the pipeline, its environment, the vehicle, the mechanics and electronics of the vehicle, and the data gathering, analysis, interpretation, and reporting) and how they affect performance.

CS032A: Fracture Mechanics
Knowledge of

1. History of fracture mechanics.
2. Material properties, including ductile and brittle fracture, and transition curves. Strength, toughness, and ductility.
3. Structural mechanics, stress, strain, Strength. Effect of notches and cracks on structures.
4. Linear elastic fracture mechanics, and the stress intensity factor.
5. Fatigue predictions using S-N curves and fracture mechanics crack growth.
6. Effects of environment on fracture and fatigue.

CS033A: Failure Analysis
Knowledge of

1. Material properties (strength, ductility, hardness, and toughness).
2. The ductile to brittle transition of steel.
3. Pipeline failure causes (with a focus on external interference, corrosion, materials defects, fatigue, ground movement, theft).
1. Modes (e.g., buckling) and mechanisms of failure (including corrosion, and fatigue).
8. Failure mechanisms and their causes (including cracking, corrosion growth, and erosion).
2. Chain of custody.
3. Human factors in failures (e.g., CSA's EXP248-2015.)
4. Failure site investigations and protecting evidence.
5. Site safety following a failure.

CS035A: Pipeline Testing
Knowledge of

1. Pressure testing components.
2. Pressure testing pipelines: history, methodology, types, procedures, purposes.
3. Pneumatic versus hydrostatic.
4. Mill testing of line pipe.
5. Pre-service testing and in-service testing.
6. Safety considerations.
7. Pressure testing levels (pressure/stress and hold

CERTIFIED IN PIPELINE DEFECT ASSESSMENT MANAGEMENT: CS020F

Designed for individuals working in pipeline integrity who can describe pipeline integrity and pipeline defect assessments (for all types of defects found in pipelines) and can summarize and give examples of fatigue assessment.

To be awarded the Certified in Pipeline Integrity Management designation, a candidate must pass a comprehensive examination consisting of forty-(40) multiple-choice questions. The importance of each knowledge, and skills areas (KSA) within it, determines the specifications of the Pipeline Integrity Management examination. The relative order of importance of the KSAs determines the percentage of the total exam questions.

Please note that questions from the various content areas will be mixed throughout the examination. The questions will **NOT** be presented in content area order on the examination. All questions are only offered in English.

Knowledge of:

1. Material properties (with a detailed focus on fracture toughness). (12.5%)
2. Fracture mechanisms (brittle, transitional, ductile), and fracture mechanics approaches (including J integral and crack tip opening displacement). (12.5%)
3. Assessment of corrosion using ASME B31G, assessment of cracks using API 579/BS 7910, and assessment of mechanical damage. (12.5%)
4. Pipeline failure causes (including external interference, external forces, corrosion, fatigue, ground movement, sabotage, theft, human error (including over-pressure, overtemperature), spanning, hydrodynamic loads, buckling, and thermal stressing). (15%)
5. Effect of hydrotesting on defect behavior. (12.5%)
6. Commercial, corporate, political, and sabotage threats to pipelines and facilities. (10%)
7. Case studies in pipeline failures, modes, and mechanisms. (12.5%)
8. Corrosion growth and fatigue crack growth models. (12.5%)

Preparing for the Exam

Individuals need some technical knowledge before commencing this certification program, particularly if an individual is new to, or inexperienced in, pipeline integrity. Each certification scheme contains a list of recommended awareness level competencies (knowledge and skills) which cover basic terminologies, principles, and practices in pipeline integrity competencies.

This list of awareness level competencies can assist in understanding the foundation level competency prior to assessment. These competencies are only a recommendation but are **NOT** required.

CS020A: Pipeline Defect Assessment
Knowledge of

1. Material properties (strength, ductility, hardness, and toughness).
2. Fracture mechanics: history, key parameters, methods, and published good
3. practices.
4. Stress analysis (internal pressure and external loading).
5. Pipeline failure causes (with a focus on external interference, corrosion, materials defects, fatigue, ground movement, theft).
6. Types of failure (including ductile, brittle, overload, and fatigue).
7. Case studies in major pipeline failures
8. Corrosion assessment, crack assessment, mechanical damage assessment.
9. Crack management in pipelines.

CS030A: Stress Analysis
Knowledge of
1. Loads, forces, moments.
2. Pressure, stress.
3. Stresses in pipelines caused by internal pressure and external loadings.
4. Stress versus strain.
5. Mechanical properties (strength, deformation, fracture).
6. Stressing guidelines in pipeline standards, including allowable stresses and design factors.
7. Effect of subsea environment, and stresses in risers.
8. Effect of ground movement on pipelines.

CS032A: Fracture Mechanics
Knowledge of
1. History of fracture mechanics. Material properties, including ductile and brittle fracture, and transition curves. Strength, toughness, and ductility.
2. Structural mechanics, stress, strain, strength. Effect of notches and cracks on structures.
3. Linear elastic fracture mechanics, and the stress intensity factor.
4. Fatigue predictions using S-N curves and fracture mechanics crack growth.
5. Effects of environment on fracture and fatigue.

