WHY CHOOSE CASTI

OUR STRIVE FOR EXCELLENCE

While other trainers may tell you “when taking inspector’s certification exams, a ‘pass’ is a ‘pass’”, at CASTI we believe in excellence and becoming the best inspector that you can be. That is why CASTI’s motto is:

We’ll help prepare you not only to pass the exam, but to also be a better inspector!

ONCE A CASTI CUSTOMER, ALWAYS A CASTI CUSTOMER

We take great pride in providing you with the best possible customer experience. Once you have taken one of our training courses, you will see just what our customers mean when they rave about our unparalleled quality and commitment.

CASTI MEANS QUALITY

CASTI always strives to meet and exceed the existing and growing customer needs of engineering codes and standards training with new and innovative courses and delivery methods.

The training provided by CASTI allows you to gain thorough knowledge of the most up-to-date codes, regulations, technological advances, resources, and trends. With a better understanding of the important underlying principles behind codes and standards, you and your company will gain efficiencies and avoid costly errors.

CASTI's training is 100% original content designed specifically for you. Our training courses go far beyond the literary words of Code documents by explaining specific Code paragraphs and related interpretations to provide guidance where a close study of the Code, on its own, may not produce a clear conclusion. We strengthen learner understanding by answering every question relating to the code and particularly focusing on the “why”. We reinforce learning with workshops and practical problems based on real-life examples drawn from the extensive on-the-job experience of our qualified and knowledgeable instructors.

THE CASTI LEARNING ADVANTAGE (CLA)

The CASTI Learning Advantage (CLA) training system introduces a progressive new series of hybrid training courses that combines pre-classroom online learning, in-classroom instructor-led learning, and post-classroom online learning. CLA courses provide exceptional value, not only in the amount and quality of the content but also by providing the opportunity to maximize learning while minimalizing time away from work. CLA courses reach beyond lecture-style training. They feature practical examples, workshops, detailed solutions, and interactive learning to provide our customers with knowledge that they can retain throughout their career.

CASTI AND YOUR CAREER

Whether you are new to codes and standards, wanting to expand your understanding, or looking to further your career, CASTI has a course for you. CASTI is committed to being with you every step of the way. We are in the business of building careers, not just offering training courses. Let us help you on your path to success, see our CASTI Career Path for more information on what you need to:

GET CERTIFIED, GET HIRED, AND GET AHEAD.
TRAINING COURSES - REGISTRATION, REFUND, AND DISCOUNT POLICIES

- All registration cancellations or transfers will be charged a 15% processing fee.
- Payment by Purchase Order submission constitutes a contract between the customer and CASTI wherefore payment, as per CASTI's Registration, Refund, and Discount Policies, is the responsibility of the customer. Payment by Cheque or Purchase Order is due upon the receipt of the invoice and must be received by CASTI no later than three weeks prior to the course start date.
- Registration cancellations received in writing 30 or more full days before the course start date will receive a refund, less a 15% processing fee.
- Registration cancellations received in writing between 5 to 30 full days before the course start date will receive a credit, less a 15% processing fee. All credits are valid for 1 year from the course start date. Credits will not be extended or refunded under any circumstances. Credits are issued to the original purchaser only. Credits are not transferable. Only the original purchaser may use the credit and only while the credit is valid.
- Registration transfer requests received in writing 5 or more full days before the course start date will receive a credit, less a 15% processing fee. All credits are valid for 1 year from the course start date. Credits will not be extended or refunded under any circumstances. Credits are issued to the original purchaser only. Credits are not transferable. Only the original purchaser may use the credit and only while the credit is valid.
- Absolutely no refunds or credits for registration cancellations with less than 5 full days notice.
- Absolutely no refunds or credits for no-shows. This policy extends for the entire length of each course, such that if the customer does not attend any part or all of the course, CASTI is not liable for any missed content, including but not limited to all training materials.
- All registration cancellation, transfer, or substitution requests must be received in writing via email to training@casti.ca and all requests must be confirmed via email reply from CASTI. Only cancellations, transfers, or substitutions that have been confirmed by CASTI will be honoured.

In the event that the original purchaser cannot attend, an attendee substitution may be requested. Requests for attendee substitution must be received in writing by CASTI at least 5 full days prior to the course start date. All substitutions are subject to written approval from CASTI. Substitutions will only be considered upon request of the original purchaser. Discounts for multiple course registrations are not valid in the event of substitutions and such discounts will be revoked. All outstanding registration fees resulting from revocation of discounts must be paid before the course start date.
- A full (i.e., 100%) refund of the registration fee will be refunded for courses cancelled or postponed by CASTI. CASTI reserves the right to postpone or cancel any course(s) and/or change instructors at any time. CASTI shall not be responsible for the delay or failure to perform any of the terms and conditions or other activities if such delay or failure is caused by strike, war, act of God, circumstances beyond the control of CASTI, or force majeure.
- Registration signifies acceptance that CASTI will not be held liable for any costs or fees incurred by registrants for travel, accommodation, and other expenses should a course be postponed, cancelled, or otherwise modified.
- CASTI offers course discounts to individuals who register in multiple courses. The same individual must be attending all courses within the same calendar year to qualify for a discount. Discounts are based on descending value of courses - highest priced course is paid in full, additional course registrations will receive a 5% discount.
CLA REFUND POLICY - HYBRID TRAINING COURSES

In addition to the items listed above, the following items apply to all training courses with an online component:

- Once your pre-classroom online learning account has been accessed:
  - cancellations received in writing 30 or more full days before the in-classroom course start date will receive a refund, less a 25% fee.
  - cancellations or transfers received in writing between 5 to 30 full days before the in-classroom course start date will receive a credit valid for 1 year, less a 25% fee. The original registrant and the new transferred registrant must be from the same company.

- For all CLA courses where pre-classroom online learning account have NOT been accessed:
  - cancellations received in writing 30 or more full days before the in-classroom course start date will receive a refund, less a 15% processing fee.
  - cancellations or transfers received in writing between 5 to 30 full days before the in-classroom course start date will receive a credit valid for 1 year, less a 15% processing fee. The original registrant and the new transferred registrant must be from the same company.

All credits are valid for 1 year from the date the cancellation is received in writing. Credits will not be extended or refunded under any circumstance. Credits are transferrable provided the original registrant and the new transferred registrant are from the same company.

CLA REFUND POLICY - ONLINE TRAINING COURSES

- For all CLA online-only courses where the online learning account has NOT been accessed, cancellations received in writing 10 or fewer business days after the registration date will receive a full refund, less a 15% processing fee.
- Absolutely no refunds or credits for cancellations after 10 full business days.
- Absolutely no refunds or credits will be given after the online learning account has been accessed.
- Printing is not allowed.
- PO registrations will not be given the passcode until payment is received.

CASTI EXAM PREPARATION GUARANTEE POLICY

Customers who are unsuccessful in achieving a passing mark with the API ICP, AWS CWI, CSA W178.2, or Alberta Welding Examiner exams after taking the related CASTI course will be offered a 50% discount to retake the same course again, provided all of the following requirements are met:

- All of the pre-classroom online lessons were fully completed and all answers submitted online prior to the start of in-classroom training.
- 100% attendance at the classroom training.
- All of the post-classroom training is fully completed and all answers submitted online prior to the exam date.
- This offer is limited to the first available course where seating is available.

Final approval for registration under the CASTI Exam Preparation Guarantee Policy is given at the sole discretion of Codes and Standards Training Institute (CASTI).

Note: CASTI has no prior knowledge of future examination questions for API ICP, AWS CWI, CSA W178.2, or Alberta Welding Examiner exams.
MINIMUM SYSTEM REQUIREMENTS FOR THE CLA ONLINE STUDY

- Broadband Internet connection
- Windows Vista (or higher)
- Mac and Android computers and tablets are not supported
- Microsoft Internet Explorer 8 (or higher) or Mozilla Firefox 19 (or higher)
- Latest version of Adobe Reader
- The ability to edit, highlight, and copy and paste in the PDF are not available due to our copyright policy.

Note 1: Use of Adobe software may have additional system requirements (Please refer to the Adobe specifications provided with your Adobe software or visit the Adobe website at www.adobe.com for more information.)

Note 2: Please consult with your company IT department if you are unsure that your company computer meets the above requirements.

PRINT DOCUMENT ORDERS - SHIPPING AND REFUND POLICY

- ABSOLUTELY NO RETURNS ACCEPTED on document orders.
- Courier services will NOT ship to P.O. Boxes. Please provide a valid street address for shipping.
- CASTI is not responsible for lost or damaged shipping. All claims for shipping loss or damage must be directed to appropriate courier service.
- Please allow 2 business days to process your document order. Shipping times will vary depending on your location.
- All documents are printed on 3-hole punched paper and are delivered as a shrink-wrapped set. Documents are stamped for exam use.
- All prices are subject to change without notice.

MINIMUM SYSTEM REQUIREMENTS FOR E-DOCUMENTS

- Internet connection (broadband recommended). (An internet connection is required to download and install your e-book and e-document.)
- FileOpen Plugin must be installed: http://plugin.fileopen.com
- Windows Vista (or higher)
- Mac and Android computers and tablets are not supported.
- This software must only be installed on a desktop or laptop hard drive.
- 100 MB free disk space.
- Latest version of Adobe Reader.
- The ability to edit, highlight, and copy and paste in the PDF are not available due to our copyright policy.

Note 1: Use of Adobe software may have additional system requirements (Please refer to the Adobe specifications provided with your Adobe software or visit the Adobe website at www.adobe.com for more information.)

Note 2: Only single-sided printing is available.

Note 3: Please consult with your company IT department if installing E-Document(s) on a company computer.
E-DOCUMENT ORDERS - POLICY

- E-document purchases are not eligible for refund, credit, or exchange.
- CASTI e-documents are available as single-user license products only. All CASTI e-document publications are protected by copyright. You are permitted to install your CASTI e-document ONE time on ONE computer only. When installed, your e-document cannot be moved to or accessed from any other computer(s). Please be sure to select an appropriate computer to install your CASTI e-document.
- You are responsible for ensuring that firewalls or other software/hardware configurations do not prevent the CASTI e-document software from authorizing the installation online. CASTI can not provide technical support for your firewall configuration. Please contact your firewall provider or network technical support personnel to resolve such issues.
- If the CASTI e-document PDF file is removed from the licensed computer for any reason, CASTI is not responsible for replacing the e-document. However, at CASTI's sole discretion, a one-time reinstallation may be authorized for current e-document editions only. Outdated or replaced editions will not be supported.
- CASTI is not responsible for the replacement of e-documents lost, stolen, or damaged due to software, hardware, and/or operating system issues which render e-documents inoperable or inaccessible. CASTI is not responsible for the replacement of e-documents lost or damaged due to removal, deletion, or overwriting of e-documents whether accidental or intentional. CASTI is also not responsible for the replacement of e-documents when the computer on which the e-document has been installed is replaced, reformatted, updated, or changed in any manner.
- You are permitted to create a single hard copy of your CASTI e-document, by printing a copy of it from the computer on which you choose to install the e-document. This is the only way you may create a hard copy of your CASTI e-document. You may not create any additional hard copies through any means; you may not print subsequent copies and you may not photocopy your single hard copy. You may create your single hard copy at any time after purchasing the e-document; however, CASTI will only provide technical support to help you do so within 30 days of your purchase.

TECHNICAL SUPPORT

When you purchase a CASTI e-book you are entitled to 30-days of free technical support (from the date of installation).

Before contacting CASTI Technical Support please go to the Frequently Asked Questions (FAQ) page of our web site for troubleshooting advice. If you have reviewed all the FAQs and you have not been able to successfully install your CASTI e-book, please request Technical Support by email at training@casti.ca or call (780)424-2552 between the hours of 8:30 am to 4:30 pm MT for assistance.

PRIVACY POLICY

Codes and Standards Training Inc. (CASTI) and CASTI Publishing Inc. have developed our privacy and records policy in full conformance with Alberta's Freedom of Information and Protection of Privacy Act. We are committed to providing our customers with optimum service while protecting their privacy and safeguarding their personal information.

Student records are kept for a minimum of 6 years, and at the discretion of CASTI, these records may be destroyed thereafter. Student records are released only after a written request is received by the student. Records are not released to third parties without the written permission of the student. CASTI does not sell, rent, give or share customer information to third parties.

While our web site provides links to other related web sites, we are not responsible or liable for the information or the privacy practices on other sites. We suggest that you read the privacy statements on each web site that you visit.
TERMS AND CONDITIONS

COPYRIGHT: ©2015 Codes and Standards Training Institute (CASTI). All rights reserved. All CASTI training materials are the property of CASTI and CASTI Publishing Inc. CASTI training materials are copyrighted and protected under Canadian and International copyright laws. Furthermore, CASTI training materials are solely for personal use by fully paid course attendees and customers. Copying any CASTI training materials without written permission from CASTI is illegal. No part of CASTI notebooks may be reused, reproduced, or redistributed in any form or by any means-graphic, electronic, or mechanical, including photocopying, recording, taping, information storage, or retrieval systems-without the written permission of CASTI. CASTI reserves the right to revise these policies, terms, and conditions at any time without notice.

INTENT OF ATTENDANCE: The course text and materials supplied to attendees at CASTI courses are prepared and issued for the attendee's sole use. Use of CASTI materials and training methods in any form for training personnel, other than fully paid attendees of CASTI courses, is strictly forbidden.

All employees of companies offering any form of training in areas that are the same or similar to the training provided by CASTI are strictly prohibited from attending a CASTI course and subsequently presenting the same or similar courses for any reason and under any circumstances, or any other form of obtaining and using CASTI training materials or methods. Committing any of these acts without written permission from CASTI is a violation of these Terms and Conditions, and will be dealt with through legal actions. Attendance at our courses or sending attendees to our courses constitutes full acceptance of these Terms and Conditions and no other Terms and Conditions contained in purchase orders, requisitions, or other documents shall supersede these Terms and Conditions under any circumstance.

IMPORTANT NOTICE: The material presented in CASTI courses has been prepared for the general information of the reader and should not be used or relied upon for specific applications without first securing competent technical advice. Nor should it be used as a replacement for current complete engineering codes and standards. In fact, CASTI highly recommends that the appropriate, current engineering codes and standards be reviewed in detail prior to any decision making.

