



**BODY OF KNOWLEDGE**

**API-1169 PIPELINE CONSTRUCTION INSPECTOR**

**CERTIFICATION EXAMINATION**

**August 2018 – August 2019**

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 Z662-15), 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 Z662-15, 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\***

Section 3	Definitions	Section 1532
Section 4	Determination of endangered species and threatened species	Section 1533
Section 7	Interagency Cooperation	Section 1536
Section 9	Prohibited Acts	Section 1538
Section 10	Exceptions	Section 1539
Section 12	Endangered Plants	Section 1541

**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**, 4<sup>th</sup> Edition, November 2012

[http://www.cepa.com/wp-content/uploads/2014/01/FourthEdition\\_WatercourseCrossingManual\\_Nov2012.pdf](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 specific topics that an applicant should be familiar with and expect to be tested during the API-1169 Pipeline Construction Inspection exam.

The following categories describe the minimum necessary knowledge and skills:

1. General Quality Principles 10% of the exam
  - a. Basic inspection principles, such as:
    - Management of Change
    - Personnel testing and qualification verification
    - Project requirements enforcement
    - Inspection roles and responsibilities
  - b. Records management, including
    - Legibility
    - Traceability
    - Retrievability
    - Records Retention
  - c. Document Control
    - Revision Status
  - d. Non-Conformance handling
    - Control of nonconforming conditions
    - Reporting
    - Disposition
    - Corrective and Preventive Actions
    - Closing
  - e. Root Cause Analysis (RCA)
    - Purpose of RCA
    - Defining root cause
  - f. Calibration – Monitoring and Measurement Equipment Control
    - Equipment calibration status
    - Calibration methods
  - g. Material Preservation and Handling
    - Quarantine, tagging, and identification
    - Standard requirements
  
2. Pipeline Construction Inspection 50% of the exam
  - a. Clearing and Grading
    - Alignment sheets (e.g., extra work space, PI locations, special conditions)
    - Specifications (e.g., width, right of way, grubbing, top soil segregation)
    - Permits (e.g., road crossing, road access, railroad, encroachment)
    - Special landowner requirements (e.g., line list)
    - Written and/or electronic reporting
  - b. Ditching
    - Base-bottom contour matching pipe
    - Depth of cover specifications (e.g., CFR 49, part 192, part 195)
    - Specifications (e.g., measurements)
    - Landowner restrictions (e.g., ditch skip, cattle crossing, dust control)
    - Monitoring and measuring devices
    - Written and/or electronic reporting
  - c. 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)
- d. Pipe Bending
  - Pipe ovality and wrinkles (e.g., ASME B.31.4, B.31.8, 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)
- e. Coating Basics
  - Specifications, qualified procedures, qualified personnel, documentation, material/consumable control, testing (equipment and products)
- f. Welding Basics
  - Specifications, qualified procedures, qualified personnel, documentation, material/consumable control, testing (equipment and products)
- g. Lowering In
  - Proper equipment (e.g., lifting, cradles, slings)
  - Specifications (e.g., spacing, location in ditch, depth, ditch preparation, sand bag placement, benching)
  - Lifting plans (e.g., boom spacing, lift height, boom size, number of booms)
  - Written / electronic Reporting (e.g., amount, damage, holiday detection)
- h. 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)
- i. Tie-in's
  - 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)
- j. Pressure Testing
  - Specifications (e.g., pipeline elevation/profile, pressure range, time, temperature correction)
  - DOT requirements (e.g., CFR192, CFR195)
  - Pressure testing equipment (e.g., type and size, test heads, pipe/hose)
  - Calibration certification of pressure testing equipment
  - Notifications (e.g., first responder, regulators)
  - Uptake (e.g., source requirements, withdraw rate, filtration)
  - Dewatering (e.g., special requirements, pigging, filtration and testing)
  - Pipeline cleaning/drying requirements (e.g., dew point calibration)
  - Written / electronic reporting (e.g., charts, records, calibration, pressure test logs, test distance)
  - Leak identification and repairs
- k. 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 built, type)
- l. Clean-Up
  - 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)
- m. As-Builts