CS033A: Failure Analysis
Knowledge of
1. Material properties (strength, ductility, hardness, and toughness).
2. The ductile to brittle transition of steel.
3. Pipeline failure causes (with a focus on external interference, corrosion, materials defects, fatigue, ground movement, theft).
4. Modes (e.g., buckling) and mechanisms of failure (including corrosion, and fatigue).
5. Failure mechanisms and their causes (including cracking, corrosion growth, and erosion).
6. Chain of custody.
7. Human factors in failures (e.g., CSA's EXP248-2015.)
8. Failure site investigations and protecting evidence.
9. Site safety following a failure.

CS048A: Pipeline Defects
Knowledge of
1. Line pipe welds (longitudinal, and spiral), welding processes, inspection methods, and defects (e.g. lack of fusion, laminations, hook cracks, porosity).
2. Pipeline welds (circumferential): standards, inspection methods, and defects (including geometric defects such as misalignment).
3. Common pipeline construction related defects (e.g., misalignment) and their causes.
4. Common types of internal and external corrosion (e.g., pitting, general) and their causes.
5. In-service defects (e.g., mechanical damage, stress corrosion cracking and fatigue cracking

CS050A: Crack Management
Knowledge of
1. Material properties (strength, toughness, etc.) that are needed to understand the effect of cracks.
2. Types and causes of cracks in pipelines (from line pipe manufacture, to construction, to operation).
3. Crack assessment/management standards (API 579, API 1176, etc.).
4. Examples of failures caused by cracking in pipelines
5. Crack management in a pipeline (identifying, assessing, prioritizing, reassessment, mitigation,

CS042A: Failure Modes and Mechanisms

Knowledge of

1. Why failures occur.
2. Loading types (tension, torsion, compression, etc.)
3. Brittle and ductile failures.
4. Failure modes (collapse, buckling), and failure modes from pressure loading (leak, etc.).
5. Failure mechanisms (including corrosion and fatigue)
6. Modes of failure (including ductile, brittle, overload, and fatigue).
7. Failure mechanisms and their causes (including cracking, corrosion growth, and erosion), modes, and final failure

CS012A: Pipeline Repair

Knowledge of

1. Methods and techniques for onshore and sub-sea pipeline repairs.
2. Defect failure modes and how repair methods provide support to the defect.
3. Standard pressure reduction requirements prior to, and during, repair.
4. Budgeting time and cost factors comparing cut-out with live repairs.
5. Permanent versus temporary repairs.
6. Structural versus pressure containment repairs.

CERTIFIED IN IN-LINE INSPECTION TECHNOLOGIES & PROCEDURES: CS022F

Designed for individuals working in pipeline integrity who can classify and summarize in-line inspection technologies and procedures

To be awarded the Certified in In-Line Inspection Technologies & Procedures designation, a candidate must pass a comprehensive examination consisting of forty-(40) multiple-choice questions. The relative order of importance of the KSAs determines the percentage of the total exam questions.

Please note that questions from the various content areas will be mixed throughout the examination. The questions will **NOT** be presented in content area order on the examination. All questions are only offered in English.

Knowledge of:

1. Different pipeline types used to convey hydrocarbon products (e.g., production, export, transmission and distribution), their key features, and general operating characteristics that affect pigging and in-line inspection.(12.5%)
2. Different line pipe types, pipeline construction concepts (e.g., launcher/receivers, and other related facilities). (12.5%)
3. Familiarity with different ILI tools/technologies and their relative strengths and weaknesses. (12.5%)
4. The service providers, the major suppliers, and their individual capabilities. (12.5%)
5. Major pipeline threats and the associated damage mechanisms. (12.5%)
6. Major project phases required to execute a successful ILI campaign. (12.5%)
7. Familiarity with standard ILI data analysis methodology. (12.5%)
8. Industry standards pertaining to ILI pigging. (12.5%)

Preparing for the Exam

Individuals need some technical knowledge before commencing this certification program, particularly if an individual is new to, or inexperienced in, pipeline integrity. Each certification scheme contains a list of recommended awareness level competencies (knowledge and skills) which cover basic terminologies, principles, and practices in pipeline integrity competencies.

This list of awareness level competencies can assist in understanding the foundation level competency prior to assessment. These competencies are only a recommendation but are **NOT** required.

CS006A: Onshore Laws, Regulations and Standards
Knowledge of

1. What are laws and regulations, processes, their differences, and importance?
2. Pipeline laws and regulations and standards: history, and development.
3. Pipeline standards and specifications and linking them to regulations.
4. Minimum requirements in regulations and standards.
5. Typical contents of laws and regulations for pipelines.
6. Pipeline standards: purposes, intent

CS023A: Pipeline Inspection Technologies and Procedures
Knowledge of

1. External pipeline inspection principles (techniques, technologies).
1. Internal pipeline inspection principles (techniques, technologies).
2. Environmental influences on pipeline integrity.
3. Threats to pipeline integrity.

