



## Technical Bolting Training Synopsis - 2022



Hydratight is a leading and preferred training provider to major operators, contractors and training management service companies due to our extensive field service experience, subject matter expertise in Joint Integrity Assurance™ and our proven training track record.

The Hydratight Academy is now able to supplement our instructor led training courses with flexible online training options covering the health, safety, quality, and technical knowledge elements found within our standard training courses.

Attendance of any eLearning courses within the Hydratight Integrity Assurance Series can be supplemented with hands-on practical instructor led blended training for learners to achieve full course certification.



As an ECITB approved training provider for over 25 years, the Hydratight Academy can also offer the full range of ECITB MJI eLearning and blended course options.

Listed below are our standard instructor led courses and eLearning programs that are now available within our [Learning Development Management System](#).



### Hydratight – Integrity Assurance

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### ECITB - Mechanical Joint Integrity

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### Program Title

- Hydratight Integrity Assurance

### Course Title

- **JI-01 - Joint Integrity Level 1 – Hand Torque**
  - o Bolted Joint Integrity & Hand Torque Tightening

### Course Summary

- A portfolio of modular Joint Integrity courses based upon Hydratight's best practice internal Competency Assurance Management System with Hydratight certification.

### Certification

- Hydratight Certification
- 3 years validity

### Course Duration

- 1 Day

### Course Combinations

- JI-01/02 – Joint Integrity Level 1 & 2 Combo
  - o Bolted Joint Integrity & Hand/Hydraulic Torque Tightening (1.5 days)
- JI-01/02/03 – Joint Integrity Level 1 to 3 Combo
  - o Bolted Joint Integrity, Torque Tightening & Bolt Tensioning (2.5 days)

### Class Size

- Maximum 6 delegates

### Course Content

- Instruction and practice in observing health and safety requirements when working with bolted joint assemblies.
- Instruction and compliance with approved working practices and the ASME PCC-1 guidelines for pressure boundary bolted flange joint assembly.
- Common joint types.
- Gaskets and seal ring types.
- Behaviour of studbolts when tightened.
- The importance of correct residual bolt load.
- Disassembly procedures.
- Inspection and surface finish requirements.
- Assembly and alignment procedures.
- The correct assembly and disassembly of bolted flange assemblies and clamp connectors using hand torque equipment.
- Joint integrity assurance quality control procedures.



### **Program Title**

- Hydratight Integrity Assurance

### **Course Title:**

- **JI-02 - Joint Integrity Level 2 – Hydraulic Torque**
  - o Bolted Joint Integrity & Hydraulic Torque Tightening

### **Course Summary**

- A portfolio of modular Joint Integrity courses based upon Hydratight's best practice internal Competency Assurance Management System with Hydratight certification.

### **Certification**

- Hydratight Certification
- 3 years validity

### **Course Duration**

- 1 Day

### **Course Combinations**

- JI-01/02 – Joint Integrity Level 1 & 2 Combo
  - o Bolted Joint Integrity & Hand/Hydraulic Torque Tightening (1.5 days)
- JI-01/02/03 – Joint Integrity Level 1 to 3 Combo
  - o Bolted Joint Integrity, Torque Tightening & Bolt Tensioning (2.5 days)

### **Class Size**

- Maximum 6 delegates

### **Course Content**

- Instruction and practice in observing health and safety requirements when working with bolted joint assemblies.
- Instruction and compliance with approved working practices and the ASME PCC-1 guidelines for pressure boundary bolted flange joint assembly.
- Common joint types.
- Gaskets and seal ring types.
- Behaviour of studbolts when tightened.
- The importance of correct residual bolt load.
- Disassembly procedures.
- Inspection and surface finish requirements.
- Assembly and alignment procedures.
- The correct assembly and disassembly of bolted flange assemblies and clamp connectors using hydraulic torque equipment.
- Joint integrity assurance quality control procedures.



### Program Title

- Hydratight Integrity Assurance

### Course Title

- **JI-03 - Joint Integrity Level 3 – Bolt Tensioning**
  - o Bolted Joint Integrity & Hydraulic Bolt Tensioning

### Course Summary

- A portfolio of modular Joint Integrity courses based upon Hydratight's best practice internal Competency Assurance Management System with Hydratight certification.

