



## **BODY OF KNOWLEDGE**

### **API 1169 PIPELINE CONSTRUCTION INSPECTOR**

**Through September 2021 exams**

API 1169 Pipeline Construction Inspectors must have a broad knowledge base relating to construction of new onshore pipeline construction. This knowledge base, at a minimum, includes such topics as inspector responsibilities, personnel and general pipeline safety, environmental and pollution control, and general pipeline construction inspection. The API 1169 Pipeline Construction Inspector Certification Examination is designed to determine if applicants have such knowledge.

Candidates will be given three hours to complete the 115-question examination (100 scored, 15 not scored) on a computer. Questions for the examination are multiple-choice and personal reference materials are not permitted to be brought into the computer testing centers. US and Canadian government-based reference materials will be provided to all the candidates during the exam on their computer monitors. Candidates may choose to use either set of references to answer all questions. Please note that the keyword search function (Ctrl + F) is *not* available during the exam. Review the Exam Tutorial provided on API's website for further information regarding the operation of the PDF viewer. Please see page two of the API 1169 Effectivity Sheet for a complete list of the documents that will be available during the exam.

Please note: This exam has been reviewed and approved by Canadian experts for use by the Canadian pipeline industry. When a reference has a Canadian equivalent, (for example API 1104 and CSA Z662-19), candidate may choose to study either the American or Canadian reference(s) with the assurance that exam questions will focus on areas where the technical content overlaps.

Please note that API has chosen to use certain standards and codes as representative of best practices within the pipeline industry. Local regulations may differ and it is the responsibility of the pipeline inspector to know and understand the applicable rules and regulations for the area where the pipeline project is undertaken. For this reason, some questions may only be answered using US OSHA regulations (29 CFR 1910 and 29 CFR 1926). These questions are clearly identified in the exam and will say "according to OSHA" in order that applicants will know to use the OSHA regulations provided during the exam to answer these questions.

To determine whether the applicants have sufficient knowledge of inspection practices and related topics, a minimum of one question from each main category listed within this Body of Knowledge will be included on the API certification examination. Only information covered in one of the referenced materials listed in this body of knowledge will be utilized for the examination questions.



## **REFERENCE PUBLICATIONS**

### **API 1169, Basic Inspection Requirements – New Pipeline Construction**

Entire document is subject to testing

### **API 1110, Pressure Testing of Steel Pipelines –**

Entire document is subject to testing with exception of the appendices

### **API Q1, Specification for Quality Programs**

ATTN: Test questions will only be based on the following portions of the document:

- Section 3 - Terms, Definitions and Abbreviations
- Section 4 - Quality Management System Requirements
- Section 5 - Product Realization

### **ANSI Z49.1, Safety in Welding, Cutting, and Allied Processes**

(<http://www.aws.org/standards/page/ansi-z491>)

ATTN: Test questions will only be based on the following portions of the document:

- Chapter 4 - Protection of Personnel and the General Area
- Chapter 5 - Ventilation
- Chapter 6 - Fire Prevention and Protection
- Chapter 8 - Public Exhibitions and Demonstrations

### **CEPA Foundation/INGAA Foundation, A Practical Guide for Pipeline Construction Inspectors**

(<http://www.ingaa.org/Foundation/Foundation-Reports/29158.aspx>)

Entire document is subject to testing

### **CGA (Common Ground Alliance) Best Practices**

(<http://commongroundalliance.com/programs/best-practices>)

Entire document is subject to testing

### **INGAA, Construction Safety Guidelines**

- *Natural Gas Pipeline Crossing Guidelines* (<http://www.ingaa.org/File.aspx?id=20405>)  
Section II - Definitions
- *CS-S-9 Pressure Testing (Hydrostatic/Pneumatic) Safety Guidelines* (<http://www.ingaa.org/File.aspx?id=18981>)  
Entire document is subject to testing

### **ISO 9000 Quality Management Systems – Fundamentals and Vocabulary**

ATTN: Test questions will only be based upon the Definitions

### **API 1104, Welding of Pipeline and Related Facilities**

ATTN: Test questions will only be based on the following portions of the document:

- Section 3 - Terms, Definitions, Acronyms, and Abbreviations
- Section 4 - Specifications
- Section 5 - Qualifications of Welding Procedures with Filler Metal Additions
- Section 6 - Qualification of Welders
- Section 7 - Design and Preparation of a Joint for Production Welding
- Section 8 - Inspection and Testing of Production Welds
- Section 9 - Acceptance Standards for NDT
- Section 10 - Repair and Removal of Weld Defects
- Section 11 - Procedures for Nondestructive Testing (NDT)

### **OR CSA Z662-19, Oil and Gas Pipeline Systems**

(<http://shop.csa.ca/>)

ATTN: Test questions will only be based on the following portions of the document:

- Chapter 1 - Scope
- Chapter 2 - Reference publications and definitions
- Chapter 4 - Design
- Chapter 6 - Transportation, handling, and installation
- Chapter 7 - Joining
- Chapter 8 - Pressure testing
- Chapter 9 - Corrosion control
- Chapter 10 - Operating, maintenance, and upgrading



ATTN: The below references on pages 3 and 4 will be available to applicants during the exam. Only those articles and sections specifically listed will be available to applicants. For simplicity purposes, API has extracted all the necessary pages of the below listed regulations (both US and Canadian) and made a pdf version available for downloading on our website. Applicants are encouraged to use the pdf version.

US References

Canadian Equivalents

49 CFR 192, Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards:

- Subpart A – General
Article 7
Subpart E – Welding of Steel in Pipelines
Subpart G – General Construction Requirements for Transmission Lines and Mains
Subpart J – Test Requirements
Article 505
Subpart L – Operations
Article 614
Subpart M – Maintenance
Article 707

49 CFR 195, Transportation of Hazardous Liquids by Pipeline

- Subpart A – General
Articles 2 & 3
Subpart D – Construction
Subpart E – Pressure Testing
Articles 302 & 310
Subpart F – Operations and Maintenance
Article 410

Safety

29 CFR 1910, Occupational Safety and Health Standards

- Subpart H – Hazardous Materials
Article 119
Subpart I – Personal Protective Equipment
The Subpart I (Excluding Article 140 and Subpart I Appendices)
Subpart J – General Environmental Controls
Articles 145-147 (Excluding Article Appendices)
Subpart N – Materials Handling and Storage
Article 184

29 CFR 1926, Safety and Health Regulations for Construction:

- Subpart C – General Safety and Health Provisions
Subpart D – Occupational Health and Environmental Controls
Article 62 (Excluding Article Appendices)
Subpart E – Personal Protective and Life Saving Equipment
Article 102
Subpart F – Fire Protection and Prevention
Article 152
Subpart H – Materials Handling, Storage, Use and Disposal
Articles 250 and 251
Subpart L – Scaffolds
Article 451
Subpart M – Fall Protection
Articles 500-501
Subpart O – Motor Vehicles, Mechanized Equipment and Marine Operations
Article 601
Subpart P – Excavations
The entirety of Subpart P, Including Appendices
Subpart U – Blasting and the Use of Explosives
Articles 902 & 914
Subpart CC – Cranes & Derricks in Construction
Article 1417

Canada Occupational Health and Safety Regulations (COHS) : (F)
(http://laws.justice.gc.ca/eng/regulations/sor-86-304/index.html)

- Part III - Temporary Structures and Excavations
Part IV - Elevating Devices
Part X - Hazardous Substances
Part XI - Confined Spaces
Part XII - Safety Material, Equipment, Devices and Clothing
Part XIV - Materials Handling
Part XV - Hazardous Occurrence Investigation, Recording and Reporting
Part XIX - Hazard Prevention Program



49 CFR 172, Hazardous Materials Table, Special Provisions Hazardous Materials Communication, Emergency Response Information, Training Requirements, and Security Plans:

- Subpart B – Table of Hazardous Materials and Special Provisions
Article 101: Purpose and use of Hazardous Materials Table (Excluding Article Appendices)

Transport Canada, Transportation of Dangerous Goods Regulations: (F)

- Part 1.4 - Definitions
Part 2 - Classification (excluding appendices 1 and 3 through 5)
Part 4 - Dangerous Goods Safety Marks
Part 6 - Training

Environmental

33 CFR 321, Permits for Dams and Dikes in Navigable Waters of the United States

Entire document is subject to testing

40 CFR 300, National Oil and Hazardous Substances Pollution Contingency Plan:

- Subpart A – Introduction
Subpart E – Hazardous Substance Response

Federal Energy Regulatory Commission: Office of Energy Projects

Wetland and Waterbody Construction and Mitigation Procedures, May 2013.