CS021A: Non-Destructive Testing Technologies
Knowledge of
1. Material properties (mechanical, and magnetic for metals).
2. Screening principles.
3. Inspection (for geometry defects, metal loss, and cracks).
4. Magnetic particle testing.
5. Liquid penetrant testing
6. Other techniques (e.g., visual).
7. Radiographic testing (methods).
8. Electromagnetic testing (methods, general EC).
9. Ultrasonic testing (methods, piezo-electric UT)

CS022A: In-Line Inspection Technologies and Procedures
Knowledge of
1. History of pigging, and in-line inspection.
2. Pipelines, pigs and ILI: current and future.
3. Associated market including understanding the number of service providers and supply vs demand issues.
4. Components of an ILI (the pipeline, its environment, the vehicle, the mechanics and electronics of the vehicle, and the data gathering, analysis, interpretation, and reporting) and how they affect performance.

CS_026A: ILI Data Analysis and Reporting
Knowledge of
Pipeline basics.
1. Overview of pipeline features and anomalies.
2. Overview of ILI technologies (UT, MFL, EMAT, etc.) and their respective application fields (geometric, volumetric and planar anomalies).
3. Pipeline tracking.
4. Understanding of ILI distance references, and the correlation to pipeline data.
5. Data quality and acceptance criteria.
6. Detection and sizing capabilities of the ILI technology (including sizing tolerances).
7. Overview of ILI anomaly classification,
8. Basics of anomaly interaction rules and pressure assessment.
9. Structure and content of ILI reports (Data Quality Report, Preliminary and Final Inspection Reports, etc.).
10. Applied in-ditch NDE technologies
11. Data quality and acceptance criteria

CS050A: Crack Management
Knowledge of
1. Material properties (strength, toughness, etc.) that are needed to understand the effect of cracks.
2. Types and causes of cracks in pipelines (from line pipe manufacture, to construction, to operation).
3. Crack assessment/management standards (API 579, API 1176, etc.).
4. Examples of failures caused by cracking in pipelines
5. Crack management in a pipeline (identifying, assessing, prioritizing, reassessment, mitigation,

CS048A: Pipeline Defects
Knowledge of
1. Line pipe welds (longitudinal, and spiral), welding processes, inspection methods, and defects (e.g. l ack of fusion, laminations, hook cracks, porosity).
2. Pipeline welds (circumferential): standards, inspection methods, and defects (including geometric defects such as misalignment).
3. Common pipeline construction related defects (e.g., misalignment) and their causes.
4. Common types of internal and external corrosion (e.g., pitting, general) and their causes.
5. In-service defects (e.g., mechanical damage, stress corrosion cracking and fatigue cracking

CS027A: Pipeline Inspection Data Management
Knowledge of
1. External inspection methods (coating and cathodic protection, excavation, etc.).
2. Internal inspection methods (including inline inspection tools)
3. Threats to pipeline integrity.
4. Pipeline inspection reporting and data management.

CS051A: Geo-technics
Knowledge of
1. Basics of soil types including typical properties and influence on loads and stability.
2. Loads from pipeline installation, including depth of cover & trench shape.
3. Definition of soil – pipe interaction based on direction and influence of soil type
4. Influence of environment on instability and considerations of pipeline routing and hazard mitigation.
5. Range of geo-hazards including uncontrolled events, influence of man and loads generated by civil engineering activity.
6. How geo-hazards are detected and methods to monitor movement and the effects on pipelines

CERTIFIED IN IN-LINE INSPECTION DATA ANALYSIS & REPORTING: CS026F

Designed for individuals working in pipeline integrity who can explain ILI data analysis and reporting procedures

To be awarded the Certified in In-Line Inspection Data Analysis & Reporting designation, a candidate must pass a comprehensive examination consisting of forty-(40) multiple-choice questions. The relative order of importance of the KSAs determines the percentage of the total exam questions.

Please note that questions from the various content areas will be mixed throughout the examination. The questions will **NOT** be presented in content area order on the examination. All questions are only offered in English.

Knowledge of:

1. Pipe materials (steel grades, design parameters, etc.) and pipeline components (weld types, installation, etc.). (7.5%)
2. Pipeline anomaly categories (geometrical, volumetric, planar). (7.5%)
3. ILI technologies, theoretical base of the underlying NDE principles, and their performance
4. specification. (10%)
5. Pipeline tracking and assessment of AGM marker. (7.5%)
6. Correlation of different ILI runs by girth weld list comparison. (7.5%)
7. Assessment of ILI data quantity (data loss) and quality (e.g., signal strength). (10%)
8. Correlation of inspection pipe tally to pipeline data.(7.5%)
9. Interpretation and classification of pipeline anomalies and components, as well as indications of their origin (dirt, debris, objects, noise, etc.). (7.5%)
10. Sizing of anomaly dimensions (depth, length, width, etc.). (10%)
11. Compilation of standard ILI reports with statistical charts and tables. (7.5%)
12. Cataloging field verification results and comparison to ILI results. (10%)

Preparing for the Exam

Individuals need some technical knowledge before commencing this certification program, particularly if an individual is new to, or inexperienced in, pipeline integrity. Each certification scheme contains a list of recommended awareness level competencies (knowledge and skills) which cover basic terminologies, principles, and practices in pipeline integrity competencies.

This list of awareness level competencies can assist in understanding the foundation level competency prior to assessment. These competencies are only a recommendation but are **NOT** required.

CS015A: Internal Corrosion Mechanisms

Knowledge of

1. Corrosion principles basics.
2. Types of corrosion.
3. Types of pipeline internal corrosion.
4. Pipeline internal environment impact of corrosion.
5. Corrosion growth rates.
6. Measuring corrosion (e.g., by coupons).
7. Effect of water in crude oil, products, and natural gas.