Codes, standards, and technology constantly change. Information delivered in CASTI courses and contained in course materials is based on the best available information obtained by CASTI and its instructors at the time of the course. While the material in all CASTI notebooks and online training courses was prepared with great effort and is believed to be technically correct, CASTI, its staff, and instructors, do not represent or warrant the material's suitability for any general or specific use and assume no liability or responsibility of any kind in connection with the information therein. CASTI is in no way responsible for subsequent use regardless of intention. Nothing in the CASTI notebooks or online courses shall be construed as a defense against any alleged infringement of letters of patents, copyright, or trademark, or as defense against liability for such infringement.

CASTI maintains a high standard of professionalism in its commitment against discrimination based on gender, ethnicity, religion, age, disability, socioeconomic status, and/or sexual orientation.

CASTI reserves the right to revise these policies, terms, and conditions at any time without notice.
A WORLD LEADER
In Codes and Standards Training

Codes and Standards Training Institute (CASTI) was founded in 1982 when John E. Bringas, P.Eng., taught our first course in welding metallurgy. Since then, CASTI has presented over 1,500 courses internationally, specializing in the area of engineering codes and standards (e.g., API, ASME, ASTM, CSA, NACE, ISO, etc.). The CASTI instructor staff includes members of many codes and standards committees, as well as globally-recognized professional engineers with international accreditations.

CASTI technical courses are developed for inspectors, engineers, technologists, designers, supervisors, maintenance, and quality assurance personnel who work for owners-users such as petrochemical plants, refineries, gas plants, power plants, oil/gas pipelines, pulp and paper mills, municipalities, or those who work for engineering procurement companies, inspection companies, fabricators, and regulators in governing jurisdictions.

OUR INSTRUCTIONAL PHILOSOPHY

To ensure the highest quality education, all courses are developed and taught by highly knowledgeable and experienced instructors who are or have been Code committee members. As an IACET Training Provider, CASTI training ensures course development, delivery, and evaluation in accordance with the IACET Standard 1, which is recognized worldwide (http://www.iacet.org/iacet-standard/ansiiacet-standard). We not only teach "what" is in the Code or Standard, but, more importantly, "why" it is there.

TUITION TAX CREDIT

CASTI is a certified educational institution approved by the Minister of Human Resources and Social Development Canada. Accordingly, students may claim the fees paid to CASTI for purposes of the Tuition, Education and Textbook Tax Credits, provided that all appropriate criteria for eligibility have been met. Please contact the Canada Revenue Agency to inquire about your specific eligibility.

CONTINUING EDUCATION UNITS (CEU)

CASTI is an Authorized Provider for the International Association for Continuing Education and Training (IACET), 8405 Greensboro Drive, Suite 800, McLean, VA 22102. In obtaining this approval, CASTI has demonstrated that it complies with the ANSI/IACET Standards, which are widely recognized as standards of good practice internationally. As a result of their Authorized Provider membership status, CASTI is authorized to offer IACET CEUs for its programs that qualify under the ANSI/IACET Standards. One CEU is equal to ten contact hours of participation in an organized continuing education experience under responsible sponsorship, capable direction, and qualified instruction. Only IACET Authorized Providers, who undergo a strict evaluation by continuing education peers, can award the IACET CEU. For APEGGA members, one CEU is equal to ten professional development hours.

SPECIAL DISCOUNTS

First course – Full price
Additional courses – 5% discount

CASTI offers discounts to individuals who register in multiple courses. The same individual must be attending all courses within the calendar year to qualify for a discount. Discounts are based on descending value of courses—the highest-priced course is paid in full, and then additional course registrations will receive a 5% discount.

CASTI offers a 10% discount for group bookings of five participants or more. The individuals in a group must be attending the same course in order to qualify. Contact CASTI to learn more.
IN-HOUSE TRAINING
CUSTOMIZED TRAINING SOLUTIONS

ADVANTAGES OF IN-HOUSE TRAINING

In-house training is a cost-effective way to provide customized training for small groups or whole departments with the convenience of having training done at your facility or a nearby site to accommodate your staff schedules.

CASTI training allows you to gain thorough knowledge of the most up-to-date codes, regulations, technological advances, resources, and trends. With better understanding of the important underlying principles behind codes and standards, your company will gain efficiencies and avoid costly errors.

CASTI can adapt the content of any of our standard open-enrollment courses to suit your requirements or we can develop a custom course specifically targeting your company’s needs. In addition, you may wish to include your company’s QMS, WPR, and other such documents to tailor the training to your everyday operations.

WHY CHOOSE CASTI?

CASTI has presented over 1,500 courses internationally, specializing in the area of engineering codes and standards (e.g., API, ASME, ASTM, CSA, NACE, ISO, etc.). The CASTI instructor staff includes members of many codes and standards committees as well as globally-recognized professional engineers with international accreditations.

With over 40 different courses, CASTI has become a world leader in the field of codes and standards training.

A COST EFFECTIVE TRAINING SOLUTION

CASTI’s training instructors are prepared to travel to your site to present your course. As a result, our in-house training service allows customers to make significant financial savings on items such as staff accommodation and travel, as well as venue costs.

To add to these savings, CASTI Learning Advantage (CLA) online lessons are also available to allow more content coverage; in addition, course delivery is convenient for your staff so there are minimal disruptions to your everyday business.

INSTRUCTOR AVAILABILITY & TRAINING DATES

To avoid disappointment, CASTI recommends booking in-house training courses at least six months in advance. This will help in securing instructor availability for dates suitable to your schedule.

We welcome your no-obligation inquiry to discuss your exact training needs.

NEXT STEP

For inquiries, please complete the In-House Training Request Form. A CASTI representative will contact you to discuss the details of your training request as soon as possible.

Including any specific topics of interest and the goals you wish to achieve through training is helpful to provide, along with the background (job title and level of experience) of the individuals you would like to train, the number of people you would like to train, and the approximate dates you would like to deliver the training program. A representative will contact you to discuss how we may assist you.
IN-HOUSE TRAINING REQUEST FORM

CONTACT INFORMATION
Name: ______________________________________________________________________________
Job Title/Company: ______________________________________________________________________
Address: ______________________________________________________________________________
Telephone Number: ____________________________  Email Address: ___________________________

If you are an Administrator, please fill in the contact information below for the Technical Lead/Engineer who is best able to answer technical questions regarding the course being requested.

Lead Technical/Engineer Name: ____________________________________________________________
Job Title/Company: ______________________________________________________________________
Telephone Number: ____________________________  Email Address: ___________________________

COURSE REQUIREMENTS
Are you requesting a standard course (courses outlined in this catalogue)?  q yes  q no

Which CASTI course is your request most similar to?

Expected Number of Participants?  q < 10  q 10-15  q 15-20  q 20+

What is the background of the target audience for this training course?

   ___# of EIT/2 yr. Eng. Tech   ___# of Inspectors   ___# of Engineers

What is your ideal length of course?

   q 3 days  q 4 days  q 5 day  q Other: ______

   Please note: The length of CASTI public courses are designed to allow coverage of all topics outlined in the course descriptions. Requests for shortened course lengths will require omitting some of the course topics.

   Please provide a detailed description of your training needs/goals and customization requests:
   ____________________________________________________________________________________
   ____________________________________________________________________________________
   ____________________________________________________________________________________
   ____________________________________________________________________________________

Are you interested in CLA online training in addition to an in-classroom training course?  q yes  q no

Start Dates for Training (YY-MM-DD)
   1st Choice: ____________  2nd Choice: ____________  3rd Choice: ____________

Course Location (address, city, province/state, country): ______________________________________
BENEFITS OF TRAINING

Invest in Your Career. Your education is like a business investment. Although it takes time and money up-front to complete your courses and obtain certification, you will see an excellent return on an investment that will continue to give back throughout your entire career.

Enhance Your Skills. Ensuring that your knowledge and skills are up-to-date with the trends affecting your industry is important so employers will continue to view you as a valuable asset to the company. By continuing your education, you can learn new skills and specializations that will allow you to become a more versatile employee and increase your long-term value to employers.

Demonstrate Value To Employers. An excellent way to demonstrate to employers that you are committed to your career is by attending training courses. By investing time and money in continuing your education, you will send a powerful message to employers that you are serious about improving your education and applying new skills to your job. Employers are more likely to hire and retain professionals who show the desire and commitment for lifelong learning and many even provide tuition reimbursement as added encouragement.

Leverage past experience. Earning additional credentials will attest to your capability and is also a good source of knowledge and networking. It will also significantly improve your marketability. The more certifications obtained the better likelihood of achieving the supervisor or managerial levels.

Discover Your Dream Job. From welder to inspector, the best way to learn more about a potential career in supervisory and managerial positions is through training and certification. By continuing your education, you can discover a dream job that is less physically demanding and increases your earning potential.

Increase Your Earning Potential. If you are looking to achieve a higher salary over the life of your career, then get trained and certified. Not only will you increase your marketability to employers, but you will experience a significant increase in income.

Get Started Now!
CASTI offers a variety of training programs to fit your lifestyle, schedule, and budget. See CASTI's Career Path to find out what courses you need to help reach your goals.
CSA W178.2 LEVEL 1 
WELDING INSPECTOR 
EXAM PREPARATION

For Exam Candidates

OVERVIEW

The objective of this course is to assist exam candidates to achieve the CSA W178.2 Level 1 Welding Inspector Certification. This course will also prepare exam candidates to write the ASME B31.3 code endorsement exam as part of the certification.

CSA’s certification programs benefit the industry by:
- Providing knowledgeable specialized inspectors
- Establishing a minimum standard of knowledge and skill for the personnel
- Providing higher management control of inspection practices
- Increasing employer’s confidence and peace-of-mind
- Helping maintain safety and high level of performance
- Reducing potential for downtime because of equipment failure

Learning Objectives

This course is designed to maximize your success in passing the CSA W178.2 Level 1 certification examinations by learning to:
- understand what the CSA W178.2 Standard requires exam candidates to know
- efficiently reference the ASME code during the product category and standard/code exam portion of this certification
- complete all areas of study required of exam candidates to pass all part-exams for this certification

Upon completion of the course, participants may also qualify for exemption from the Welding Inspection exam. Please see Exam Information for more details.

Who Should Attend

Inspectors, NDE examiners, Alberta welding examiners, experienced welders, welding supervisors, quality control personnel, technologists, and engineers who want to obtain the CSA W178.2 Level 1 welding inspector certification.

Accreditation

CASTI is recognized by the International Association of Continuing Education and Training (IACET) as an Authorized Provider of Continuing Education Units (CEUs), under the ANSI/IACET 1-2013 Standard, for good practices and quality continuing education and training programs.

Each participant will receive a CASTI Certificate of Completion with 4.8 CEUs for attending all 6 days of the classroom training. An additional 4.0 CEUs will be awarded for the completion of the pre-classroom online lessons prior to the course start date.

Before You Register

Prerequisites: There are no prerequisites for this course; however, it is recommended that you meet the Education and Experience Requirements to qualify to write the exam.

CASTI does not approve candidates to write the exam. The CSA W178.2 certification examinations are administered by the Canadian Welding Bureau. Information regarding education and experience requirements and exam applications must be made directly to the Canadian Welding Bureau.

Course Type: HYBRID¹, EP²

Related Courses: CASTI’s CSA W178.2 Level 2, AWS Certified Welding Inspector Exam Preparation Courses; and ASME B31.3 Materials, Fabrication, Inspection, and Testing Requirements, CSA W178.2 - ASME B31.3 Online Code Endorsement Exam Preparation, CSA W178.2 - ASME Section VIII, Division 1, and ASME Section IX Online Code Endorsement Exam Preparation³

¹ In addition to in-classroom training, this course contains pre-classroom online lessons that must be completed before the course start date. It also contains post-classroom online practice exams.
² This course is an exam preparation course for the related certification exam(s).
³ These courses aid those requiring only or extra training for ASME code endorsement exams.

PROGRAM OF STUDY

Exam Information

The CSA W178.2 Level 1 Welding Inspector Certification is broken up into four exams:
- Welding Inspection*, closed-book
- Practical and Recording
- CSA Standard W178.2, open-book

*This course is approved by the Canadian Welding Bureau (CWB) for exemption from the closed-book Welding Inspection portion of the CSA W178.2 Level 1 Welding Inspector Certification. This exemption is equivalent to that which is given to candidates who have completed the CWB modules.

To qualify for exemption, students must:
- complete the pre-classroom online lessons covering Welding Inspection, including answering all questions, prior to writing the Welding Inspection closed-book (2 hr) in-classroom exam on the last day of the in-classroom training.
- receive a minimum mark of 70% on the pre-classroom online Welding questions.
- receive a minimum mark of 70% on the in-classroom Welding Inspection closed-book (2 hr) exam administered by CASTI on the last day of the in-classroom training.

The CSA W178.2 exams are administered by the Canadian Welding Bureau (CWB). All exam candidates must apply directly with CWB to write the exams. CASTI does not have prior knowledge of future CSA W178.2 Level 1 examination questions.
CASTI Learning Advantage (CLA)
Hybrid Training

This course includes 13 days* of training as described below:

Pre-Classroom CLA Online

<table>
<thead>
<tr>
<th>Estimated 5 days* (40hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- online study with practice questions introducing:</td>
</tr>
<tr>
<td>- welding inspection‡</td>
</tr>
<tr>
<td>- practical and recording</td>
</tr>
<tr>
<td>- CSA Standard W178.2</td>
</tr>
<tr>
<td>- product category and standard/code (ASME B31.3)</td>
</tr>
<tr>
<td>- 3 practice exams for Welding Inspection‡</td>
</tr>
<tr>
<td>- all questions are submitted and automatically graded online</td>
</tr>
<tr>
<td>- pre-classroom online training is available 6 weeks prior to classroom start date</td>
</tr>
</tbody>
</table>

‡ a grade of 70% must be achieved to partially qualify in part for exam exemption, see Exam Information below

In-Classroom

<table>
<thead>
<tr>
<th>5 days</th>
<th>Review and Exemption Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>- instructor-led training consisting of 4 exam parts:</td>
<td></td>
</tr>
<tr>
<td>- welding inspection</td>
<td></td>
</tr>
<tr>
<td>- practical and recording</td>
<td></td>
</tr>
<tr>
<td>- CSA Standard W178.2</td>
<td></td>
</tr>
<tr>
<td>- product category and standard/code (ASME B31.3)</td>
<td></td>
</tr>
<tr>
<td>- workshop exercises in class for the practical reporting using weld samples and inspection tools</td>
<td></td>
</tr>
<tr>
<td>- instructor-led review</td>
<td></td>
</tr>
<tr>
<td>- final welding inspection closed-book (2 hr) in-classroom exam</td>
<td></td>
</tr>
<tr>
<td>A minimum mark of 70% must be received for the final exam to partially qualify for exemption from the closed-book Welding Inspection exam of the CSA W178.2 Level 1 Welding Inspector Certification.</td>
<td></td>
</tr>
</tbody>
</table>

Post-Classroom CLA Online

<table>
<thead>
<tr>
<th>Estimated 2 days* (16hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- instructor-supported online study of ASME codes</td>
</tr>
<tr>
<td>- 3 practice exams for ASME B31.3 code endorsement</td>
</tr>
<tr>
<td>- 3 practice exams for CSA Standard W178.2</td>
</tr>
<tr>
<td>- all questions are submitted and automatically graded online</td>
</tr>
</tbody>
</table>

* Estimate based on the average time required by past students to complete online training. Your personal skill and experience levels will determine the actual time required to complete this work.