### Certification

- Hydratight Certification
- 3 years validity

### Course Duration

- 1 Day

### Course Combinations

- JI-01/02 – Joint Integrity Level 1 & 2 Combo
  - o Bolted Joint Integrity & Hand/Hydraulic Torque Tightening (1.5 days)
- JI-01/02/03 – Joint Integrity Level 1 to 3 Combo
  - o Bolted Joint Integrity, Torque Tightening & Bolt Tensioning (2.5 days)

### Class Size

- Maximum 6 delegates

### Course Content

- Instruction and practice in observing health and safety requirements when working with bolted joint assemblies.
- Instruction and compliance with approved working practices and the ASME PCC-1 guidelines for pressure boundary bolted flange joint assembly.
- Common joint types.
- Gaskets and seal ring types.
- Behaviour of studbolts when tightened.
- The importance of correct residual bolt load.
- Disassembly procedures.
- Inspection and surface finish requirements.
- Assembly and alignment procedures.
- The correct assembly and disassembly of bolted flange assemblies using hydraulic bolt tensioning equipment.
- Joint integrity assurance quality control procedures.



### Hydratight Integrity Assurance Series - eLearning and Blended Learning Courses



Introduction to Bolted Joint Integrity



Introduction to Torque Tightening



Introduction to Bolt Tensioning



Introduction to Bolted Joint Integrity - Combo

Hydratight Integrity Assurance eLearning courses can be supplemented with hands-on practical instructor led training for individuals who are required to carry out bolted joint integrity tasks in the workplace.

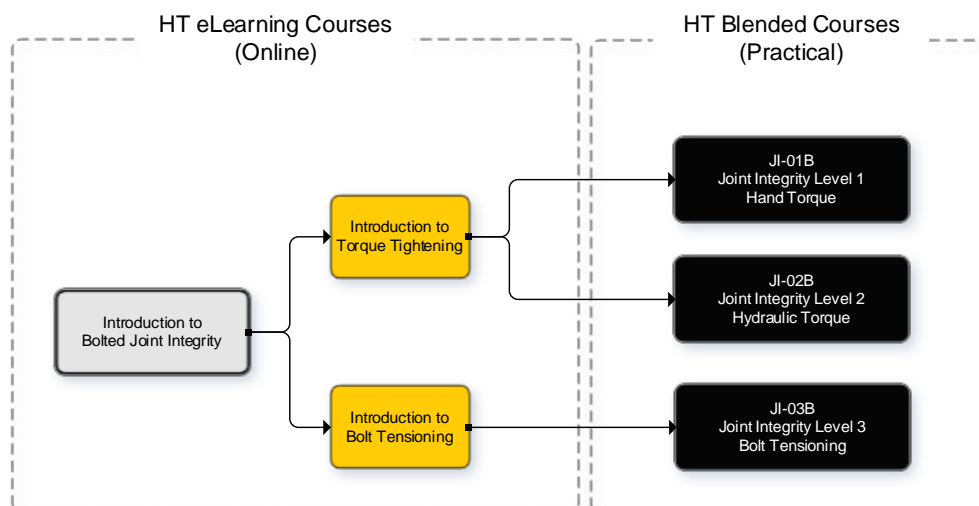
These online eLearning courses cover the health, safety, quality and technical knowledge learning objectives relevant to the disassembly, inspection, assembly and tightening of bolted connections.

Our online training courses can then be supplemented with our blended learning training courses to cover the hands-on practical training exercises relevant to the subject area.

Introduction to Bolted Joint Integrity completion is a pre-requisite prior to enrolment on torque tightening and/or bolt tensioning courses and application for hands-on practical training.

Contact [eLearning@hydratight.com](mailto:eLearning@hydratight.com) to enrol on Hydratight Academy Integrity Assurance eLearning courses and local delivery options for follow up, hands-on blended learning practical training.

### Pre-requisites – Integrity Assurance Series eLearning > Practical Blended Training





### Program Title

- ECITB Mechanical Joint Integrity

### Course Title

- **MJI-01 Mechanical Joint Integrity First Principles**

### Course Summary

- The ECITB MJI-01 training standard covers knowledge-based learning only relevant to isolation, dismantling techniques, component inspection, alignment, assembly, and tightening of bolted connections and has been designed for use in collaboration with the activity based MJI training standards.