CS021A: Non-Destructive Testing Technologies
Knowledge of
1. Material properties (mechanical, and magnetic for metals).
2. Screening principles.
3. Inspection (for geometry defects, metal loss, and cracks).
4. Magnetic particle testing.
5. Liquid penetrant testing
6. Other techniques (e.g., visual).
7. Radiographic testing (methods).
8. Electromagnetic testing (methods, general EC).
9. Ultrasonic testing (methods, piezo-electric UT)

CS022A: In-Line Inspection Technologies and Procedures
Knowledge of
1. History of pigging, and in-line inspection.
2. Pipelines, pigs and ILI: current and future.
3. Associated market including understanding the number of service providers and supply vs demand issues.
4. Components of an ILI (the pipeline, its environment, the vehicle, the mechanics and electronics of the vehicle, and the data gathering, analysis, interpretation, and reporting) and how they affect performance.

CS023A: Pipeline Inspection Technologies and Procedures
Knowledge of
1. External pipeline inspection principles (techniques, technologies).
2. Internal pipeline inspection principles (techniques, technologies).
3. Environmental influences on pipeline integrity.
4. Threats to pipeline integrity.
5. External pipeline inspection principles (techniques, technologies).
6. Internal pipeline inspection principles (techniques, technologies).
7. Environmental influences on pipeline integrity.
8. Threats to pipeline integrity.

CS024A: Pipeline Preparation and Cleaning
Knowledge of
1. Pipeline lifecycle.
2. Pipelines types, configurations, products carried.
3. History of pigging.
4. What is a pig?
5. Pig types and function (including gauging pigs).
6. Pipeline piggability, system constraints, modifications required.
7. Pig handling, launching and receiving.
8. Pig traps and sites.
9. Site safety.

CS042A: Failure Modes and Mechanisms
Knowledge of
1. Why failures occur.
2. Loading types (tension, torsion, compression, etc.)
3. Brittle and ductile failures.
4. Failure modes (collapse, buckling), and failure modes from pressure loading (leak, etc.).
5. Failure mechanisms (including corrosion and fatigue)
6. Modes of failure (including ductile, brittle, overload, and fatigue).
7. Failure mechanisms and their causes (including cracking, corrosion growth, and erosion), modes, and final failure.

CS_026A: ILI Data Analysis and Reporting

Knowledge of

1. Pipeline basics.
2. Overview of pipeline features and anomalies.
3. Overview of ILI technologies (UT, MFL, EMAT, etc.) and their respective application fields (geometric, volumetric and planar anomalies).
4. Pipeline tracking.
5. Understanding of ILI distance references, and the correlation to pipeline data.
6. Data quality and acceptance criteria.
7. Detection and sizing capabilities of the ILI technology (including sizing tolerances).
8. Overview of ILI anomaly classification,
9. Basics of anomaly interaction rules and pressure assessment.
10. Structure and content of ILI reports (Data Quality Report, Preliminary and Final Inspection Reports, etc.).
11. Applied in-ditch NDE technologies
12. Data quality and acceptance criteria

CS034A: Pipeline Welding

Knowledge of

1. History of welding, and its development in pipelines
2. Welding basics, processes, and types.
3. Effect of welding on materials' properties, and the heat affected zone.
4. Pipeline welding standards.
5. Types of weld imperfections.
6. Line pipe welds, and pipeline girth welds.
7. Principals of non-destructive testing of welds.
8. Pipeline welding QA/QC and records. Welding health and safety (including welding hazards, protective clothing, and safety equipment).

CS048A: Pipeline Defects

Knowledge of

1. Line pipe welds (longitudinal, and spiral), welding processes, inspection methods, and defects (e.g. lack of fusion, laminations, hook cracks, porosity).
2. Pipeline welds (circumferential): standards, inspection methods, and defects (including geometric defects such as misalignment).
3. Common pipeline construction related defects (e.g., misalignment) and their causes.
4. Common types of internal and external corrosion (e.g., pitting, general) and their causes.
5. In-service defects (e.g., mechanical damage, stress corrosion cracking and fatigue cracking

CS027A: Pipeline Inspection Data Management

Knowledge of

1. External inspection methods (coating and cathodic protection, excavation, etc.).
2. Internal inspection methods (including inline inspection tools)
3. Threats to pipeline integrity.
4. Pipeline inspection reporting and data management.

CERTIFIED IN STRESS ANALYSIS: CS030F

Designed for individuals working in pipeline integrity who can describe and review pipeline stress analyses.

To be awarded the Certified in Pipeline Integrity Management designation, a candidate must pass a comprehensive examination consisting of forty-(40) multiple-choice questions. The importance of each knowledge, and skills areas (KSA) within it, determines the specifications of the Pipeline Integrity Management examination. The relative order of importance of the KSAs determines the percentage of the total exam questions.

Please note that questions from the various content areas will be mixed throughout the examination. The questions will **NOT** be presented in content area order on the examination. All questions are only offered in English.