(http://www.ferc.gov/industries/gas/enviro/procedures.pdf)

Entire document is subject to testing

Upland Erosion Control, Revegetation, and Maintenance Plan, May 2013.

(http://www.ferc.gov/industries/gas/enviro/plan.pdf)

Entire document is subject to testing

Migratory Bird Permits (50 CFR 21):

Subpart B – General Requirements and Exceptions

33 USC Chapter 9: Protection of Navigable Waters and of Harbor and River Improvements Generally

Subchapter I – In General
Articles 401,403, 403a, 404 & 407

Endangered Species Act of 1973\*

16 U.S.C. Chapter 35 Endangered Species\*

Table with 3 columns: Section number, Description, and Corresponding Section number. Rows include Section 3 (Definitions), Section 4 (Determination of endangered species), Section 7 (Interagency Cooperation), Section 9 (Prohibited Acts), Section 10 (Exceptions), and Section 12 (Endangered Plants).

Canadian Environmental Protection Act, 1999 (S.C. 1999, c.33): (F)

- Section 3 - Definitions
Section 64 - Toxic Substances
Section 65 - Definition of virtual elimination
Sections 90-94 - Regulation of Toxic Substances
Sections 95-99 - Release of Toxic Substance

Fisheries and Oceans, Land Development Guidelines for the Protection of Aquatic Habitat:

Section 3- Erosion and Sediment Control and Site Development Practices

Canada Water Act (R.S.C., 1985, c.C-11): (F)

Part II - Water Quality Management

Canadian Energy Pipeline Association (CEPA), Pipeline Associated Watercourse Crossings, 4th Edition, November 2012

(http://www.cepa.com/wp-content/uploads/2014/01/FourthEdition\_WatercourseCrossingManual\_Nov2012.pdf)

Entire document is subject to testing with the exception of Section 2.2: Provincial and Territorial Jurisdictions

Migratory Bird Convention Act, 1994 (S.C. 1994, c.22): (F)

- Section 4 – Purpose
Section 5 – Prohibitions
Section 6 – Administration
Section 12 – Regulations

Navigation Protection Act (R.S.C.,1985, c. N-22) (F)

- Section 2 – Definitions
Sections 3-14 – Works
Sections 21-26 – Deposit and Dewatering

Species at Risk Act (S.C. 2002, c. 29) (F)

- Sections 2 – Definitions
Sections 32- 36 – General Prohibitions
Section 37 – Preparation – endangered or threatened species
Section 38 – Commitments to be considered
Section 39 – Cooperation with others
Sections 56-64 – Protection of Critical Habitat

Canadian documents with (F) listed next to their titles indicates that the document is provided in both English and French during the exam. Please note that not all documents have French translations.

\* The Endangered Species Act and 16 U.S.C. Chapter 35 Endangered Species are interchangeable



Attention: All examination questions are based on the materials listed above.  
The ASME Documents below are recommended for general knowledge but not required for the exam. All exam-related information contained within ASME documents can also be found in API RP 1169 and CEPA/INGAA's Practical Guide for Pipeline Construction Inspectors

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**ASME B31.4, Pipeline Transportation Systems for Liquids and Slurries**

ATTN: Test questions will only be based on the following portions of the document:

- Chapter I - Scope and Definitions
- Chapter II - Design
- Chapter III - Materials
- Chapter V - Construction, Welding, and Assembly
- Chapter VI - Inspection and Testing

**ASME B31.8, Gas Transmission and Distribution Piping Systems**

ATTN: Test questions will only be based on the following portions of the document:

- General Provisions and Definitions
- Chapter I - Materials and Equipment
- Chapter II - Welding
- Chapter III - Piping System Components and Fabrication Details
- Chapter IV - Design, Installation and Testing
- Chapter VI - Corrosion Control