### Certification

- ECITB Training and Technical Test Certification
- Training Certificates - 12 months validity for technical test application purposes
- Technical Test Certificates - 3 years validity

### Course Combinations

- MJI-01/10/11 - Hand Torque Bolted Connection Techniques (1 day)
- MJI-01/19/20 - Hydraulically Torque Bolted Connection Techniques Module\* (1 day)
- MJI-01/18 - Hydraulically Tension Bolted Connection Techniques (1 day)
- MJI-01/10/11/19/20 - Hydraulically Torque Bolted Connection Techniques (1.5 days)
- MJI-01/10/11/18/19/20 - Hydraulically Torque and Tension Bolted Connection Techniques (2.5 days)

\*Valid MJI-10/11 training certificate within 12 months or TMJI10/11 technical test certificate required.

### Class Size

- Maximum 6 delegates

### Course Content

- This training unit specifies the knowledge-based performance expected of persons trained to dismantle, inspect, prepare, assemble, and tighten mechanical joints.
- Understand health, safety, legislation, and quality control procedures related to mechanical joint connections.
- Understand how to perform mechanical joint connection tasks.
- Understand preparation of work areas, equipment, tools, components, and materials for mechanical joint connection tasks.
- Understand how to reinstate the work area, equipment, and materials after completing the mechanical joint connection task.



### Program Title

- ECITB Mechanical Joint Integrity

### Course Title

- **MJI-10 Hand Torqued Bolted Connections**

### Course Summary

- The ECITB MJI-10 training standard covers activity-based training relevant to isolation, dismantling techniques, component inspection, alignment, assembly, and the hand torque tightening of flanged connections.

### Certification

- ECITB Training and Technical Test Certification
- Training Certificates - 12 months validity for technical test application purposes
- Technical Test Certificates - 3 years validity

### Course Combinations

- MJI-01/10/11 - Hand Torque Bolted Connection Techniques (1 day)
- MJI-01/19/20 - Hydraulically Torque Bolted Connection Techniques Module\* (1 day)
- MJI-01/18 - Hydraulically Tension Bolted Connection Techniques (1 day)
- MJI-01/10/11/19/20 - Hydraulically Torque Bolted Connection Techniques (1.5 days)
- MJI-01/10/11/18/19/20 - Hydraulically Torque and Tension Bolted Connection Techniques (2.5 days)

\*Valid MJI-10/11 training certificate within 12 months or TMJI10/11 technical test certificate required.

### Class Size

- Maximum 6 delegates

### Course Content

- This training unit specifies the activity-based performance expected of persons trained to dismantle, inspect, prepare, assemble, and hand torque tighten flanged connections.
- Understand health, safety, legislation, and quality control procedures related to flanged connections.
- Understand tightening and torquing sequences for flanged connections.
- Prepare work areas, equipment, and materials for flanged connection tasks.
- Perform hand torqued flanged connection activities

### Related Technical Test

- TMJI10 Dismantle, Assemble and Hand Torque Flanged Joints



### Program Title

- ECITB Mechanical Joint Integrity

### Course Title

- **MJI-11 Hand Torqued Clamp Connectors**

### Course Summary

- The ECITB MJI-11 training standard covers activity-based training relevant to isolation, dismantling techniques, component inspection, alignment, assembly, and hand torque tightening of clamp connectors.

### Certification

- ECITB Training and Technical Test Certification
- Training Certificates - 12 months validity for technical test application purposes
- Technical Test Certificates - 3 years validity

### Course Combinations

- MJI-01/10/11 - Hand Torque Bolted Connection Techniques (1 day)
- MJI-01/19/20 - Hydraulically Torque Bolted Connection Techniques Module\* (1 day)
- MJI-01/18 - Hydraulically Tension Bolted Connection Techniques (1 day)
- MJI-01/10/11/19/20 - Hydraulically Torque Bolted Connection Techniques (1.5 days)
- MJI-01/10/11/18/19/20 - Hydraulically Torque and Tension Bolted Connection Techniques (2.5 days)

\*Valid MJI-10/11 training certificate within 12 months or TMJI10/11 technical test certificate required.

### Class Size

- Maximum 6 delegates

### Course Content

- This training unit specifies the activity-based performance expected of persons trained to dismantle, inspect, prepare, assemble, and hand torque tighten clamp connectors.
- Understand health, safety, legislation, and quality control procedures related to clamp connectors.
- Understand tightening and torquing sequences for clamp connectors.
- Prepare work areas, equipment, and materials for clamp connector tasks.
- Perform hand torqued clamp connector activities.