Knowledge of:

1. Principal stresses, equivalent stresses, thermal stress, residual stresses (primary and secondary stresses). (12.5%)
2. Pipeline stress analysis methods and software (elastic). (12.5%)
3. Derivation of pipeline stresses from first principles. (10%)
4. True stress-strain. (12.5%)
5. Design for fatigue. (12.5%)
6. Stress analysis using pipeline standards, and pipeline standards' methods, and their bases. (12.5%)
7. Wall thickness calculations. (15%)
8. Soil-pipe interactions, effect of seabed conditions. (12.5%)

Preparing for the Exam

Individuals need some technical knowledge before commencing this certification program, particularly if an individual is new to, or inexperienced in, pipeline integrity. Each certification scheme contains a list of recommended awareness level competencies (knowledge and skills) which cover basic terminologies, principles, and practices in pipeline integrity competencies.

This list of awareness level competencies can assist in understanding the foundation level competency prior to assessment. These competencies are only a recommendation but are **NOT** required.

CS008A: Pipeline Hydraulics
Knowledge of

1. Flow assurance
2. States of matter and phases.
3. Fluid mechanics.
4. Pipeline economics.
5. Pressure and 'head'.
6. Compressibility.
7. Resistance to flow.
8. Fluid flow.
9. Wax and hydrate formation.
10. Increasing pressure (pumps and compressors).

CS032A: Fracture Mechanics
Knowledge of

1. History of fracture mechanics. Material properties, including ductile and brittle fracture, and transition curves. Strength, toughness, and ductility.
2. Structural mechanics, stress, strain, strength. Effect of notches and cracks on structures.
3. Linear elastic fracture mechanics, and the stress intensity factor.
4. Fatigue predictions using S-N curves and fracture mechanics crack growth.
5. Effects of environment on fracture and fatigue.

CS048A: Pipeline Defects

Knowledge of

1. Line pipe welds (longitudinal, and spiral), welding processes, inspection methods, and defects (e.g. lack of fusion, laminations, hook cracks, porosity).
2. Pipeline welds (circumferential): standards, inspection methods, and defects (including geometric defects such as misalignment).
3. Common pipeline construction related defects (e.g., misalignment) and their causes.
4. Common types of internal and external corrosion (e.g., pitting, general) and their causes.
5. In-service defects (e.g., mechanical damage, stress corrosion cracking and fatigue cracking

CS018A: Onshore Pipeline Construction

Knowledge of

1. History of pipeline construction and the 'spread' method.
2. Construction project planning, management, and overall project costs and timescales.
3. Laws and regulations.
4. Routing and permits.
5. Line pipe, fittings, and installations.
6. Crossings.
7. Working width, right of way (ROW).
8. Pipeline construction sequence (planning to completion) and construction activities.
9. Environmental considerations.
10. Safety considerations

CS030A: Stress Analysis

Knowledge of

1. Loads, forces, moments.
2. Pressure, stress.
3. Stresses in pipelines caused by internal pressure and external loadings.
4. Stress versus strain.
5. Mechanical properties (strength, deformation, fracture).
6. Stressing guidelines in pipeline standards, including allowable stresses and design factors.
7. Effect of subsea environment, and stresses in risers.
8. Effect of ground movement on pipelines.

CS033A: Failure Analysis

Knowledge of

1. Material properties (strength, ductility, hardness, and toughness).
2. The ductile to brittle transition of steel.
3. Pipeline failure causes (with a focus on external interference, corrosion, materials defects, fatigue, ground movement, theft).
4. Modes (e.g., buckling) and mechanisms of failure (including corrosion, and fatigue).
5. Failure mechanisms and their causes (including cracking, corrosion growth, and erosion).
6. Chain of custody.
7. Human factors in failures (e.g., CSA's EXP248-2015.)
8. Failure site investigations and protecting evidence.
9. Site safety following a failure.

CS051A: Geo-technics

Knowledge of

1. Basics of soil types including typical properties and influence on loads and stability.
2. Loads from pipeline installation, including depth of cover & trench shape.
3. Definition of soil – pipe interaction based on direction and influence of soil type
4. Influence of environment on instability and considerations of pipeline routing and hazard mitigation.
5. Range of geo-hazards including uncontrolled events, influence of man and loads generated by civil engineering activity.
6. How geo-hazards are detected and methods to monitor movement and the effects on pipelines

CS020A: Pipeline Defect Assessment

Knowledge of

1. Material properties (strength, ductility, hardness, and toughness).
2. Fracture mechanics: history, key parameters, methods, and published good
3. practices.
4. Stress analysis (internal pressure and external loading).
5. Pipeline failure causes (with a focus on external interference, corrosion, materials defects, fatigue, ground movement, theft).
6. Types of failure (including ductile, brittle, overload, and fatigue).
7. Case studies in major pipeline failures
8. Corrosion assessment, crack assessment, mechanical damage assessment.
9. Crack management in pipelines.

CS042A: Failure Modes and Mechanisms

Knowledge of

1. Why failures occur.
2. Loading types (tension, torsion, compression, etc.)
3. Brittle and ductile failures.
4. Failure modes (collapse, buckling), and failure modes from pressure loading (leak, etc.).
5. Failure mechanisms (including corrosion and fatigue)
6. Modes of failure (including ductile, brittle, overload, and fatigue).
7. Failure mechanisms and their causes (including cracking, corrosion growth, and erosion), modes, and final failure.