CLA Online Study

Completing all of the online study is a critical step maximizing your likelihood of passing the exam. Individuals who do not complete all of the online study may jeopardize the likelihood of successfully passing the exam and do so at their own risk. The online study is an integral part of this training course and must be completed by all registrants to achieve the full CEU credit, and for exam candidates to comply with the CASTI Exam Preparation Guarantee Policy.

All CLA online content includes:
- e-Instructor support (access to the same expert instructor)
- reading material for self-study
- practice problems and detailed solutions
- practice exam questions (if applicable)
- online questions are graded automatically to provide a measure of self-evaluation

COURSE INFORMATION

Topics

Welding Inspection
- Design
  - Drawings
  - Design Concepts
  - Codes, Specifications, and Standards
- Materials
  - Base Metals
  - Welding Consumables
  - Welding Metallurgy
- Production
  - Preparation of Joints
- Welding
  - Processes
  - Equipment
  - Welding Procedures
  - Side Effects
- Quality Assurance
  - Basic System Function Concepts
  - Basic Concepts of Quality Control
  - Nondestructive Examination
  - Other Examinations
- Qualification
  - Welders
  - Equipment
  - Procedures
  - Inspectors
  - Nondestructive-testing Technicians
- Exemption from or, alternatively, preparation for 2 hour portion of closed-book exam (75 multiple choice questions)

Practical and Reporting
- Examination and assessment of test coupons for weld defects and acceptability, including:
  - Porosity
  - Under Fill
  - Undercut
  - Lack of Fusion
  - Spatter
  - Surface Oxides
- Preparation for 45 minute portion of open-book exam (5 sample welds)

CSA Standard W178.2
- General Requirements
- Level 1 Welding Inspector Requirements
- Preparation for 1/2 hour portion of open-book exam (15 multiple choice questions)
Product Category and Standard/Code (Industrial Pipe: ASME B31.3 Process Piping)
- Design Conditions and Criteria
- Pressure Design of Components
- Materials Requirements
- Welding
- Preheating
- Heat Treatment
- Inspection
- Examination
- Testing
- Preparation for 2 hour portion of open-book exam
  (45 multiple choice questions)

Required Code Documents
All participants must bring a copy of CSA Standard W178.2 and a copy of the ASME B31.3 code document for the code endorsement to complete this course.

This code document can be purchased from CASTI.

A course notebook will be provided to all participants by CASTI.
CSA W178.2 LEVEL 2 WELDING INSPECTOR EXAM PREPARATION
For Exam Candidates

OVERVIEW
The objective of this course is to assist exam candidates to achieve the CSA W178.2 Level 2 Welding Inspector Certification. This course will also prepare exam candidates to write the ASME Section VIII, Division 1 and IX code endorsement exam as part of the certification.

CSA’s certification programs benefit the industry by:
- Providing knowledgeable specialized inspectors
- Establishing a minimum standard of knowledge and skill for the personnel
- Providing higher management control of inspection practices
- Increasing employer’s confidence and peace-of-mind
- Helping maintain safety and high level of performance
- Reducing potential for downtime because of equipment failure

Learning Objectives
This course is designed to maximize your success in passing the CSA W178.2 Level 2 certification examinations by learning to:
- understand what the CSA W178.2 Standard requires exam candidates to know
- efficiently reference the ASME code during the product category and standard/code exam portion of this certification
- complete all areas of study required of exam candidates to pass all part-exams for this certification

Upon completion of the course, participants may also qualify to write a shortened version of the closed-book Welding Inspection exam. Please see Exam Information for more details.

Who Should Attend
CSA W178.2 Level 1 inspectors, NDE examiners, Alberta welding examiners, experienced welders, welding supervisors, quality control personnel, technologists, and engineers who want to obtain the CSA W178.2 Level 2 welding inspector certification.

Accreditation
CASTI is recognized by the International Association of Continuing Education and Training (IACET) as an Authorized Provider of Continuing Education Units (CEUs), under the ANSI/IACET 1-2013 Standard, for good practices and quality continuing education and training programs.

Each participant will receive a CASTI Certificate of Completion with 4.8 CEUs for attending all 6 days of the classroom training. An additional 4.0 CEUs will be awarded for the completion of the pre-classroom online lessons prior to the course start date.

Before You Register
Prerequisites: There are no prerequisites for this course; however, candidates will need to meet the education and experience requirements or have a valid CSA W178.2 Level 1 Welding Inspector certification with 2 years of related experience to write the exam.

CASTI does not approve candidates to write the exam. The CSA W178.2 certification examinations are administered by the Canadian Welding Bureau. Information regarding education and experience requirements and exam applications must be made directly to the Canadian Welding Bureau.

Course Type: HYBRID1, EP2
Related Course(s): CASTI’s ASME B31.3 Materials, Fabrication, Inspection, and Testing Requirements, CSA W178.2 - ASME B31.3 Online Code Endorsement Exam Preparation, CSA W178.2 - ASME Section VIII, Division 1, and ASME Section IX Online Code Endorsement Exam Preparation2, AWS Certified Welding Inspector Exam Preparation

1. This course contains pre-clasroom online lessons that must be completed before the course start date. Early registration is recommended to allow sufficient time for completing all of the online course work.
2. This course an exam preparation course for the related certification exam(s). The primary objective is to assist exam candidates pass the exam. As such, there will not be detailed discussion of the everyday application of codes; rather, the codes will be reviewed as they pertain to the exam.
3. These courses aid those requiring only or extra training for ASME code endorsement exams.

PROGRAM OF STUDY
Exam Information
The CSA W178.2 Level 1 Welding Inspector Certification is broken up into four exams:
- Welding Inspection*, closed-book
- Practical and Recording
- CSA Standard W178.2, open-book

- This course is approved by the Canadian Welding Bureau to qualify candidates to write a shortened version of the closed-book Welding Inspection exam towards the CSA W178.2 Level 2 Welding Inspector Certification. This exemption is equivalent to that which is given to candidates who have completed the CWB modules.

To qualify for exemption, students must:
- complete all pre-classroom online lessons prior to the in-classroom course start date
- attend all classroom days of the course; and
- complete the in-classroom Welding Inspection closed-book exam administered by CASTI on the last day of in-classroom training.

The CSA W178.2 exams are administered by the Canadian Welding Bureau (CWB). All exam candidates must apply directly with CWB to write the exams. CASTI does not have prior knowledge of future CSA W178.2 Level 2 examination questions.

10544 106 Street NW, Edmonton AB  T5H 2X6 training@casti.ca Fax : 780-421-1308
CASTI Learning Advantage (CLA) Hybrid Training

This course includes 13 days* of training as described below:

<table>
<thead>
<tr>
<th>Pre-Classroom CLA Online</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated 5 days* (40hrs)</td>
</tr>
<tr>
<td>- Getting Started tutorial</td>
</tr>
<tr>
<td>- learn and practice code navigation</td>
</tr>
<tr>
<td>- self-study content for:</td>
</tr>
<tr>
<td>- basic materials science, advanced welding fundamentals, and other welding inspection techniques</td>
</tr>
<tr>
<td>- practical visual inspection and reporting</td>
</tr>
<tr>
<td>- CSA Standard W178.2</td>
</tr>
<tr>
<td>- product category and standard/code (ASME B31.3 + ASME Section VIII, Division 1, and ASME Section IX)</td>
</tr>
<tr>
<td>- review examples and practice problems, and their detailed solutions, including references to corresponding paragraphs within exam code document(s)</td>
</tr>
<tr>
<td>- 2 practice exams about Basic Materials Science, Advanced Welding Fundamentals, and Other Welding Inspection Techniques Design</td>
</tr>
<tr>
<td>- pre-classroom online training is available 6 weeks prior to classroom start date</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>In-Classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 days</td>
</tr>
<tr>
<td>- instructor-led training consisting of 4 exam parts:</td>
</tr>
<tr>
<td>- welding inspection</td>
</tr>
<tr>
<td>- practical and recording</td>
</tr>
<tr>
<td>- CSA Standard W178.2</td>
</tr>
<tr>
<td>- product category and standard/code (ASME B31.3 and ASME Section VIII, Division 1 and IX)</td>
</tr>
<tr>
<td>- instructor-led review of examples and practice problems, and their detailed solutions</td>
</tr>
<tr>
<td>- 2 report writing exercises (presented in-class and available online for further practice)</td>
</tr>
<tr>
<td>- 3 workshop exercises about practical visual inspection and reporting using weld samples and inspection tools</td>
</tr>
<tr>
<td>- solve practice problems</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Review and Final Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 day</td>
</tr>
<tr>
<td>- instructor-led review</td>
</tr>
<tr>
<td>- write an in-classroom final exam on basic materials science, advanced welding fundamentals, and other welding inspection techniques²</td>
</tr>
</tbody>
</table>

A minimum mark of 70% must be received for the final exam to partially qualify for exemption from the closed-book Welding Inspection exam of the CSA W178.2 Level 1 Welding Inspector Certification.

<table>
<thead>
<tr>
<th>Post-Classroom CLA Online</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated 2 days* (16hrs)</td>
</tr>
<tr>
<td>- instructor-supported online study</td>
</tr>
<tr>
<td>- 3 practice exams for ASME B31.3 code endorsement</td>
</tr>
<tr>
<td>- 3 practice exams for ASME VIII-1 and ASME IX code endorsement</td>
</tr>
<tr>
<td>- 3 practice exams for CSA Standard W178.2</td>
</tr>
<tr>
<td>- 2 report writing exercises (presented in-class and available online for further practice)</td>
</tr>
<tr>
<td>- all questions are submitted and automatically graded online</td>
</tr>
<tr>
<td>- post-classroom online training is available for 4 weeks from the course end date</td>
</tr>
</tbody>
</table>

² Estimate based on the average time required by past students to complete online training. Your personal skill and experience levels will determine the actual time required to complete this work.

CLA Online Study

Completing all of the online study is a critical step in maximizing your likelihood of passing the exam. Individuals who do not complete all of the online study may jeopardize the likelihood of successfully passing the exam and do so at their own risk. The online study is an integral part of this training course and must be completed by all registrants to achieve the full CEU credit, and for exam candidates to comply with the CASTI Exam Preparation Guarantee Policy.

All CLA online content includes:
- e-Instructor support (access to the same expert instructor)
- reading material for self-study
- practice problems and detailed solutions
- practice exam questions (if applicable)
- online questions are graded automatically to provide a measure of self-evaluation

COURSE INFORMATION

Topics

Welding Inspection
Exam subject covers basic materials science, advanced welding fundamentals and other welding inspection techniques

- Qualify for shorten exam or, alternatively, preparation for 2 hour portion of closed-book exam
  (75 multiple choice questions)

Practical and Reporting
Examination and assessment of test coupons for weld defects and acceptability, including samples for visual detection and identification, assessment and descriptive reporting of weld faults, dimensional faults, material deficiencies and structural discontinuities

- Preparation for 45 minute visual inspection and reporting exam
  (5 sample welds)

CSA Standard W178.2
Review general requirements

- Preparation for 1/2 hour portion of open-book exam
  (15 multiple choice questions)

Note: The CSA Standard W178.2 exam portion is not required for those who successfully passed the exam when obtaining the CSA W178.2 Level 1 certification.

Product Category and Standard/Code
ASME B31.3, and ASME Section VIII, Division 1 and IX

- Preparation for 2 hour open-book code exam
  (45 multiple choice questions)

Required Code Documents
All participants must bring a copy of CSA Standard W178.2 and a copy of the ASME B31.3 code document for the code endorsement to complete this course.

This code document can be purchased from CASTI.

A course notebook will be provided to all participants by CASTI.
AWS CWI
CERTIFIED WELDING INSPECTOR

Exam Preparation

OVERVIEW

To achieve the AWS Certified Welding Inspector (CWI) certification, and by reciprocity, also achieve the CSA W178.2 Welding Inspector Certification Level 2 that is managed by the Canadian Welding Bureau (CWB). It is also the objective of this course to prepare exam candidates to write the ASME code endorsement exam as part of the CWI certification.

AWS’s certification programs benefit the industry by:
- Providing knowledgeable specialized inspectors
- Establishing a minimum standard of knowledge and skill for the personnel
- Providing higher management control of inspection practices
- Increasing employer’s confidence and peace-of-mind
- Helping maintain safety and high level of performance
- Reducing potential for downtime because of equipment failure

Learning Objectives

This course is designed to maximize your success in passing the AWS Certified Welding Inspector (CWI) certification examinations by learning to:
- Understand safety practices basic welding fundamentals required to identify welding processes, metal joining, welding metallurgy and metal properties as well as other nondestructive (NDE) examination methods.
- Efficiently reference the ASME code during the product category and standard/code exam portion of this certification.
- Conduct practical visual inspections by recognizing weld and base metal discontinuities and using inspection tools for measurements of welds.
- Complete all areas of study required of exam candidates to pass all part-exams for this certification.

Upon completion of the course, participants may also qualify for exemption from the Welding Inspection exam. Please see Exam Information for more details.

Who Should Attend

Inspectors, technologists, engineers, or experienced welders and welding supervisors who are involved in new welding fabrication, repairs, alteration, or inspection of welded pressure equipment. It will also assist API 510 and 570 inspectors, who plan to challenge the CSA W178.2 practical exam, to become a Level 2 inspector.

For information regarding the AWS-CSA reciprocity for welding inspector certification, please visit AWS Certified Welding Inspector career path page for more details.

Accreditation

CASTI is recognized by the International Association of Continuing Education and Training (IACET) as an Authorized Provider of Continuing Education Units (CEUs), under the ANSI/IACET 1-2013 Standard, for good practices and quality continuing education and training programs.