**EXAMINATION CONTENT BASED ON SPECIFIC AREAS OF KNOWLEDGE AND PROFICIENCIES**

The inspector should be knowledgeable of general inspection responsibilities, requirements and expectations for pipeline construction that enable him/her to effectively carry out their duties. The following is a list of topics that an applicant should be familiar with and expect to be tested during the API 1169 Pipeline Construction Inspection exam:

**1. Pipeline Construction Inspection/Management Knowledge Areas**

- Quality assurance (records, measurement, documentation)
- Safety (basic site safety, roles and responsibilities)
- Environmental (permits, SWPPP, BMP's, etc.)
- Training and Qualifications

**2. Front-end Construction**

- Survey & Staking
- Line Locating
- ROW Clearing/Grading
  - Alignment sheets (e.g., extra workspace, PI locations, special conditions)
  - Specifications (e.g., width, right of way, grubbing, topsoil segregation)
  - Permits (e.g., road crossing, road access, railroad, encroachment)
  - Special landowner requirements (e.g., line list)
  - Written and/or electronic reporting

**3. Installation Construction**

- Stringing
  - Materials identification (e.g., pipe grade, wall thickness, coating, heat and pipe number)
  - Materials defects / condition
  - Handling requirements (e.g., lifting, loading and unloading, equipment, stacking, securing)
  - Pipe tally / pipe placement (e.g., placed per alignment drawings, seam locations)
  - Specifications (e.g., minimum equipment requirements)
  - Written electronic reporting (e.g., stringing distances and skips, number of joints)
- Bending
  - Pipe ovality and wrinkles (e.g., CFR192)
  - Proper bending equipment (e.g., liners, mandrels, shoes, angle measurement)
  - Specifications (e.g., bending requirements, tangents, maximum angles, seam alignments, coating or metal damage)
  - Written electronic reporting (e.g., bend location, as built)
- Welding/NDE
  - Specifications, qualified procedures, qualified personnel, documentation, material/consumable control, testing (equipment and products)
- Trenching
- Crossings/Drills
  - Specifications, clearances, type of bores, voids, crossing agreements/permits, cased vs. uncased crossings, pipe condition
- Coating
  - Specifications, qualified procedures, qualified personnel, documentation, material/consumable control, testing (equipment and products)
- Padding/Lowering in
  - Proper equipment (e.g., lifting, cradles, slings)
  - Specifications (e.g., spacing, location in ditch, depth, ditch preparation, sandbag placement, benching)
  - Lifting plans (e.g., boom spacing, lift height, boom size, number of booms)



- Written / electronic Reporting (e.g., amount, damage, holiday detection)
- Tie-ins
  - Specifications (e.g., alignment, OQ)
  - Written / electronic reporting (e.g., location, amount)
  - Material identification (e.g., pipe number, heat number, cutoff length)
  - Material Placement (e.g., transition, pipe support)

#### 4. Back-end Construction

- Cathodic Protection
  - Alignment sheets (e.g., location, type, length)
  - Specifications (e.g., connection, wire size, anode ground beds, size, length, location)
  - Written / electronic reporting (e.g., location, amount, as-builts, type)
- As-built Survey
  - Redline drawings, alignment sheets showing final as built conditions, dimensions, and characteristics of the pipeline (e.g., weld maps/logs, NDE maps/logs, PI/POT locations, depth of cover, test leads, material and coating information)
- Backfill
  - Proper equipment (e.g., type, padding requirements, rock shield, erosion control, weights)
  - Padding pipe (e.g., depth, material size, compaction, foam)
  - Specifications (e.g., padding amount, material size, bench spacing, compaction, crown)
  - Written / electronic reporting (e.g., quantity and location)
  - Buoyancy control (e.g., types, installation, spacing, documentation)
- ROW Clean-up/ Restoration
  - Alignment sheets (e.g., special conditions, mile marker placement, re-vegetation, bank stabilization)
  - Landowner requirements (e.g., damages, special conditions, fences, restoration)
  - Equipment (e.g., LGP, decompaction, seeding)
- Hydrostatic Testing
  - Horizontal drilling process, drilling fluids, drill path/profile, geotechnical studies, pull force, radius of curvature, entry/exit points, entry/exit angles)
  - Testing, gauge plate inspections, deformation
- Pigging (Cleaning/Drying)

#### 5. Post-Construction

- Line List close out
- Final completion assessment/Punch out
- Turn over to Operations