CERTIFIED IN FRACTURE MECHANICS: CS032F

Designed for individuals working in pipeline integrity can explain the history of fracture mechanics, its principles, models (elastic, elastic-plastic, and plastic), and differing models, defining the best assessment methods using fracture mechanics, and define and distinguish between the traditional approach to fatigue assessment, and the fracture mechanics approach to fatigue assessment

To be awarded the Certified in Fracture Mechanics designation, a candidate must pass a comprehensive examination consisting of forty-(40)multiple-choice questions. The relative order of importance of the KSAs determines the percentage of the total exam questions.

Please note that questions from the various content areas will be mixed throughout the examination. The questions will **NOT** be presented in content area order on the examination. All questions are only offered in English.

Knowledge of:

1. Quantitative and qualitative toughness and interpreting fracture toughness (Kmat) from Charpy and toughness data, using standard correlations. Fracture toughness testing.(12.5%)
2. Identify primary and secondary stresses, toughness, and other inputs to a fracture analysis. (12.5%)
3. Stress fields at crack tips, and elastic-plastic fracture using K, J, or CTOD. Relationship between K, J and CTOD. (12.5%)
4. FADs for fracture and collapse. Choice of FAD, inclusion of residual stress, effects of pressure testing and PWHT on inputs. (10%)
5. Can carry out fatigue analyses by S-N or fracture mechanics methods, including environmental effects and cycle counting of data. (12.5%)
6. Assessment codes – BS 7910, API 579 – and other approaches (e.g., CorLAS, PAFFC, LEFM). Use of commercial ECA software packages for routine analyses. (12.5%)
7. Assessment of environmental cracking.(12.5%)
8. Can interpret pipeline data such as design and service records, pipe stress analysis. (15%)

Preparing for the Exam

Individuals need some technical knowledge before commencing this certification program, particularly if an individual is new to, or inexperienced in, pipeline integrity. Each certification scheme contains a list of recommended awareness level competencies (knowledge and skills) which cover basic terminologies, principles, and practices in pipeline integrity competencies.

This list of awareness level competencies can assist in understanding the foundation level competency prior to assessment. These competencies are only a recommendation but are **NOT** required.

CS020A: Pipeline Defect Assessment
Knowledge of

1. Material properties (strength, ductility, hardness, and toughness).
2. Fracture mechanics: history, key parameters, methods, and published good practices.
3. Stress analysis (internal pressure and external loading).
4. Pipeline failure causes (with a focus on external interference, corrosion, materials defects, fatigue, ground movement, theft).
5. Types of failure (including ductile, brittle, overload, and fatigue).
6. Case studies in major pipeline failures
7. Corrosion assessment, crack assessment, mechanical damage assessment.
8. Crack management in pipelines.

CS030A: Stress Analysis
Knowledge of
1. Loads, forces, moments.
2. Pressure, stress.
3. Stresses in pipelines caused by internal pressure and external loadings.
4. Stress versus strain.
5. Mechanical properties (strength, deformation, fracture).
6. Stressing guidelines in pipeline standards, including allowable stresses and design factors.
7. Effect of subsea environment, and stresses in risers.
8. Effect of ground movement on pipelines.

CS032A: Fracture Mechanics
Knowledge of
1. History of fracture mechanics. Material properties, including ductile and brittle fracture, and transition curves. Strength, toughness, and ductility.
2. Structural mechanics, stress, strain, strength. Effect of notches and cracks on structures.
3. Linear elastic fracture mechanics, and the stress intensity factor.
4. Fatigue predictions using S-N curves and fracture mechanics crack growth.
5. Effects of environment on fracture and fatigue.

CS033A: Failure Analysis
Knowledge of
1. Material properties (strength, ductility, hardness, and toughness).
2. The ductile to brittle transition of steel.
3. Pipeline failure causes (with a focus on external interference, corrosion, materials defects, fatigue, ground movement, theft).
4. Modes (e.g., buckling) and mechanisms of failure (including corrosion, and fatigue).
5. Failure mechanisms and their causes (including cracking, corrosion growth, and erosion).
6. Chain of custody.
7. Human factors in failures (e.g., CSA's EXP248-2015.)
8. Failure site investigations and protecting evidence.
9. Site safety following a failure.

CS042A: Failure Modes and Mechanisms
Knowledge of
1. Why failures occur.
2. Loading types (tension, torsion, compression, etc.)
3. Brittle and ductile failures.
4. Failure modes (collapse, buckling), and failure modes from pressure loading (leak, etc.).
5. Failure mechanisms (including corrosion and fatigue)
6. Modes of failure (including ductile, brittle, overload, and fatigue).
7. Failure mechanisms and their causes (including cracking, corrosion growth, and erosion), modes, and final failure.

CS048A: Pipeline Defects
Knowledge of
1. Line pipe welds (longitudinal, and spiral), welding processes, inspection methods, and defects (e.g. lack of fusion, laminations, hook cracks, porosity).
2. Pipeline welds (circumferential): standards, inspection methods, and defects (including geometric defects such as misalignment).
3. Common pipeline construction related defects (e.g., misalignment) and their causes.
4. Common types of internal and external corrosion (e.g., pitting, general) and their causes.
5. In-service defects (e.g., mechanical damage, stress corrosion cracking and fatigue cracking

TestReach

Protocol Document for Remote Invigilated Exams

ROSEN (UK) Limited

Created:

Version 1.3

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Candidate Exam Checklist for Remote Invigilated Exams

Please ensure that you read this document thoroughly. It is your responsibility to ensure you understand, are familiar with and adhere to the regulations and protocols herein. Failure to comply with any of the procedures outlined in this document may result in your exam being terminated / results not being issued.