Each participant will receive a CASTI Certificate of Completion with 4.8 CEUs for attending all 6 days of the classroom training. An additional 4.0 CEUs will be awarded for the completion of the pre-classroom online lessons prior to the course start date.

Before You Register

Prerequisites: There are no prerequisites for this course; however, it is recommended that you meet the education and experience requirements, listed in AWS B5.1 paragraph 5.5, to qualify to write the exam.

CASTI does not approve candidates to write the exam. All questions regarding qualifications and exam applications must be directed to AWS (www.aws.org).

Course Type: HYBRID1, EP2
Related Courses: CASTI’s CSA W178.2 Level 1 and Level 2 Welding Inspector Certification

1. In addition to in-classroom training, this course contains pre-classroom online lessons that must be completed before the course start date. It also contains post-classroom online practice exams.
2. This course is an exam preparation course for the related certification exam(s). The primary objective is to assist exam candidates pass the exam. As such, there will not be detailed discussion of the everyday application of codes; rather, the codes will be reviewed as they pertain to the exam.

Exam Information

The AWS Certified Welding Inspector (CWI) certification is broken up into three exams:
- Part B: PRACTICAL – Hands-on test; using Book of Specifications and Test Kit containing basic tools and weld replicas.
- Part C: CODEBOOK – Open code book test; refer to the Body of Knowledge for the current editions being used.

A minimum passing grade of 72% is required on all parts. Please refer to the AWS Applicant Instructions for more information regarding the CWI exam.
PROGRAM OF STUDY

CASTI Learning Advantage (CLA) Hybrid Training

This course includes 13 days* of training as described below:

Pre-Classroom CLA Online

Estimated 5 days* (40hrs)

- Instructor-supported online study
- online study with practice questions introducing:
  - welding inspection fundamentals
  - practical visual inspection
  - ASME Section VIII, Division 1 and IX
- all questions are submitted and automatically graded online
- pre-classroom online training is available 6 weeks prior to classroom start date

In-Classroom

6 days

- instructor-led training consisting of 4 exam parts:
  - welding inspection
  - practical and recording
  - CSA Standard W178.2
  - product category and standard/code (ASME B31.3)
- review example problems and detailed solutions
- solve practice problems and review detailed solutions
- workshop exercises in class for the practical reporting using weld samples and inspection tools

Post-Classroom CLA Online

Estimated 2 days* (16hrs)

- instructor-supported online study of ASME codes
- 2 practice exams with the option to reset for more practice
- all questions are submitted and automatically graded online

* Estimate based on the average time required by past students to complete online training. Your personal skill and experience levels will determine the actual time required to complete this work.

CLA Online Study

Completing all of the online study work is a critical step maximizing your likelihood of passing the exam. Individuals who do not complete all of the online study work may jeopardize the likelihood of successfully passing the exam and do so at their own risk. The online study work is an integral part of this training course and must be completed by all registrants to achieve the full CEU credit, and for exam candidates to comply with the CASTI Exam Preparation Guarantee Policy.

All CLA online content includes:
- e-Instructor support (access to the same expert instructor)
- reading material for self-study
- practice problems and detailed solutions
- practice exam questions (if applicable)
- online questions are graded automatically to provide a measure of self-evaluation

COURSE INFORMATION

Topics

Welding Inspection Fundamentals (2-1/2 days):
This portion of the course will prepare exam candidates to write the 2-hour Fundamentals exam. The lessons that will be covered throughout course include:

- Welding Inspection and Certification
- Safe Practices for Welding Inspectors
- Metal Joining and Cutting Processes
- Weld Joint Geometry and Welding Symbols
- Documents Governing Welding Inspection and Qualification
- Metals Properties and Destructive Testing
- Metric Practice for Welding Inspection
- Welding Metallurgy for the Welding Inspector
- Weld and Base Metal Discontinuities
- Visual Inspection and Other NDE Methods and Symbols

Practical Visual Inspection Workshop (2 days):
This portion of the course will prepare exam candidates to write the 2-hour Practical exam and includes the AWS Visual Inspection Workshop reference manual with sample examples questions. Topics covered include:

- Terms and Definitions
- Introduction to Visual Welding Inspection
- Weld and Base Metal Discontinuities
- Measurements of Welds

ASME Code Clinic (1-1/2 days) (Optional Evening Tutorial Sessions):
This portion of the course will prepare exam candidates to write the 2-hour ASME code endorsement exam that includes:

- ASME Section IX
- ASME Section VIII-1

Interpretations Workshop
This workshop includes two practice exams, using similar sample weldments and measuring instruments to simulate the actual 2-hour practical exam.

Required Code Documents

All participants **must** bring the ASME Section IX and ASME Section VIII-1 to the class.

These code documents can be purchased from CASTI. Exam document packages with the specific code editions and sections required for the related exam.

A course notebook will be provided to all participants by CASTI.
OVERVIEW

This course will introduce some common welding and cutting processes, AWS filler metals specifications, types of welding discontinuities and the related ASME Section V requirements for NDE, as well as the QA systems necessary for welder performance qualification as described in the Alberta Welding Examiner Syllabus for Papers #1 and #3. This course is also an excellent learning experience for people seeking general knowledge in welding and related NDE.

Who Should Attend

Inspectors, welders, welding supervisors, quality control personnel, technologists, and engineers involved with welding for new fabrication, repairs, maintenance, and inspection for pressure vessel or piping. This course is also designed to assist Alberta Welding Examiner Paper #1 and Paper #3, although it is not a prerequisite that you be an exam candidate.

Accreditation

CASTI is recognized by the International Association of Continuing Education and Training (IACET) as an Authorized Provider of Continuing Education Units (CEUs), under the ANSI/IACET 1-2013 Standard, for good practices and quality continuing education and training programs.

Each participant will receive a CASTI Certificate of Completion with 3.2 CEUs for attending all 4 days of the classroom training. An additional 3.2 CEUs will be awarded for the completion of the pre-classroom online lessons prior to the course start date.

Before You Register

Prerequisites: There are no prerequisites for this course.
Course Type: HYBRID¹, Optional EP²
Related Course: ASME Section IX Welding Codes and Metallurgy for Carbon/Alloy Steels³
1. This course contains pre-classroom online lessons that should be completed before the course start date.
2. This course is a dual purpose course – for general information regarding the subject matter and as an exam preparation course for the related certification exam(s). Exam preparation workshops, homework, evening tutorials and post-classroom online study are optional.
3. For Alberta Welding Examiner exam candidates, the ASME Section IX course is designed to assist Alberta Welding Examiner Paper #2 and Paper #4.

PROGRAM OF STUDY

CASTI Learning Advantage (CLA) Hybrid Training

This course includes 10 days* of training as described below:

<table>
<thead>
<tr>
<th>Pre-Classroom CLA Online</th>
<th>In-Classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated 4 days* (32hrs)</td>
<td>4 days</td>
</tr>
<tr>
<td>• review general knowledge of welding and cutting processes</td>
<td>• instructor-led review and discussion of welding fundamentals</td>
</tr>
<tr>
<td>• review of welding filler metals, AWS A5.x</td>
<td>• review example problems and detailed solutions</td>
</tr>
<tr>
<td>• solve practical problems and review detailed solutions</td>
<td>• solve practice problems and review detailed solutions</td>
</tr>
<tr>
<td>• online pre-classroom content is available from 4 weeks prior to course start date</td>
<td>• write practice exam</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Post-Classroom CLA Online</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated 2 days* (16hrs)</td>
</tr>
<tr>
<td>• practicing WPS/PQR and WPQ reviews</td>
</tr>
<tr>
<td>• two practice exams (3.5 hours each) with answers and full solutions</td>
</tr>
<tr>
<td>• online post-classroom content will be available until the course end date.</td>
</tr>
</tbody>
</table>

CLA Online Study

Completing all of the online study is a critical step in maximizing your likelihood of passing the exam. Individuals who do not complete all of the online study may jeopardize the likelihood of successfully passing the exam and do so at their own risk. The online study is an integral part of this training course and must be completed by all registrants to achieve the full CEU credit, and for exam candidates to comply with the CASTI Exam Preparation Guarantee Policy.

All CLA online content includes:
- e-Instructor support (access to the same expert instructor)
- reading material for self-study
- practice problems and detailed solutions
- practice exam questions (if applicable)
- online questions are graded automatically to provide a measure of self-evaluation
COURSE INFORMATION

Topics

Fundamentals of Weld Joints, Joint Design, and Welding Codes
- Defining Welding, Weldability, and the Weldment
- Weld Joint Design and Geometry
- Weld Joint Preparation (ASME B31.3)
- Tack Welding
- Introduction to Overlaying, Cladding, and Temper Bead Welding
- Introduction to Welding Symbols
- Joint Design and Welding Codes Practice Problems

Welding Processes and Power Sources
- Welding Terms and Definitions
- Shielded Metal Arc Welding (SMAW)
- Gas Metal Arc Welding (GMAW)
- Flux Cored Arc Welding (FCAW)
- Gas Tungsten Arc Welding (GTAW)
- Submerged Arc Welding (SAW)

Cutting Processes
- Oxygen Cutting (OC)
- Arc Cutting (AC)

Welding Consumables
- ASME Section II, Part C - Filler Metal Specifications
  - Fundamentals of Welding Filler Metals
    - Carbon steel, alloy steel, and stainless steel filler metals for SMAW, GMAW (FCAW), GTAW, and SAW

Weld Discontinuities and ASME B31.3 Acceptance Criteria for Welds
- Welding Discontinuities, Flaws, Defects, and their ASME B31.3 Evaluation
  - Cracks, Undercut, Porosity, Welding Processes, Inclusions, Incomplete Fusion, Incomplete Penetration, Underfill, Concave Root Surface, Excessive Weld Reinforcement, and Melt-Through
- Discontinuities Due to Preparation of Weld Joint
  - Weld Joint Mismatch and Misalignment
- Weld Contour Discontinuities

Introduction to Non-Destructive Examination and ASME Section V
- Imperfections and Types of NDE Methods
- Visual Testing (VT) - ASME V Article 9
- Radiographic Testing (RT) - ASME V Article 2
- Ultrasonic Testing (UT) - ASME V Article 4
- Liquid Penetrant (PT) Testing - ASME V Article 6
- Magnetic Particle (MT) Testing - ASME V Article 7

Sample Quality Management System Manual

Welding Health and Safety

Weld Examination Workshop Using Steel Specimens and Inspection Tools

Each attendee will participate in a group workshop to examine welding samples using visual inspection tools to gain knowledge of:
- Discontinuities Terminology - Differences Between Different Codes and Standards
- ASME Section IX - Bend Test Evaluation
- Weld Specimens Discontinuities and ASME B31.3 Evaluation
  - Tack Welds in Plate, Pipe, and Flare Joints
  - Fillet and Groove Welds in Plate and Pipe

Evening Tutorials (for Alberta Welding Examiner Exam Candidates)

The Alberta Welding Examiner Syllabus (AB-94) will be explained, along with how it fits into a career path.

Evening tutorials are mandatory for exam candidates planning to challenge Alberta Welding Examiner Papers 1 and 3, and optional for all other attendees. The tutorials will cover:
- Navigating ASME Section II, Part C
- Navigating ASME Section V
- Navigating ASME Section IX
- Navigating ASME B31.3

Required Code Documents

All participants will find it useful to bring the ASME code documents discussed in this course; however, they are optional.

ABSA Welding Examiner Paper #1 exam candidates will need the code sections required to write Paper #1.

ABSA Welding Examiner Paper #3 exam candidates will need the code sections required to write Paper #3.

These code documents can be purchased from CASTI. Exam document packages will only contain the specific code editions and sections required for Paper #2 and Paper #4.

A course notebook will be provided to all participants by CASTI.
OVERVIEW

This is an introductory course to provide the basic understanding of the proper use and interpretation of ASME Section IX - Welding Qualifications code and its related ASME construction codes. To accomplish this objective, the course starts with a 2-day review of the ASME Sec. IX, followed by one day of studying the base metal metallurgy and welding metallurgy that ASME IX is based on. The fourth day covers the welding portions of related ASME construction codes (Section VIII-1, B31.1, and B31.3) and how ASME Sec. IX interacts with each, including the metallurgy previously covered through a series of workshops. It is also intended to prepare exam candidates for the ABSA Welding Examiner Paper #4 on regulations and codes and most parts of Paper #2 covering properties and structures of metals, welding metallurgy and material specifications (i.e., steel manufacturing will not be covered).

Who Should Attend

Inspectors, welders, welding supervisors, quality control personnel, technologists, and engineers involved with new welding procedure and welder qualifications for new fabrication, repairs, maintenance, and inspection for pressure vessel or piping. This course is also designed to assist ABSA Welding Examiner, Pressure Equipment Inspector and CSA W178.2 exam candidates, although it is not a prerequisite that you be an exam candidate.

Accreditation

CASTI is recognized by the International Association of Continuing Education and Training (IACET) as an Authorized Provider of Continuing Education Units (CEUs), under the ANSI/IACET 1-2013 Standard, for good practices and quality continuing education and training programs.

Each participant will receive a CASTI Certificate of Completion with 3.2 CEUs for attending all 4 days of the classroom training. An additional 3.2 CEUs will be awarded for the completion of the pre-classroom online lessons prior to the course start date.

Before You Register

Prerequisites: There are no prerequisites for this course.

Course Type: HYBRID 1, Optional EP 2

Related Course: CASTI's Welding Fundamentals 3

1. This course contains pre-classroom online lessons that should be completed before the course start date.
2. This course is a dual purpose course – for general information regarding the subject matter and as an exam preparation course for the related certification exam(s). Exam preparation workshops, evening tutorials, homework and post-classroom online study are optional.
3. For Alberta Welding Examiner exam candidates, CASTI's Welding Fundamentals course is designed to assist Alberta Welding Examiner Paper #1 and Paper #3.