- 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)
- n. HDD Basics
  - 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
- o. Bores, road crossing, foreign utility crossings
  - Specifications, clearances, type of bores, voids, crossing agreements/permits, cased vs. uncased crossings, pipe condition

### 3. Pipeline Construction Safety

25% of the exam

- a. Overall/Basic Safety
  - OSHA regulation 1910
  - Permit definitions (e.g., hot work, excavation, confined space, safe work)
  - Rigging protocol (e.g., lifting devices)
  - Job Safety Analysis (JSA) (e.g., purpose, hazards)
  - Hazard recognition (e.g., changing conditions)
  - SDS (MSDS) - Location, basic features
  - HAZCOM (types of hazards such as fire, toxicity, corrosion, explosive; hazardous materials such as fuels, paints, NORMS, inhibitors)
  - Site Conditions (e.g., terrain, environmental, temperature extremes)
  - Emergency response protocol (e.g., first responder contacts)
  - Stop work authority (e.g., immediate danger life, health, environment)
  - OQ requirements per 192, 195
  - Security protocol
  - PPE (e.g., hearing, foot, hand, head, eye, breathing, fire)
  - Specialized inspectors (e.g., coating, welding, excavation competent person)
  - LOTO protocol (OSHA)
  - Reporting protocol (e.g., dirt report, incident/near miss)
  - Hot line tie-ins
  - Appropriate use, storage and inspection of tools, equipment and materials
- b. Confined Space
  - Confined space definitions (e.g., back welding, inside pipes)
  - Entry permits
  - Required personnel
  - Entry log
  - Fire watch requirements
  - Respiratory requirements (e.g., types of respirators)
  - Rescue requirements and equipment
  - Gas detectors
  - Air monitoring
  - Ventilation requirements
  - Toxic atmosphere (e.g., PEL, IDLH)
- c. Elevated Work Surface
  - Fall arrest/protection
  - Ladder safety
  - Toe board
  - Hand rails
  - Scaffold erection and tagging
- d. Excavation
  - CGA / foreign line excavation (e.g., locating requirements, line sweep, uniform color code, daylighting requirements, third party representation)





- INGAA Crossing Guidelines
- Safe digging practices (e.g., potholing, safe approach limits, operator qualifications)
- Spoil pile placement
- Soil classification (e.g., sloping, benching, type)
- Shoring (e.g., trench box, sheet pile)
- Access and egress for excavation and confined space
- One call
- Electrical hazards (e.g., underground, induced currents, overhead)
- Excavation barriers (e.g., snow fencing, radiography, road crossing covers, exclusion)
- Traffic control (e.g., signs, flagmen, lighting)
- Atmospheric testing requirements (e.g., oxygen levels, safety levels)
- e. Pressure Testing
  - Minimum distance from test (e.g., personnel, public, structures, limited access)
  - Hazards associated with rupture
  - Test equipment failure
  - Notification (e.g., public safety, first responder, nonessential personnel)
  - Pressurizing and depressurizing
  - Running drying pigs (use)
- f. Welding
  - Arc flashes, working in area of grinding, fire hazards, propane hazards, moving equipment
- g. Coating
  - Flammable materials, respiratory concerns (fumes, dust)
- h. NDE
  - Radiation hazards

#### 4. Pipeline Construction Environmental Protection

15% of the exam

- Environmental protection plan - project specific drawings, specs (e.g., local, county, state, federal, landowner; land disturbance, fueling area, spill kits, emergency response, pollution prevention and control)
- Water intake, use and discharge requirements (e.g., hydrostatic test water, dust control)
- Waste handling (e.g., asbestos, impacted soil, sand blast, drilling fluids)
- Erosion controls (e.g., silt fencing)
- Soil handling / ROW (e.g., top soil segregation, multi lift handling)
- Documentation requirements (e.g., reading drawings, filling out forms, reviewing permits)
- Environmental hazards (e.g., contaminated soil, NORM)
- Groundwater handling (e.g., filters, hay bales, well points, dewatering)
- Stormwater handling
- Notification requirements (e.g., spill, incident, landowner interaction, agency interaction, notification protocols)
- Upland and wetland requirements (e.g., delineation, identification)
- HDD (e.g., frac out, drilling mud, containment and disposal)
- Bank stabilization techniques