1. Computer requirements:

   - Laptop / computer with 4GB of ram (no chrome books, tablets or surface pro)
   - A Windows v7.0+ or Mac10.8+ operating systems
   - Intel Core i3 (or equivalent) and 4GB RAM
   - A working webcam that can be used to scan the room, microphone and speakers
   - Internet connectivity with continuous internet speed of a minimum of 516kbps

2. Before your exam please ensure that you have downloaded the TestReach application (as per your enrolment email)

3. Make sure you have completed the webcam check and confirmed your exam slot **at least 3 days in advance of exam day.** Candidates who do not complete this process 3 days in advance will be considered a no-show and will not be able to sit their exam.

4. Make sure that you have completed the Test Tutorial

5. You must ensure that you have your TestReach user information with you – user ID and password.

6. Do not forget your signed Photo ID – either passport or driving license only

7. You must not be interrupted throughout your exam. Please make sure your room / space is private and well lit.

8. You will be asked to scan the room for a 360° view using your monitor / webcam.

9. Ensure that your computer area is free of all clutter and unauthorised materials.

10. Your mobile phone should be turned off and put out of reach once you are connected with your supervisor.

11. If you are in a room with others sitting your exams please ensure that you have headphones in order to hear the supervisor.

12. Please do not have a second monitor on your desk or within reach.

13. The only authorised items allowed for this exam are water / drinks, a single page and pen which must be shown to the camera.

14. You may not move around the test site – i.e. no wandering around the room. You need to remain in the webcam viewing area at all times.

15. Ensure that you do not block the webcam for any reason.

16. No smart watches are allowed. You will be asked to show your wrists to the supervisor.

17. There are **NO** Comfort Breaks allowed during this exam.

18. Please behave in a suitable manner towards the Supervisor, comply with any procedural requests, and respond to all validation questions.

***Note: If you have any difficulties with regard to logging on for your exam please contact:**

+353 (1) 699 1385 / +44 (0)20 34758685 / +1 (833) 202 2819

support@testreach.com

https://www.testreach.com/candidate-support.html

For information on the availability of our service see:

https://status.testreach.com

Validation Protocol for Candidates

Introduction

The below information describes the validation protocol and the steps that trained invigilators will take to verify the identity of the candidate and to ensure that the candidate's test environment is secure – this is for your information and to know what to expect.

Prior to Exam

There is a three-step process for preparing for exam day. Candidates must confirm or book their exam **3 days in advance of exam day**. Candidates who do not complete this process 3 days in advance will be considered a no-show and will not be able to sit their exam.

1. Download the TestReach application
2. Complete the system check
3. Confirm or book your exam

- Candidates will receive an email with login details from TestReach with the subject "TestReach New Account". If you cannot find this email, please check your spam folder. Please ensure that you have your user ID and password with you on the day of your exam.
- All candidates are advised to take "Test Tutorial", which guides you through taking an exam on TestReach. We suggest that you go through this tutorial by clicking "Enter" so that you can familiarise yourself with the exam canvas. You can use this tutorial multiple times and your answers will not be recorded.
- All exams need to be booked or confirmed 3 days in advance.
- Candidates are also advised to be in their chosen exam location 20 to 30 minutes before their scheduled exam start time in order to login, enter exam and go through the system checks. 15 minutes before exam, the "connect" option will activate, and candidates can click on this to commence the pre- validation process.

Note: Candidates will be permitted to commence the exam up to 30 minutes after the scheduled start time. The duration of their exam remains the same. If a candidate has not connected within 30 minutes, their exam will expire and they will not be able to do the exam.

Day of Exam:

- Ensure that you arrive at your venue 20- 30 min before your exam start time.
- Login into TestReach using your User ID and Password.

It is advised that all candidates enter exam 15 minutes before start time in order to allow the candidate to go through pre - validation process with their Supervisor.

- Select “Connect to Supervisor”. Please note that the connection to the Supervisor may not be immediate but that the Supervisor is aware that you are ready to start your exam.
- Once you are connected, Supervisor can immediately see: the candidate’s desktop / screen, a ‘chat box’ for any Instant messages between the supervisor and candidate and a live audio / video of the candidate via webcam.
- Supervisor will advise candidate of pre-validation process before they begin their exam via audio.

Authentication / Validation Process

There is a list of steps taken to verify a candidate’s identification and secondly that the testing area is secure.

a. The supervisor will ask you to show your photo ID to the camera. This ID should either be an in - date passport or driving license, with photograph and signature.

b. The candidate will be asked to pan their monitor / camera around the room to get a 360° view – the supervisor will need to make sure that the candidate pans the whole area. This is to ensure that:

- There is no second monitor / computer visible in the room
- Any phone visible has been put out of reach
- There are no notes / wall boards with information on them

c. The candidate will also be asked to scan their desk (including any shelves under the desk) – this is to make sure that there are no phones, books, post-its etc. nearby. As there are no resources allowed for this exam other than water / drink the test area should be clear.

d. If the supervisor observes any unauthorised items, they will request that the candidate removes them from the testing area.