PROGRAM OF STUDY

CASTI Learning Advantage (CLA) Hybrid Training

This course includes 11 days* of training as described below:

<table>
<thead>
<tr>
<th>Pre-Classroom CLA Online</th>
<th>In-Classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated 5 days* (40hrs)</td>
<td>4 days</td>
</tr>
<tr>
<td>• general knowledge of ASME Section IX</td>
<td></td>
</tr>
<tr>
<td>• P-No, F-No., A-No.</td>
<td></td>
</tr>
<tr>
<td>• WPS/PQR/WPQ</td>
<td></td>
</tr>
<tr>
<td>• ASME B31.1, B31.3, and Section VIII-1 WPS/PQR requirement</td>
<td></td>
</tr>
<tr>
<td>• online pre-classroom content is available from 4 weeks prior to course start date</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Post-Classroom CLA Online</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated 2 days* (16hrs)</td>
</tr>
<tr>
<td>• instructor-supported online study of API and ASME codes</td>
</tr>
<tr>
<td>• practicing WPS/PQR and WPQ reviews</td>
</tr>
<tr>
<td>• two practice exams with answer keys and detailed math solutions</td>
</tr>
</tbody>
</table>

* Estimates are based on the average time needed for previous students to complete online training. Your personal skill and experience levels will determine the actual time required to complete this work.

CLA Online Study

Completing all of the online study is a critical step in maximizing your likelihood of passing the exam. Individuals who do not complete all of the online study may jeopardize the likelihood of successfully passing the exam and do so at their own risk. The online study is an integral part of this training course and must be completed by all registrants to achieve the full CEU credit, and for exam candidates to comply with the CASTI Exam Preparation Guarantee Policy.

All CLA online content includes:

- e-Instructor support (access to the same expert instructor)
- reading material for self-study
- practice problems and detailed solutions
- practice exam questions (if applicable)
- online questions are graded automatically to provide a measure of self-evaluation
COURSE INFORMATION

Topics

Alberta Safety Codes Acts
- Overview of Pressure Equipment Safety Regulations and Pipeline codes in Canada
- Overview of CSA, ASME and related codes for New Construction and In-Service Integrity
- Overview of Pressure Welders Regulation

General Review to ASME IX
- Detailed Review of Part QG – General Requirements
- Detailed Review of Part QW - Welding Articles

Workshops: ASME Section IX
- QW-422 P-No. 1 Groups 1 to 4
- Reviewing a WPS and PQR

Introduction to Steels
- Wrought Products: Rolling, Hot-Finishing, Drawing, Forging
- Steel Making: Oxygen and Deoxidation of Steels, Desulfurization and Steel Cleanliness
- Heat of Steel, Residual and Unspecified Elements in Steels
- The Roles of Alloying Elements
- Defining Alloy Steels, Low-Alloy Steel, High-Strength Low Alloy Steel, Microalloy Steels
- Brief Introduction to Stainless Steels

Base Metal Metallurgy of Carbon and Alloy Steels
- Steel Microstructures: Ferrite, Fe-Fe3C, Pearlite, Banite, Martensite
- Using the Fe-Fe3C Phase Diagram in Practical Terms
  o Transformation Temperatures QW-407.1(2)
- Heat Treatment: Austenitizing, Annealing, Normalizing, Quench and Tempering QW-407
- ASTM Grain Size, Toughness, and Anisotropic
- Material Test Reports and What They Really Mean

Welding Metallurgy of Carbon and Alloy Steels
- Weldment zones and fundamental principles of welding metallurgy of carbon steel
- Use of carbon equivalence to predict weldability
- Alloying steels and their effects on hardenability and weldability
- Residual stress and distortion of welded connections
- Hydrogen related cracking in welding (toe cracking, cold cracking, delayed cracking, HAZ cracking, and underbead cracking)
- Preheating and postweld heat treat in practical terms to avoid cracking and improve weldability

Base Metal and Filler Metal Specifications (ASME Section II Parts A and C)
- ASTM Specifications: Product Standards, General Standards, Supplementary Requirements
- ASTM Steel Standard Designations and Product Markings
- ASME SA-106, SA-516, SA-333, SA-387, and SA-312
- ASME SFA No. and AWS Classification of Filler Metals
- ASME SFA-5.1 and SFA-5.5

Workshop: Developing a WPS for ASME Sec. VIII-1, B31.1, and B31.3

Each attendee will participate in a group workshop to write new construction and maintenance welding procedures in accordance with ASME Section VIII - Pressure Vessels, ASME B31.1 - Power Boilers and ASME B31.3 - Process Piping.

These welding procedures will be reviewed and discussed in detail during the class.

Evening Tutorials (for Alberta Welding Examiner Exam Candidates)

The Alberta Welding Examiner Syllabus (AB-94) will be explained, along with how it fits into a career path.

Evening tutorials covering practice exams for Papers #2 and #4 will be conducted, with take-home assignments handed out. A review of the take-home assignments will be covered the following evening. Be prepared for 1 hour on Days 1 and 2, and for up to 3 hours on Day 3.

Required Code Documents

All participants must bring the ASME Section IX code to this class.

ABSA Welding Examiner Paper #2 exam candidates will need the code sections required to write Paper #2.

ABSA Welding Examiner Paper #4 exam candidates will need the code sections required to write Paper #4.

These code documents can be purchased from CASTI. Exam document packages will only contain the specific code editions and sections required for Paper #2 and Paper #4.

A course notebook will be provided to all participants by CASTI.
API 510
EXAM PREPARATION
For Exam Candidates

OVERVIEW

API’s Inspector Certification Programs are based on industry-developed standards that are recognized and used with confidence worldwide. These standards have also provided a uniform platform that serves as a model for many state and government regulations. These API programs emphasize professional credibility and process integrity. They enable inspectors to play an active role in improving industry health and safety; environmental performance; ensuring compliance and self-regulation; and strengthening management control and internal inspection capabilities.

API’s individual certification programs benefit the industry by:

- Providing knowledgeable specialized inspectors
- Establishing a minimum standard of knowledge and skill for the personnel
- Providing higher management control of inspection practices
- Increasing employer’s confidence and peace-of-mind
- Helping maintain safety and high level of performance
- Reducing potential for downtime because of equipment failure

Learning Objectives

This course is designed to maximize your success in passing the API Pressure Vessel Inspector Certification Examination by learning to:

- understand what the API Body of Knowledge requires exam candidates to know;
- efficiently reference the API and ASME codes during the API ICP examination; and
- complete all calculations required of exam candidates during the API ICP examination.

Who Should Attend

This training course is intended for API 510 inspector examination candidates who have both inspection experience and experience working with the API and ASME codes. Experience with API and ASME codes is required during the supervision of inspection activities as described in the ICP Qualification Requirements. API ICP exam candidates are expected to have a broad base of general knowledge and experience covering all topics described in the API Body of Knowledge.

Accreditation

CASTI is recognized by the International Association of Continuing Education and Training (IACET) as an Authorized Provider of Continuing Education Units (CEUs), under the ANSI/IACET 1-2013 Standard, for good practices and quality continuing education and training programs.

Each participant will receive a CASTI Certificate of Completion with 4.8 CEUs for attending all 6 days of the classroom training. An additional 5.6 CEUs will be awarded for the completion of the pre-classroom online lessons prior to the course start date.

Before You Register

Prerequisites: There are no prerequisites for this course; however, you must meet the education and experience requirements for API ICP exam applicants.

This experience must have been acquired within the last 10 years while employed by, or under contract with, an authorized inspection agency. Please review the qualification requirements defined by API (www.api.org).

Additionally, to maximize your success, prior API and ASME code experience is highly recommended before taking this course. For individuals with limited API and ASME code experience, it is recommended that CASTI’s ASME Section IX Welding Codes and Metallurgy for Carbon/Alloy Steels course be taken in advance.

Course Type: HYBRID, EP
Related Courses: CASTI’s API 570, API 653, API 571 Exam Preparation Courses

1. This course contains pre-classroom online lessons that must be completed before the course start date. Early registration is recommended to allow sufficient time for completing all of the online course work.
2. This course an exam preparation course for the related certification exam(s). The primary objective is to assist exam candidates pass the exam. As such, there will not be detailed discussion of the everyday application of codes; rather, the codes will be reviewed as they pertain to the exam.

PROGRAM OF STUDY

CASTI Learning Advantage (CLA) Hybrid Training

This course includes 18 days* of training as described below:

<table>
<thead>
<tr>
<th>Pre-Classroom CLA Online</th>
<th>In-Classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated 7 days* (56hrs)</td>
<td>6 days</td>
</tr>
<tr>
<td>Getting Started tutorial</td>
<td>instructor-led review and discussion of API and ASME codes</td>
</tr>
<tr>
<td>learn and practice code navigation</td>
<td>solve practice problems</td>
</tr>
<tr>
<td>study of API and ASME codes</td>
<td>instructor-led review examples and practice problems, and their detailed solutions</td>
</tr>
<tr>
<td>review examples and practice problems, and their detailed solutions including references to corresponding paragraphs within the exam documents</td>
<td>instructor-led practice and review WPS/PQR workshop</td>
</tr>
<tr>
<td>practice and review WPS/PQR workshop</td>
<td>write and review a practice exam</td>
</tr>
<tr>
<td>online pre-classroom content is available 4 weeks prior to course start date</td>
<td></td>
</tr>
</tbody>
</table>

Post-Classroom CLA Online

| Estimated 5 days* (40hrs)| |
|--------------------------| |
| instructor-supported online study of API and ASME codes | |
| write 2 new practice exams with open-book and closed-book portions, plus the option to rewrite practice exam given in-class | |
| review exam answer keys and detailed math solutions | |
| online post-classroom content is available for 4 weeks from the course end date | |

* Estimates are based on the average time needed for previous students to complete online training. Your personal skill and experience levels will determine the actual time required to complete this work.
Cla Online Study

Completing all of the online study is a critical step in maximizing your likelihood of passing the exam. Individuals who do not complete all of the online study may jeopardize the likelihood of successfully passing the exam and do so at their own risk. The online study is an integral part of this training course and must be completed by all registrants to achieve the full CEU credit, and for exam candidates to comply with the CASTI Exam Preparation Guarantee Policy.

All CLA online content includes:
- e-Instructor support (access to the same expert instructor)
- reading material for self-study
- practice problems and detailed solutions
- practice exam questions (if applicable)
- online questions are graded automatically to provide a measure of self-evaluation

COURSE INFORMATION

Topics

API American Petroleum Institute Standards
- API Standard 510, Pressure Inspection Code
- API Recommended Practice 571, Damage Mechanisms Affecting Fixed Equipment in the Refining Industry, select portions
- API Recommended Practice 572, Inspection Practices for Pressure Vessels
- API Recommended Practice 576, Inspection of Pressure-Relieving Devices
- API Recommended Practice 577, Welding Inspection and Metallurgy

ASME Boiler Pressure Vessel Codes
- ASME Section V, Nondestructive Examination, select portions
- ASME Section VIII, Rules for Construction of Pressure Vessels, Division 1, select portions
- ASME Section IX, Welding and Blazing Qualifications, select portions

For a complete list of specific Code editions, addenda, and supplements of reference publications that are effective for your exam date, please refer to this API 510 Effectivity Sheet.

Exam Information

This summary of exam information is provided for your general overview. It is important that you read the complete documents containing these details as provided by API.

The API 510 ICP examination is 7 hours long and consists of 150 multiple-choice questions divided into two parts:

- the 3-hour closed-book part tests the candidate on knowledge and tasks requiring everyday working knowledge of API Standard 510 and other applicable reference documents.
- the 4-hour open-book portion of the examination requires the use of more detailed information that the inspector is expected to be able to find in the documents, but would not normally be committed to memory.

Note: CASTI provides this course to help candidates prepare for the API exam. However, this course is a separate entity from the API examination. API requires that all exam candidates apply directly with API. CASTI does not have prior knowledge of future API ICP examination questions.

Required Code Documents

All participants must bring the API and ASME Code documents referenced in the API 510 Effectivity Sheet. For more information, visit: http://www.api.org/certification-programs/individual-certification-programs-icp/icp-certifications/api-510

These API and ASME code documents can be purchased from CASTI. Note: API exam document packages contain only the portions listed in the API Effectivity Sheet and are not available for individual purchase.

A course notebook will be provided to all participants by CASTI.
API 570 EXAM PREPARATION
For Exam Candidates

OVERVIEW
API's Inspector Certification Programs are based on industry-developed standards that are recognized and used with confidence worldwide. These standards have also provided a uniform platform that serves as a model for many state and government regulations. These API programs emphasize professional credibility and process integrity. They enable inspectors to play an active role in improving industry health and safety; environmental performance; ensuring compliance and self-regulation; and strengthening management control and internal inspection capabilities.

API's individual certification programs benefit the industry by:
- Providing knowledgeable specialized inspectors
- Establishing a minimum standard of knowledge and skill for the personnel
- Providing higher management control of inspection practices
- Increasing employer’s confidence and peace-of-mind
- Helping maintain safety and high level of performance
- Reducing potential for downtime because of equipment failure

Learning Objectives
This course is designed to maximize your success in passing the API 570 Piping Inspector Certification Examination by learning to:
- understand what the API Body of Knowledge requires exam candidates to know;
- efficiently reference the API and ASME codes during the API ICP examination; and
- complete all calculations required of exam candidates during the API ICP examination.

Who Should Attend
This training course is intended for API 570 inspector examination candidates who have both inspection experience and experience working with the API and ASME codes. Experience with API and ASME codes is required during the supervision of inspection activities as described in the ICP Qualification Requirements. API ICP exam candidates are expected to have a broad base of general knowledge and experience covering all topics described in the API Body of Knowledge.

Accreditation
CASTI is recognized by the International Association of Continuing Education and Training (IACET) as an Authorized Provider of Continuing Education Units (CEUs), under the ANSI/IACET 1-2013 Standard, for good practices and quality continuing education and training programs.

Each participant will receive a CASTI Certificate of Completion with 4.8 CEUs for attending all 6 days of the classroom training. An additional 5.6 CEUs will be awarded for the completion of the pre-classroom online lessons prior to the course start date.

Before You Register
Prerequisites: There are no prerequisites for this course; however, you must meet the education and experience requirements for API ICP exam applicants.

This experience must have been acquired within the last 10 years while employed by, or under contract with, an authorized inspection agency. Please review the qualification requirements defined by API (www.api.org).

Additionally, to maximize your success, prior API and ASME code experience is highly recommended before taking this course. For individuals with limited API and ASME code experience, it is recommended that CASTI's ASME Section IX Welding Codes and Metallurgy for Carbon/Alloy Steels course be taken in advance.

Course Type: HYBRID¹, EP²
Related Courses: CASTI's API 510, API 653, API RP 571 Exam Preparation Courses
1. This course contains pre-classroom online lessons that must be completed before the course start date. Early registration is recommended to allow sufficient time for completing all of the online course work.
2. This course an exam preparation course for the related certification exam(s). The primary objective is to assist exam candidates pass the exam. As such, there will not be detailed discussion of the everyday application of codes; rather, the codes will be reviewed as they pertain to the exam.