### Related Technical Test

- TMJI-11 Dismantle, Assemble and Hand Torque Clamp Connectors





### Program Title

- ECITB Mechanical Joint Integrity

### Course Title

- **MJI-18 Hydraulically Tensioned Bolted Connections**

### Course Summary

- The ECITB MJI-18 training standard covers activity-based training relevant to isolation, dismantling techniques, component inspection, alignment, assembly, and hydraulic bolt tensioning of flanged connections.

### Certification

- ECITB Training and Technical Test Certification
- Training Certificates - 12 months validity for technical test application purposes
- Technical Test Certificates - 3 years validity

### Course Combinations

- MJI-01/10/11 - Hand Torque Bolted Connection Techniques (1 day)
- MJI-01/19/20 - Hydraulically Torque Bolted Connection Techniques Module\* (1 day)
- MJI-01/18 - Hydraulically Tension Bolted Connection Techniques (1 day)
- MJI-01/10/11/19/20 - Hydraulically Torque Bolted Connection Techniques (1.5 days)
- MJI-01/10/11/18/19/20 - Hydraulically Torque and Tension Bolted Connection Techniques (2.5 days)

\*Valid MJI-10/11 training certificate within 12 months or TMJI10/11 technical test certificate required.

### Class Size

- Maximum 6 delegates

### Course Content

- This training unit specifies the activity-based performance expected of persons trained to dismantle, inspect, prepare, assemble, and hydraulic bolt tension flanged connections.
- Understand health, safety, legislation, and quality control procedures related to flanged connections.
- Understand tensioning and tightening sequences for flanged connections
- Prepare work areas, equipment, and materials for flanged connection tasks.
- Perform hydraulic bolt tensioned flanged connection activities

### Related Technical Test

- TMJI-18 Dismantle, Assemble and Tensioning Bolted Connections



### Program Title

- ECITB Mechanical Joint Integrity

### Course Title

- **MJI-19 Hydraulically Torqued Bolted Connections**

### Course Summary

- The ECITB MJI-19 training standard covers activity-based training relevant to isolation, dismantling techniques, component inspection, alignment, assembly, and hydraulic torque tightening of flanged connections.

### Certification

- ECITB Training and Technical Test Certification
- Training Certificates - 12 months validity for technical test application purposes
- Technical Test Certificates - 3 years validity

### Course Combinations

- MJI-01/10/11 - Hand Torque Bolted Connection Techniques (1 day)
- MJI-01/19/20 - Hydraulically Torque Bolted Connection Techniques Module\* (1 day)
- MJI-01/18 - Hydraulically Tension Bolted Connection Techniques (1 day)
- MJI-01/10/11/19/20 - Hydraulically Torque Bolted Connection Techniques (1.5 days)
- MJI-01/10/11/18/19/20 - Hydraulically Torque and Tension Bolted Connection Techniques (2.5 days)

\*Valid MJI-10/11 training certificate within 12 months or TMJI10/11 technical test certificate required.

### Class Size

- Maximum 6 delegates

### Course Content

- This training unit specifies the activity-based performance expected of persons trained to dismantle, inspect, prepare, assemble, and hydraulic torque tighten flanged connections.
- Understand health, safety, legislation, and quality control procedures related to flanged connections.
- Understand hydraulic tightening and torquing sequences for flanged connections.
- Prepare work areas, equipment, and materials for flanged connection tasks.
- Perform hydraulic torqued flanged connection activities

### Related Technical Test

- TMJI-19 Dismantle, Assemble and Hydraulically Torque Flanged Joints



### Program Title

- ECITB Mechanical Joint Integrity

### Course Title

- **MJI-20 Hydraulically Torqued Clamp Connectors**

### Course Summary

- The ECITB MJI-20 training standard covers activity-based training relevant to isolation, dismantling techniques, component inspection, alignment, assembly, and hydraulic torque tightening of clamp connectors.

### Certification

- ECITB Training and Technical Test Certification
- Training Certificates - 12 months validity for technical test application purposes
- Technical Test Certificates - 3 years validity

### Course Combinations

- MJI-01/10/11 - Hand Torque Bolted Connection Techniques (1 day)
- MJI-01/19/20 - Hydraulically Torque Bolted Connection Techniques Module\* (1 day)
- MJI-01/18 - Hydraulically Tension Bolted Connection Techniques (1 day)
- MJI-01/10/11/19/20 - Hydraulically Torque Bolted Connection Techniques (1.5 days)
- MJI-01/10/11/18/19/20 - Hydraulically Torque and Tension Bolted Connection Techniques (2.5 days)

\*Valid MJI-10/11 training certificate within 12 months or TMJI10/11 technical test certificate required.