No-Shows

There is no requirement to contact a candidate on the day of the exam if they are a no show. There is no additional fee for a no show, but the exam charge will apply.

Monitoring Protocol

1. During the exam the supervisor is required to monitor the candidate via webcam. The supervisor is also able to monitor audio feedback to ensure that there are no verbal answers or communication from any outside source. The supervisor will be able to:
   - see the candidate via webcam and see the candidate's screen
   - use a chat box to communicate to the candidate
   - hear the candidate and all times and talk with them when required.

2. When monitoring the exam, the supervisor will watch the screen at all times. They will check for: Eye movement / Head movement / Hand movement / Talking or mouthing or other indications of external communication

3. If the supervisor notices any of the above behaviours they will send the candidate an Instant message or talk to them asking them to refrain from the behaviour e.g. "please keep your eyes on the screen", "please keep within view of the webcam", "there is no talking allowed – thank you", etc.

4. If the supervisor is required to log an infringement, the supervisor will click on the Log Infringement button. The supervisor will click on the appropriate infringement described and then on the 'Take Action' button.

5. By clicking the 'Take Action' button this will record the exceptional activity onto the 'Actions Log' and will automatically send a message to the candidate saying an exception has occurred. The candidate MUST click OK to this in order to resume their exam. – This can be seen by the supervisor on the screen share.

6. Please see the Infringement Protocols for specific Major / Minor Infringements.

7. It is at the client's discretion to decide if the test should be allowed or not or what post-exam action to take where any major infringements are recorded.

8. There are 2 automatic time warnings given – one with 30 mins to go before the end of the exam and one with 5 minutes to go.

Sample Infringement Guidelines

Minor Infringements

A Minor Infringement is one that is deemed a low-level exception. Minor Infringements may not compromise the test and can be rectified immediately however all minor infringements are logged.

- Leaning out of view of the camera.
- Blocking the computer camera.
- Commencing hand movements that could be interpreted as sign language.
- Glancing at other areas of the room that the supervisor cannot see (in this instance prior to raising an infringement the supervisor will query the candidate and ask the candidate to pan the room and in particular that area to check)
- Behaving in an unsuitable manner to the supervisor.

Major Infringements

A Major Infringement is one that is deemed a medium level exception. One that does not compromise the test and one that is rectified quite quickly with the candidate during the test.

- Accessing (or trying to access) another site / document when online
- Referring to any material – if there are no resources allowed.
- Not removing objects that are deemed interactive such as smart watches.
- Not agreeing or responding to the validation questions asked by the Supervisor.

Blocker Infringements

A Blocker Infringement is one that is deemed a high level exception. One that compromises the test and causes the test to be terminated. Supervisors will warn the candidates in advance.

- Leaving the test centre area for ANY reason.

- Communication of any sort with a third party.
- Mobile phones are not to be used in the testing area at all once the exam has commenced.

The supervisor is to alert the candidate that an action has been recorded. The supervisor will then log all the exceptional actions and inform the client via an actions log.

Actions taken if an infringement occurs:

- There is an actions log available to the supervisor which will log any infringement made (including any notes written by the supervisor) and be timed and dated automatically.
- If the supervisor notices any suspicious activity the supervisor will update the feedback log to indicate that an exception has occurred and detail the activity in question.
- A recording of the exam will also be taken to provide supporting evidence.

Candidate Issues on Exam Day

Minor Incidents

It is the candidate's responsibility to ensure their computer:

- is in good order
- has sufficient memory
- has up-to-date software, drivers etc
- has good internet connection speeds
- is plugged into a power source so you have enough power for the duration of the exam
- all apps running in the background are closed in case it impedes with the progress of the exam

If the candidate's equipment fails on exam day then there is limited troubleshooting steps that the TestReach support team can work through.

Candidate experiences poor internet connection at the time of their exam.
A candidate may have their exam resumed up to a maximum of 3 times. After this they will be asked to contact their examining body to rebook their exam.

Candidate experiences an issue local to their device i.e. issues with their webcam, sound card, graphics card etc.
Our customer support team will spend up to a maximum of 15 mins on an in-bound telephone helping the candidate to resolve issues local to their device.

At this point, the customer support team will end the call and advise the candidate to contact the examining body to rebook their exam.
This is to ensure that our customer support team have the required availability to provide a high level of support to all candidates taking an exam at that time.

Candidate is late
Candidate is late for their exam or experiences issues logging onto the TestReach app.
If a candidate calls the customer support line within 30 mins of their exam start time, the customer support team will help the candidate to resolve the issue.
If a candidate calls after 30 mins, they will be advised to contact the examining body to rebook their exam.

Major or Critical Incidents

In the very unlikely event that the TestReach service has a major or critical incident, candidates should go to https://status.testreach.com

This website will keep you up to date on any actions you should take and when we expect the service to resume.

In the event of a disruption to our service, our support lines would see naturally see a spike in activity and it is unlikely that you will be able to speak to an agent. The https://status.testreach.com page is our main and sole source of communication to candidates during this time.