PROGRAM OF STUDY
CASTI Learning Advantage (CLA) Hybrid Training
This course includes 18 days* of training as described below:

<table>
<thead>
<tr>
<th>Pre-Classroom CLA Online</th>
<th>In-Classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated 7 days* (56hrs)</td>
<td>6 days</td>
</tr>
<tr>
<td>• Getting Started tutorial</td>
<td>• instructor-led review and discussion of API and ASME codes</td>
</tr>
<tr>
<td>• learn and practice code navigation</td>
<td>• solve practice problems</td>
</tr>
<tr>
<td>• study of API and ASME codes</td>
<td>• instructor-led review examples and practice problems, and their detailed solutions</td>
</tr>
<tr>
<td>• review examples and practice problems, and their detailed solutions including references to corresponding paragraphs within the exam documents</td>
<td>• instructor-led practice and review WPS/PQR workshop</td>
</tr>
<tr>
<td>• practice and review WPS/PQR workshop</td>
<td>• write and review a practice exam</td>
</tr>
<tr>
<td>• online pre-classroom content is available from 4 weeks prior to course start date</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Post-Classroom CLA Online</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated 5 days* (40hrs)</td>
</tr>
<tr>
<td>• supported online study of API and ASME codes</td>
</tr>
<tr>
<td>• write 2 new practice exams with open-book and closed-book portions, plus the option to rewrite practice exam given in-class</td>
</tr>
<tr>
<td>• review exam answer keys and detailed math solutions</td>
</tr>
<tr>
<td>• online post-classroom content is available 4 weeks from the course end date</td>
</tr>
</tbody>
</table>

* Estimates are based on the average time needed for previous students to complete online training. Your personal skill and experience levels will determine the actual time required to complete this work.
CLA Online Study

Completing all of the online study is a critical step in maximizing your likelihood of passing the exam. Individuals who do not complete all of the online study may jeopardize the likelihood of successfully passing the exam and do so at their own risk. The online study is an integral part of this training course and must be completed by all registrants to achieve the full CEU credit, and for exam candidates to comply with the CASTI Exam Preparation Guarantee Policy.

All CLA online content includes:
- e-Instructor support (access to the same expert instructor)
- reading material for self-study
- practice problems and detailed solutions
- practice exam questions (if applicable)
- online questions are graded automatically to provide a measure of self-evaluation

COURSE INFORMATION

Topics

API Standards
- API Standard 570, Piping Inspection Code
- API Recommended Practice 571, Damage Mechanisms Affecting Fixed Equipment in the Refining Industry, select portions
- API Recommended Practice 574, Inspection Practices for Piping System Components
- API Recommended Practice 577, Welding Inspection and Metallurgy
- API Recommended Practice 578, Material Verification program for New and Existing Alloy Piping Systems

ASME Codes
- ASME Section V, Nondestructive Examination, select portions
- ASME Section IX, Welding and Blazing Qualifications, select portions
- ASME B16.5, Pipe Flanges and Flanged Fittings
- ASME B31.3, Process Piping

For a complete list of specific code editions, addenda, and supplements of reference publications that are effective for your exam date, please refer to this API 570 Effectivity Sheet.

Exam Information

This summary of exam information is provided for your general overview. It is important that you read the complete documents containing these details as provided by API.

The API 570 ICP examination is 7 hours long and consists of 150 multiple-choice questions divided into two parts:

- the 3-hour closed-book part tests the candidate on knowledge and tasks requiring everyday working knowledge of API Standard 570 and other applicable reference documents.
- the 4-hour open-book portion of the examination requires the use of more detailed information that the inspector is expected to be able to find in the documents, but would not normally be committed to memory.

Note: CASTI provides this course to help candidates prepare for the API exam. However, this course is a separate entity from the API examination. API requires that all exam candidates apply directly with API. CASTI does not have prior knowledge of future API ICP examination questions.

Required Code Documents

All participants must bring the API and ASME Code documents referenced in the API 570 Effectivity Sheet. For more information, visit: http://www.api.org/certification-programs/individual-certification-programs-icp/icp-certifications/api-570

These API and ASME code documents can be purchased from CASTI. Note: API exam document packages contain only the portions listed in the API Effectivity Sheet and are not available for individual purchase.

A course notebook will be provided to all participants by CASTI.
API 653
EXAM PREPARATION
For Exam Candidates

OVERVIEW

API's Inspector Certification Programs are based on industry-developed standards that are recognized and used with confidence worldwide. These standards have also provided a uniform platform that serves as a model for many state and government regulations. These API programs emphasize professional credibility and process integrity. They enable inspectors to play an active role in improving industry health and safety; environmental performance; ensuring compliance and self-regulation; and strengthening management control and internal inspection capabilities.

API's individual certification programs benefit the industry by:
- Providing knowledgeable specialized inspectors
- Establishing a minimum standard of knowledge and skill for the personnel
- Providing higher management control of inspection practices
- Increasing employer’s confidence and peace-of-mind
- Helping maintain safety and high level of performance
- Reducing potential for downtime because of equipment failure

Learning Objectives

This course is designed to maximize your success in passing the API 653 Aboveground Storage Tank Inspector Certification Examination by learning to:
- understand what the API Body of Knowledge requires exam candidates to know;
- efficiently reference the API and ASME codes during the API ICP examination; and
- complete all calculations required of exam candidates during the API ICP examination.

Who Should Attend

This training course is intended for API 653 inspector examination candidates who have both inspection experience and experience working with the API and ASME codes. Experience with API and ASME codes is required during the supervision of inspection activities as described in the ICP Qualification Requirements. API ICP exam candidates are expected to have a broad base of general knowledge and experience covering all topics described in the API Body of Knowledge.

Accreditation

CASTI is recognized by the International Association of Continuing Education and Training (IACET) as an Authorized Provider of Continuing Education Units (CEUs), under the ANSI/IACET 1-2013 Standard, for good practices and quality continuing education and training programs.

Each participant will receive a CASTI Certificate of Completion with 4.8 CEUs for attending all 6 days of the classroom training. An additional 5.6 CEUs will be awarded for the completion of the pre-classroom online lessons prior to the course start date.

Before You Register

Prerequisites: There are no prerequisites for this course; however, you must have the education and experience requirements for API ICP exam applicants.

This experience must have been acquired within the last 10 years while employed by, or under contract with, an authorized inspection agency. Please review the qualification requirements defined by API (www.api.org).

Additionally, to maximize your success, prior API and ASME code experience is highly recommended before taking this course. For individuals with limited API and ASME code experience, it is recommended that CASTI's ASME Section IX Welding Codes and Metallurgy for Carbon/Alloy Steels course be taken in advance.

Course Type: HYBRID², EP² Related Courses: CASTI's API 510, API 570, and API 571 Exam Preparation Courses

1. This course contains pre-classroom online lessons that must be completed before the course start date. Early registration is recommended to allow sufficient time for completing all of the online course work.

2. This course an exam preparation course for the related certification exam(s). The primary objective is to assist exam candidates pass the exam. As such, there will not be detailed discussion of the everyday application of codes; rather, the codes will be reviewed as they pertain to the exam.

PROGRAM OF STUDY

CASTI Learning Advantage (CLA) Hybrid Training

This course includes 18 days* of training as described below:

<table>
<thead>
<tr>
<th>Pre-Classroom CLA Online</th>
<th>In-Classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated 7 days* (56hrs)</td>
<td>6 days</td>
</tr>
<tr>
<td>• Getting Started tutorial</td>
<td>• instructor-led review and discussion of API and ASME codes</td>
</tr>
<tr>
<td>• learn and practice code navigation</td>
<td>• solve practice problems</td>
</tr>
<tr>
<td>• study of API and ASME codes</td>
<td>• instructor-led review examples and practice problems, and their detailed solutions</td>
</tr>
<tr>
<td>• review examples and practice problems, and their detailed solutions including references to corresponding paragraphs within the exam documents</td>
<td>• instructor-led practice and review WPS/PQR workshop</td>
</tr>
<tr>
<td>• practice and review WPS/PQR workshop</td>
<td>• write and review a practice exam</td>
</tr>
<tr>
<td>• online pre-classroom content is available from 4 weeks prior to course start date</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Post-Classroom CLA Online</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated 5 days* (40hrs)</td>
<td></td>
</tr>
<tr>
<td>• instructor-supported online study of API and ASME codes</td>
<td></td>
</tr>
<tr>
<td>• write 2 new practice exams with open-book and closed-book portions, plus the option to rewrite practice exam given in-class</td>
<td></td>
</tr>
<tr>
<td>• review exam answer keys and detailed math solutions</td>
<td></td>
</tr>
<tr>
<td>• online post-classroom content is available 4 weeks from the course end date</td>
<td></td>
</tr>
</tbody>
</table>

* Estimates are based on the average time needed for previous students to complete online training. Your personal skill and experience levels will determine the actual time required to complete this work.
CLA Online Study

Completing all of the online study is a critical step in maximizing your likelihood of passing the exam. Individuals who do not complete all of the online study may jeopardize the likelihood of successfully passing the exam and do so at their own risk. The online study is an integral part of this training course and must be completed by all registrants to achieve the full CEU credit, and for exam candidates to comply with the CASTI Exam Preparation Guarantee Policy.

All CLA online content includes:
- e-Instructor support (access to the same expert instructor)
- reading material for self-study
- practice problems and detailed solutions
- practice exam questions (if applicable)
- online questions are graded automatically to provide a measure of self-evaluation

COURSE INFORMATION

Topics

API Standards

- API Recommended Practice 571, *Damage Mechanisms Affecting Fixed Equipment in the Refining Industry*, select portions
- API Recommended Practice 575, *Inspection of Atmospheric and Low-Pressure Storage Tanks*
- API Recommended Practice 577, *Welding Inspection and Metallurgy*
- API Standard 650, *Welded Tanks for Oil Storage*
- API Standard 651, *Cathodic Protection of Aboveground Petroleum Storage Tanks*
- API Standard 652, *Lining of Aboveground Petroleum Storage Tank Bottoms*
- API Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

ASME Codes

- ASME Section V, *Nondestructive Examination*, select portions
- ASME Section IX, *Welding and Blazing Qualifications*, select portions

For a complete list of specific code editions, addenda, and supplements of reference publications that are effective for your exam date, please refer to this API 653 Effectivity Sheet.

Exam Information

This summary of exam information is provided for your general overview. It is important that you read the complete documents containing these details as provided by API.

The API 653 ICP examination is 7 hours long and consists of 150 multiple-choice questions divided into two parts:

- the 3-hour closed-book part tests the candidate on knowledge and tasks requiring everyday working knowledge of API Standard 653 and other applicable reference documents.
- the 4-hour open-book portion of the examination requires the use of more detailed information that the inspector is expected to be able to find in the documents, but would not normally be committed to memory.

Note: CASTI provides this course to help candidates prepare for the API exam. However, this course is a separate entity from the API examination. API requires that all exam candidates apply directly with API. CASTI does not have prior knowledge of future API ICP examination questions.

Required Code Documents

All participants must bring the API and ASME Code documents referenced in the API 653 Effectivity Sheet. For more information, visit: http://www.api.org/certification-programs/individual-certification-programs-icp/icp-certifications/api-653

These API and ASME code documents can be purchased from CASTI. Note: API exam document packages contain only the portions listed in the API Effectivity Sheet and are not available for individual purchase.

A course notebook will be provided to all participants by CASTI.
API RP 571
Damage Mechanisms Affecting Fixed Equipment in the Refining Industry

OVERVIEW

This course is intended to improve safety and reliability, and minimize liability of fixed equipment by learning about common damage mechanisms in the refining and petrochemical industry as covered in API 571 are the primary objectives. The roles of the engineer and inspector in identifying affected materials and equipment, critical factors, appearance of damage, prevention and mitigation, inspection and monitoring will be covered to introduce the concepts of service-induced deterioration and failure modes. This course is intended for anyone interested in gaining a fundamental understanding of damage mechanisms in metals.

Who Should Attend

Engineers, inspectors, designers, and experienced maintenance personnel who are involved in designing, operating, maintaining, repairing, inspecting and analyzing pressure vessels, piping, tanks and pipelines for safe operations in the refining, petrochemical and other related industries. It will assist with API 579 and API 580 evaluations and API 571 ICP exam candidates.

Accreditation

CASTI is recognized by the International Association of Continuing Education and Training (IACET) as an Authorized Provider of Continuing Education Units (CEUs), under the ANSI/IACET 1-2013 Standard, for good practices and quality continuing education and training programs.

Each participant will receive a CASTI Certificate of Completion with 3.2 CEUs for attending all 4 days of the classroom training. An additional 0.4 CEUs will be awarded for the completion of the pre-classroom online lessons prior to the course start date.

Before You Register

Prerequisites: There are no prerequisites for this course.
Course Type: HYBRID, Optional EP
Related Course: API 579-1/ASME FSS-1 Fitness for Service

1. This course contains pre-classroom online lessons that should be completed before the course start date.
2. This course is a dual purpose course – for general information regarding the subject matter and as an exam preparation course for the related certification exam(s). Exam preparation workshops, evening tutorials, homework and post-classroom online study are optional.
3. A thorough understanding of the damage mechanisms covered in API RP 571 greatly assists with API 579-1/ASME FFS-1 assessments. It is highly recommended that CASTI’s API 579-1/ASME FFS-1 Fitness for Service course be taken following this course.

PROGRAM OF STUDY

CASTI Learning Advantage (CLA) Hybrid Training

This course includes 5.5 days* of training as described below:

<table>
<thead>
<tr>
<th>Pre-Classroom CLA Online</th>
<th>In-Classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated 0.5 days* (4hrs)</td>
<td>4 days</td>
</tr>
<tr>
<td>• online study of steels and metallurgy</td>
<td>• instructor-led review and discussion of API and ASME codes</td>
</tr>
<tr>
<td>• review of example problems</td>
<td>• review example problems and detailed solutions</td>
</tr>
<tr>
<td>• solve practice problems and review solutions</td>
<td>• solve practice problems and review detailed solutions</td>
</tr>
<tr>
<td>• online pre-classroom content will be available 4 weeks prior to course start date</td>
<td>• write practice exam and review on last day</td>
</tr>
<tr>
<td>• in-classroom training held from 8am to 6pm</td>
<td>• in-classroom training held from 8am to 6pm</td>
</tr>
</tbody>
</table>

Post-Classroom CLA Online

Estimated 2 days* (16hrs)

• instructor-supported online study of API and ASME codes
• practice exams with answer keys and detailed math solutions

* Estimates are based on the average time needed for previous students to complete online training. Your personal skill and experience levels will determine the actual time required to complete this work.

CLA Online Study

Completing all of the online study is a critical step maximizing your likelihood of passing the exam. Individuals who do not complete all of the online study may jeopardize the likelihood of successfully passing the exam and do so at their own risk. The online study is an integral part of this training course and must be completed by all registrants to achieve the full CEU credit, and for exam candidates to comply with the CASTI Exam Preparation Guarantee Policy.

All CLA online content includes:
• e-Instructor support (access to the same expert instructor)
• reading material for self-study
• practice problems and detailed solutions
• practice exam questions (if applicable)
• online questions are graded automatically to provide a measure of self-evaluation
COURSE INFORMATION

Topics

Introduction to Carbon and Alloy Steel Metallurgy
- Basic carbon steel metallurgy: using the Fe-Fe₃C phase diagram in practical terms
- Basic alloy steel metallurgy for high and low temperature service
- Common heat treatments for carbon and alloy steels

Introduction to Stainless Steel Metallurgy
- Types and classification of stainless steels
- General corrosion resistance of stainless steels (advantages and disadvantages)
- General introduction to the weldability of stainless steels and affect welding on corrosion resistance

Base Metal and Filler Metal Specifications - ASME Section II Parts A and C
- Classification of steels - UNS, SAE, ASTM, ASME
- AWS/ASME classification of filler metals, SFA No., F No., and A No
- Material test reports and what they really mean

Welding Metallurgy of Carbon and Alloy Steels
- Weldment and metallurgical heat affected zones using fundamental principles of welding metallurgy
- Use of carbon equivalence to predict weldability
- Hydrogen assisted cracking related to welding (toe cracking, cold cracking, delayed cracking, HAZ cracking, and underbead cracking)
- Preheating and postweld heat treat in practical terms to avoid cracking, improve weldability, and resist weld related failures

I) General Damage Mechanisms as Described in API 571

Mechanical and Metallurgical Failure Mechanisms
- Graphitization and Softening (Spheroidization)
- Temper Embrittlement
- Strain Aging
- 885°F Embrittlement
- Sigma Phase Embrittlement
- Brittle Fracture
- Creep/Stress Rupture
- Short Term Overheating—Stress Rupture
- Steam Blanketing
- Dissimilar Metal Weld (DMW) Cracking
- Thermal Shock
- Erosion/Erosion-Corrosion
- Cavitation
- Mechanical, Thermal and Vibration-Induced Fatigue
- Refractory Degradation
- Reheat Cracking

Uniform or Localized Loss of Thickness
- Galvanic Corrosion, Atmospheric Corrosion
- Corrosion Under Insulation (CUI)
- Cooling Water Corrosion, Boiler Water Condensate Corrosion
- CO₂ Corrosion
- Flue Gas Dew Point Corrosion
- Microbiologically Induced Corrosion (MIC)
- Soil Corrosion
- Caustic Corrosion
- Dealloying
- Graphitic Corrosion

High Temperature Corrosion, 400°F (204°C)
- Oxidation, Sulfidation, Carburization, Decarburization
- Metal Dusting, Fuel Ash Corrosion
- Nitriding

Environment-Assisted Cracking
- Chloride Stress Corrosion Cracking (Cl-SCC)
- Corrosion Fatigue
- Caustic Stress Corrosion Cracking (Caustic Embrittlement)
- Ammonia Stress Corrosion Cracking
- Liquid Metal Embrittlement (LME)
- Hydrogen Embrittlement (HE)

II) Refining Industry Damage Mechanisms as Described in API 571

Uniform or Localized Loss in Thickness Phenomena
- Amine Corrosion
- Ammonium Bisulfide Corrosion (Alkaline Sour Water)
- Ammonium Chloride Corrosion
- Hydrochloric Acid (HCl) Corrosion
- High Temp H₂S Corrosion
- Hydrofluoric (HF) Acid Corrosion
- Naphthenic Acid Corrosion (NAC)
- Phenol (Carbonic Acid) Corrosion
- Phosphoric Acid Corrosion
- Sour Water Corrosion (Acidic)
- Sulfuric Acid Corrosion

Environment-Assisted Cracking
- Polythionic Acid Stress Corrosion Cracking (PASCC)
- Amine Stress Corrosion Cracking
- Wet H₂S Damage (Blistering/HIC/SOHIC/SCC)
- Hydrogen Stress Cracking—HF
- Carbonate Stress Corrosion Cracking

Other Mechanisms
- High Temperature Hydrogen Attack (HTHA) and Titanium Hydriding

Required Code Documents

All participants must bring the API RP 571 Code to this class. This code document can be purchased from CASTI. A course notebook will be provided to all participants by CASTI.

This code documents may be purchased from CASTI.
API 579-1/ASME FFS-1
Fitness-for-Service

OVERVIEW

The basic and intermediate methodologies of inspecting and assessing equipment for continued service, the need for more advanced evaluations, and the possible remediations available will be discussed in accordance with the methodologies given in API 579-1/ASME FFS-1. A limited discussion will be presented on advanced methods of assessment.

The role of the inspector in gathering data and evaluating that data will be discussed as will be the role of the technologist and engineer in appraising the data and employing it in engineering calculations.

Who Should Attend

Inspectors, engineers, and technologists who are involved in performing API 579-1/ASME FFS-1 evaluations, inspecting and analyzing pressure vessels, pressure piping, tanks and pipelines for safe operation when there is a change in service temperature, or where they have been found to be damaged, distorted, cracked, blistered, or experiencing metal loss.

Accreditation

CASTI is recognized by the International Association of Continuing Education and Training (IACET) as an Authorized Provider of Continuing Education Units (CEUs), under the ANSI/IACET 1-2013 Standard, for good practices and quality continuing education and training programs.

Each participant will receive a CASTI Certificate of Completion with 3.2 CEUs for attending all 4 days of the classroom training.

Before You Register

Prerequisites: There are no prerequisites for this course.
Course Type: CLASSROOM
Related Course: CASTI's API 579-1/ASME FFS-1 Fitness-for-Service

1. A thorough understanding of the damage mechanisms covered in API RP 571 are critical to API 579-1/ASME FFS-1 assessment. It is highly recommended that CASTI’s API RP 571 - Damage Mechanisms Affecting Fixed Equipment in the Refining Industry course be taken in advance.

Prior API and ASME code experience is highly recommended before taking this course. For individuals with limited API and ASME code experience, it is recommended that the CASTI's ASME Section IX - Welding Codes and Metallurgy course be taken in advance.

COURSE INFORMATION

Topics

Scope of API 579-1/ASME FFS-1:
- Responsibilities of owner-user, inspector, engineer

General Assessment Method
- Data requirements:
  - What is required
  - Who is responsible
  - How is data obtained and organized
- Remaining strength factor
- Need for in-service monitoring (inspection frequency)

Remaining Life Determination
Brittle Fracture Resistance:
- Governing thickness concept (as per ASME VIII)
- Stress ratio
- Hydrostatic testing
- Thin wall considerations

Metal Loss Evaluation:
- Point thickness methodology
- Grid thickness methodology
- Supplemental loading
- ASME B31.1 and B31.3 flexibility analysis
- Pitting evaluation

Problem Solving Workshop

HIC and SOHIC Evaluation:
- Blisters and hydrogen induced cracking

Problem Solving Workshop

Evaluating Geometric Irregularities
- Bending and section axial forces
- Weld misalignment
- Out of round
- Internal and external pressure
- Bulges and dents
- Gouges
- Combinations of distress
- Fatigue analysis

Evaluation of Cracks and Crack-like Flaws:
- Primary, secondary, and residual stress
- Non-fracture mechanics method
- Fracture mechanics method

Problem Solving Workshop

Creep Damage Assessment
Heat and Fire Damage Evaluation
Lamination Evaluation

Required Code Documents

All participants must bring API 579-1/ASME FFS-1 code document to this class.

This code document may be purchased from CASTI.

A course notebook will be provided to all participants by CASTI.
ASME B31.3
Introduction to Process Piping Design and Canadian Regulations

OVERVIEW

This introductory level design course provides an understanding of the Canadian regulatory regime as it applies to pressure piping systems, including an overview of the relationship between provincial regulations, CSA B51, and ASME B31.3; and some pertinent construction requirements, although construction requirements will not be covered in detail. The course will highlight areas where code requirements may not fully meet local Canadian regulatory requirements, reference applicable code interpretations and local regulatory bulletins, notices, or advisories. Discussion includes an overview of piping flexibility (i.e., stress) analysis requirements but it is not intended to provide detailed instruction on flexibility analysis requirements.

Learning Objectives

This course will enable students to:
- understand the basic ASME B31.3 code design requirements;
- determine when ASME B31.3 applies;
- complete basic code design calculations;
- gain general understanding of the standards applicable to piping components commonly used in ASME B31.3 piping systems and the implications and/or limitations that these components may have in their piping designs; and
- understand how materials' properties are considered in code design by providing a brief overview of materials properties.

Who Should Attend

Engineers, technologist, and designers who are working for Owners, EPCs, inspection firms, fabricators, and repair/maintenance organizations that are involved with ASME B31.3 piping systems.

Accreditation

CASTI is recognized by the International Association of Continuing Education and Training (IACET) as an Authorized Provider of Continuing Education Units (CEUs), under the ANSI/IACET 1-2013 Standard, for good practices and quality continuing education and training programs.

Each participant will receive a CASTI Certificate of Completion with 3.2 CEUs for attending all 4 days of the classroom training.

Before You Register

Prerequisites: There are no prerequisites for this course.
Course Type: CLASSROOM
Similar Course: CASTI’s ASME B31.3 Materials, Fabrication, Inspection, and Testing Requirements¹

1. Please review both course outlines to determine which area of the code is most suitable.

Note: Due to the importance of the Oil and Gas Industry in Alberta, there will be a focus on local Alberta requirements but the course may touch on certain requirements in other jurisdictions as well (e.g., Offshore East Coast, British Columbia, Saskatchewan, etc.).

COURSE INFORMATION

Topics

Introduction to Regulations, Codes and Standards
- Federal Acts and Regulations
- Provincial Acts and Regulations
- Canadian Pressure Equipment Standards – CSA B51 requirements
- Piping that is not ASME B31.3 code (e.g., Plumbing, Power, Fuel Gas)

Introduction to ASME B31.3
- ASME B31.3 code history and basic philosophy
- ASME B31.3 code organization

Definitions
- Principal axis and stress
- Failure theories
- Stress categories
- Definition and basis for allowable stress
- Fluid service

Piping Design Criteria
- Design conditions
- Design loads (pressure, weight, thermal, seismic, wind, anchor movement)
- Failure modes
- Primary and secondary stress categories
- Load categorization
- Allowable stresses

Pressure Design of Piping Components
An overview of typical materials and materials requirements as is necessary to understand design implications shall be provided.
- Straight Pipe (internal and external pressure)
- Elbows and bends (consideration of wall thinning)
- Branch connections (area replacement)
  - Stub in connections
  - Extruded outlet header
  - Wye pattern fittings
- Closures
- Blind flanges and blanks
- Other unlisted components

Listed Piping Components
An overview of typical materials and materials requirements as is necessary to understand design implications shall be provided.
- MSS SP-95 Nipples and swages
- MSS SP-97 Integrally Reinforced Branch Connections (e.g., Olets)
- ASME B16.9 wrought fittings (butt welded)
- ASME B16.11 forged fittings (threaded and socket welded)
- ASME B16.5, B16.36, B16.47, and MSS SP-44 flanges
- ASME B16.20 and B16.21 gaskets
- ASME B16.48 blanks
- Valves (ASME, API, MSS)
Instrument Tubing Components
- Straight Tubing (mechanical properties, material standards)
- Tube Fittings
- Testing requirements

Overview of Pipe Flexibility Analysis
This section will not be presented to the same level of detail as in CASTI’s ASME B31.3 Materials, Fabrication, Inspection, and Testing Requirements course
- Allowable and displacement stresses
- Flexibility
- Bending stress
- Torsional stress
- Fatigue
- Stress intensification
- Combined loads
- Cold spring
- Simplified analysis methods

Pipe Support Design
- Support types
- Assumptions
- Load combinations

Piping Types
- System piping
- Pressure relief piping
- Category M (lethal) service
- High pressure service (Chapter IX)

Leak Testing
- Required Leak testing
- Hydrostatic testing
- Pneumatic testing
- Alternative leak testing
- Initial service testing

Problem Solving Workshops

Topics that are excluded from this course are:
- An overview of applicable code paragraphs will be provided but design procedures shall not be reviewed.
- Design procedures for unlisted components (e.g., non-standard flanges or fittings, etc.)
- Lap joint fittings
- Design of expansion joints and spring hangers
- Seismic and earthquake design
- Vibration analysis
- Non-metallic piping systems

Required Code Documents
All participants must bring the ASME B31.3 code to this class.

This code document may be purchased from CASTI.

A course notebook will be provided to all participants by CASTI.
ASME B31.3
Materials, Fabrication, Inspection, and Testing Requirements

OVERVIEW

This is an introductory course to provide the basic understanding of the materials, fabrication, inspection and testing portions of ASME B31.3 for new construction and how it may be applied for post construction inspection, repairs, and alterations. The course also includes an introduction to ASTM material standards and AWS filler metal standards.

This course will assist manufacturers in meeting the personnel competency and training requirements of AB-518, Rev. 1, Pressure Piping Construction Requirements.

Who Should Attend

Inspectors, engineers, maintenance and QA personnel who work for owner-user companies, inspection companies, fabricators, maintenance service and repair companies, inspection companies and EPC’s from petrochemical plants, refineries, power plants, gas/oil pipeline companies, and pulp mills. This course will also assist CSA W178.2 exam candidates who plan to write the B31.3 code exam.

Accreditation

CASTI is recognized by the International Association of Continuing Education and Training (IACET) as an Authorized Provider of Continuing Education Units (CEUs), under the ANSI/IACET 1-2013 Standard, for good practices and quality continuing education and training programs.

Each participant will receive a CASTI Certificate of Completion with 3.2 CEUs for attending all 4 days of the classroom training. An additional 2.4 CEUs will be awarded for the completion of the pre-classroom online lessons prior to the course start date.

Before You Register

Prerequisites: There are no prerequisites for this course.

Course Type: HYBRID1, Optional EP2

Similar Course: CASTI’s ASME B31.3 Introduction to Process Piping Design and Canadian Regulations3

1. This course contains pre-classroom online lessons that must be completed before the course start date.
2. This course is a dual purpose course – for general information regarding the subject matter and as an exam preparation course for the related certification exam(s). Exam preparation workshops, evening tutorials, homework and post-classroom online study are optional.
3. Please review both course outlines to determine which area of the code is most suitable.

PROGRAM OF STUDY

CASTI Learning Advantage (CLA) Hybrid Training

This course includes 7 days* of training as described below:

<table>
<thead>
<tr>
<th>Pre-Classroom CLA Online</th>
<th>In-Classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated 3 days* (24hrs)</td>
<td>4 days</td>
</tr>
<tr>
<td>• wall thickness for straight pipe</td>
<td>• lectures</td>
</tr>
<tr>
<td>• steel metallurgy and welding metallurgy</td>
<td>• group discussions</td>
</tr>
<tr>
<td>• ASTM specifications (A106, A333, A312, A941)</td>
<td>• real-life examples</td>
</tr>
<tr>
<td>• temperature limitations (min./max. DMT)</td>
<td>• practice problems</td>
</tr>
<tr>
<td>• impact testing criteria</td>
<td>• interpretation case studies; and</td>
</tr>
<tr>
<td>• preheating and PWHT process piping</td>
<td>• workshops</td>
</tr>
<tr>
<td>• leak testing (hydrostatic and pneumatic)</td>
<td></td>
</tr>
<tr>
<td>• corrosion rates, remaining life of equipment, next inspection interval</td>
<td></td>
</tr>
<tr>
<td>• online pre-classroom training is available 4 weeks prior to classroom start date</td>
<td></td>
</tr>
</tbody>
</table>

• Estimates are based on the average time needed for previous students to complete online training. Your personal skill and experience levels will determine the actual time required to complete this work.

CLA Online Study

Completing all of the online study is a critical step maximizing your likelihood of passing the exam. Individuals who do not complete all of the online study may jeopardize the likelihood of successfully passing the exam and do so at their own risk. The online study is an integral part of this training course and must be completed by all registrants to achieve the full CEU credit, and for exam candidates to comply with the CASTI Exam Preparation Guarantee Policy.

All CLA online content includes:

• e-Instructor support (access to the same expert instructor)
• reading material for self-study
• practice problems and detailed solutions
• practice exam questions (if applicable)
• online questions are graded automatically to provide a measure of self-evaluation
COURSE INFORMATION

Topics

Introduction to Laws, Regulations, Jurisdiction and Related Codes and Standards
- Alberta Safety Code Act and hierarchy of related regulations, codes, and standards
- Brief introduction to the Alberta Pressure Equipment Safety Regulations (PESR)
- Brief introduction to the Alberta Pressure Welders Regulations
- ABSA's Role as the Jurisdiction Administrator and Authorized Inspection Agency
- Brief introduction to ABSA forms for pressure equipment

B31.3 Responsibilities
- Owner, designer, manufacturer, fabricator, erector, and owner's inspector

Brief Introduction to B31.3 Design Requirements for New Construction
- Design minimum temperature
- Quality factors for castings and welds
- Pressure design of straight pipe
- Pipe undertolerance and how to order pipe accordingly

Steels and ASTM Specifications
- Introduction to Steel Metallurgy
  - Fe-Fe3C diagram and how to use it with B31.3
    - grains, grain boundaries, grain size, and how they relate to the brittle fracture rules in B31.3
    - heat treatment of steel and related terms and definitions as used in ASTM standards, including ASTM A941
    - review of B31.3 steel and heat treatment terms/definitions and how they differ from ASTM A941, API 570, and NACE standards
- ASTM Specifications
  - ASTM General Specification requirements (A530, A999, A450) and how they work with ASTM piping product specifications
  - ASTM Piping Product Specifications
    - A106 (A530) seamless carbon steel piping for high temperature service
    - A333 (A999) carbon steel piping for low temperature service
    - A335 alloy steel piping for high temperature service
    - A312 (A450) austenitic stainless steel piping
- Material Test Reports
  - Review of sample A106, A333, and A312 material test reports
  - Understanding the importance of material test report data
  - Using material test reports to make critical purchasing decisions

B31.3 Materials and Requirements
- B31.3 Listed, unknown and reclaimed materials terms and definitions
- B31.3 Requirements for low temperature toughness tests for metals
  - Charpy impact testing procedure
    - specimen size
    - test temperature
  - Minimum temperatures without impact testing for carbon steel materials
  - Reduction in minimum design metal temperature without impact testing
  - Charpy impact testing acceptance criteria

Welding Metallurgy
- Regions of the heat-affected zone (HAZ) in carbon steel
- Carbon equivalent, ASTM specifications, and various formulas
- Heat input of welding
  - Effect on the HAZ and brittle fracture of carbon steels
  - ASME Sec. IX welding procedure requirements for carbon steels
  - B31.3 low temperature notch-toughness requirements for carbon steels
- Brief introduction to the welding metallurgy of austenitic stainless steel

B31.3 Fabrication by Welding
- Responsibilities
- Weld and joint types
- Preheat requirements
- Postweld heat treatment requirements
- Hardness testing requirements

B31.3 Inspection and Testing for New Construction
- Responsibilities of the fabricator, purchaser and inspector
- Examination requirements: extent, supplementary and typical weld imperfections
- Examination methods for evaluating weld imperfections and acceptance criteria

B31.3 Leak Testing for New Construction
- General requirements
- Preparation for leak testing
- Brittle fracture considerations for leak testing
- Hydrostatic testing
- Pneumatic testing

Required Code Documents

All participants must bring the API RP 571 Code to this class.

This code documents may be purchased from CASTI.

A course notebook will be provided to all participants by CASTI.
ASME SECTION VIII, DIVISION 1
Code Design Requirements for Pressure Vessels

OVERVIEW

The design requirements of Section VIII, Division 1 will be explained and the application of those requirements demonstrated through example problems. General, material, and fabrication requirements with related documentation will be covered. The participants will not only gain the knowledge for design of safe and economical vessels, they will also learn how to pick proper materials, avoid common fabrication problems, and prepare data reports. A number of important Code Cases, which will result in more economical construction will be introduced. The latest Code revisions and the work being performed on future revisions will be reviewed.

Who Should Attend

Individuals involved with the purchase, design, fabrication, or inspection of pressure vessels. (Engineers, designers, fabrication personnel, QA supervisors, and inspectors who work for pressure vessel owners, fabricators, inspection companies, EPC's and government agencies.) Some degree of technical background will be helpful, but individuals are not required to have an engineering degree or previous work experience in the subject matter.

Accreditation

CASTI is recognized by the International Association of Continuing Education and Training (IACET) as an Authorized Provider of Continuing Education Units (CEUs), under the ANSI/IACET 1-2013 Standard, for good practices and quality continuing education and training programs.

Each participant will receive a CASTI Certificate of Completion with 3.2 CEUs for attending all 4 days of the classroom training.

Before You Register

Prerequisites: There are no prerequisites for this course.
Course Type: CLASSROOM
Related Course: CASTI’s API 579-1/ASME FFS-1 Fitness-for-Service

1. A thorough understanding of the damage mechanisms covered in API RP 571 are critical to API 579-1/ASME FFS-1 assessment. It is highly recommended that CASTI’s API RP 571 - Damage Mechanisms Affecting Fixed Equipment in the Refining Industry course be taken in advance.

Prior API and ASME code experience is highly recommended before taking this course. For individuals with limited API and ASME code experience, it is recommended that the CASTI’s ASME Section IX - Welding Codes and Metallurgy course be taken in advance.

COURSE INFORMATION

Topics

Introduction to the ASME B&PV Code
General Requirements of Section VIII, Division 1
Design Criteria and Strength Theory of Division 1
General Design Rules
- Shells for internal pressure
- Heads for internal pressure

Introduction to Buckling
Design Rules
- Shells for external pressure
- Heads for external pressure
- Flat covers
- Openings

Sizing of Stiffeners
Design for External Loadings
Design of Nozzles for Piping Reactions
- WRC Bulletins 107, 297 and 368
- Definition of Joint Categories and Joint Efficiencies

Fabrication Requirements
- Post weld heat treatment (PWHT)
- Tolerances
- Non-destructive examination (NDE)
- Welding requirements and weld details
- Carbon and low alloy material requirements
- High alloys
- Heat treated materials

Testing requirements
Overpressure protection requirements
Stamping and documentation requirements
Introduction to Flange design
Appendices
Comparison with Division 2
Research and development work being performed
- PVRC and elsewhere

Design Example Problems
Open Discussion
Questions and Answers

Required Code Documents

All participants must bring the ASME Section VIII, Division 1 code document to this class.

This code document may be purchased from CASTI.

A course notebook will be provided to all participants by CASTI.
ASME SECTION VIII, DIVISION 1
Materials, Fabrication, Inspection, and Testing Requirements

OVERVIEW

This is an introductory course to provide a basic understanding of the fabrication, inspection and testing portions of ASME Section VIII Division 1. Principles of design will be discussed, but not in sufficient detail that this course can be considered a design course for new construction. ASME Section VIII, Division 1 deals with new construction, however, in this course the application of the principles expressed in the code will be extrapolated to deal with operation and maintenance issues and how they work with API 510 for post construction inspection, repairs and alterations. The course also includes a brief introduction to ASME Section II Part A (Ferrous Material Standards) and to ASME Section IX - Welding Qualifications.

Who Should Attend

Inspectors, engineers, maintenance and QA personnel who work for owner-user companies, inspection companies, fabricators, maintenance service and repair companies, inspection companies, EPC’s and others who want an understanding of the principles and applications of ASME VIII Division 1. Optional evening tutorial sessions will be available.

Accreditation

CASTI is recognized by the International Association of Continuing Education and Training (IACET) as an Authorized Provider of Continuing Education Units (CEUs), under the ANSI/IACET 1-2013 Standard, for good practices and quality continuing education and training programs.

Before You Register

Prerequisites: There are no prerequisites for this course.
Course Type: HYBRID
Similar Course: CASTI’s ASME Section VIII, Division 1 Code Design Requirements for Pressure Vessels

1. This course contains pre-classroom online lessons that must be completed before the course start date.
2. Please review both course outlines to determine which area of the code is most suitable.

PROGRAM OF STUDY

CASTI Learning Advantage (CLA) Hybrid Training

This course includes 7 days* of training as described below:

<table>
<thead>
<tr>
<th>Pre-Classroom CLA Online</th>
<th>In-Classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated 3 days* (24hrs)</td>
<td>4 days</td>
</tr>
<tr>
<td>• wall thickness for straight pipe</td>
<td>• lectures</td>
</tr>
<tr>
<td>• steel metallurgy and welding metallurgy</td>
<td>• group discussions</td>
</tr>
<tr>
<td>• ASTM specifications (A106, A333, A312, A941)</td>
<td>• real-life examples</td>
</tr>
<tr>
<td>• temperature limitations (min./max. DMT)</td>
<td>• practice problems</td>
</tr>
<tr>
<td>• impact testing criteria</td>
<td>• interpretation case studies; and</td>
</tr>
<tr>
<td>• preheating and PWHT</td>
<td>• workshops</td>
</tr>
<tr>
<td>• process piping</td>
<td></td>
</tr>
<tr>
<td>• leak testing (hydrostatic and pneumatic)</td>
<td></td>
</tr>
<tr>
<td>• corrosion rates, remaining life of equipment, next inspection interval</td>
<td></td>
</tr>
<tr>
<td>• pre-classroom online training is available 4 weeks prior to classroom start date</td>
<td></td>
</tr>
</tbody>
</table>

• Estimates are based on the average time needed for previous students to complete online training. Your personal skill and experience levels will determine the actual time required to complete this work.

CLA Online Study

Completing all of the online study is a critical step maximizing your likelihood of passing the exam. Individuals who do not complete all of the online study may jeopardize the likelihood of successfully passing the exam and do so at their own risk. The online study is an integral part of this training course and must be completed by all registrants to achieve the full CEU credit, and for exam candidates to comply with the CASTI Exam Preparation Guarantee Policy.

All CLA online content includes:
- e-Instructor support (access to the same expert instructor)
- reading material for self-study
- practice problems and detailed solutions
- practice exam questions (if applicable)
- online questions are graded automatically to provide a measure of self-evaluation

Required Code Documents

All participants must bring the ASME Section VIII, Division 1 to this class. Only Parts U, UG, UW, UCS, UHA, UHT, are required from ASME Section VIII, Division 1.

This code documents may be purchased from CASTI.

A course notebook will be provided to all participants by CASTI.
CASTI's Learning Advantage (CLA) Online Training Courses offer flexible, convenient, time saving, cost saving advantages to getting the education you need to get ahead.

- CASTI e-Instructor support
- accessible 24/7 almost anywhere you have a PC and an internet connection
- self-study material with explanations and sample questions throughout
- code book navigation tutorials
- exam preparation courses include complete practice exams
- solutions reference the corresponding code paragraphs for better understanding
- assessment-based: questions are submitted online and automatically graded

AVAILABLE NOW. REGISTER TODAY!
CSA W178.2 Code Endorsement Exam Preparation
AWS CWI Code Endorsement Exam Preparation
In-Service Pressure Vessel Inspector Certification

GET ONLINE. GET CERTIFIED. GET HIRED. GET AHEAD.

ONLINE STUDY COMPONENTS

- e-Instructor support
- simple online access using a web browser (see Minimum System Requirements below)
- study material with explanations and sample questions throughout
- code book navigation tutorial
- connecting-to-the-code references
- 3 practice exams
- solutions to questions include references to the corresponding paragraph of the exam document(s)
- all study material sample questions and practice exam questions are submitted online and automatically
- graded

COURSE LENGTH

Online lessons are available for six months from the date of registration or until your scheduled exam date, whichever occurs first. Please register your exam dates to unlock additional online practice exams.

MINIMUM SYSTEM REQUIREMENTS FOR THE CLA ONLINE STUDY

- Broadband Internet connection
- Windows Vista (or higher)
- Microsoft Internet Explorer 8 (or higher) or Mozilla Firefox 19 (or higher)
- 1 GB of RAM (2 GB or greater recommended)
- 1080 x 1024 video resolution (or higher)
- Adobe Reader 8 (or higher)

Note 1: Currently we do not support Mac computers or tablets.
Note 2: Use of Adobe software may have additional system requirements. Please refer to the Adobe specifications provided with your Adobe software or visit the Adobe website at www.adobe.com for more information.