### Class Size

- Maximum 6 delegates

### Course Content

- This training unit specifies the activity-based performance expected of persons trained to dismantle, inspect, prepare, assemble, and hydraulic torque tighten clamp connectors.
- Understand health, safety, legislation, and quality control procedures related to clamp connectors.
- Understand hydraulic tightening and torquing sequences for clamp connectors.
- Prepare work areas, equipment, and materials for clamp connector tasks.
- Perform hydraulic torqued clamp connector activities.

### Related Technical Test

- TMJI-20 Dismantle, Assemble and Hydraulically Torque Clamp Connector Joints

### ECITB Mechanical Joint Integrity eLearning and Blended Learning Courses



Hand Torque Bolted Connection Techniques  
(MJI-01/10/11E)



Hydraulically Tension Bolted Connection Techniques  
(MJI-01/18E)



Hydraulically Torque Bolted Connection Techniques  
(MJI-01/10/11/19/20E)



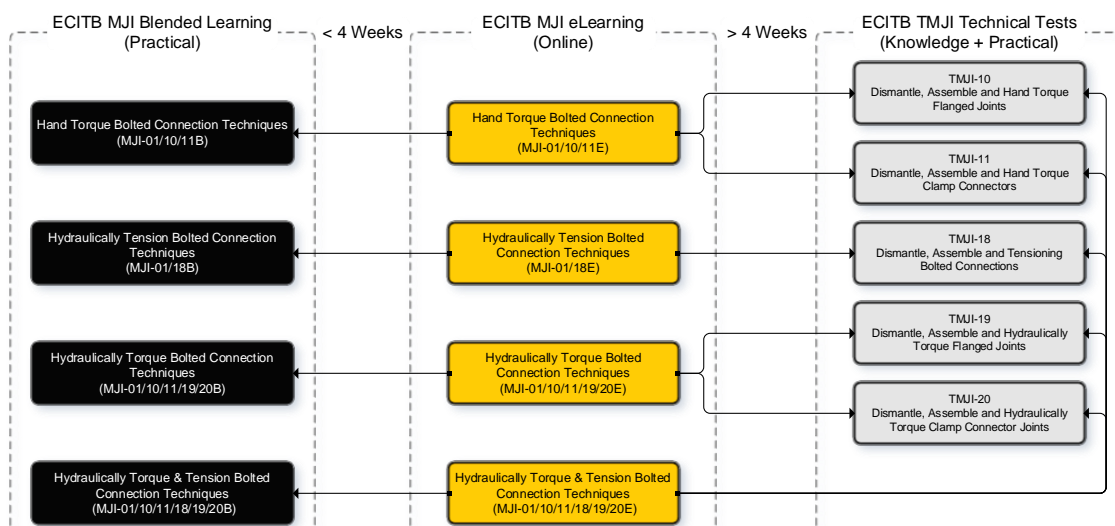
Hydraulically Torque & Tension Bolted Connection  
Techniques (MJI-01/10/11/18/19/20E)

ECITB approved MJI-E eLearning courses can be completed as a refresher training option up to 4 weeks before attendance of technical testing or within 4 weeks prior to attending MJI-B blended learning practical training.

These courses are derived from the ECITB mechanical joint integrity technical training standards and cover the learning objectives and key learning points relevant to the disassembly, inspection, assembly and tightening of flange and clamp connections.

Contact [eLearning@hydratight.com](mailto:eLearning@hydratight.com) to enrol on Hydratight Academy ECITB MJI eLearning courses and local delivery options for follow up, hands-on blended learning practical training.

### Pre-requisites – MJI Blended Learning - MJI eLearning - TMJI Technical Testing





### **Program Title**

- ASME PCC-1 Appendix A

### **Course Title**

- **Training of Fundamentals & Piping**

### **Course Summary**

- This course is one of four standard training modules as specified within the ASME PCC-1 Guidelines for Pressure Boundary Bolted Flange Joint Assembly and its Appendix A specific to the training, qualification, and certification of joint assembly personnel.
- The course will deliver a thorough understanding of bolted flange joint disassembly, assembly and tightening techniques using hand torque tightening equipment.

### **Certification**

- Hydratight Certification
- Training Certificates – Open validity
- Qualification Certificates – 3 years validity

### **Course Combinations**

- Training of Fundamentals & Piping (2 days)
- Powered Equipment Supplemental Qualification (1 day)
- Heat Exchanger Supplemental Qualification (1 day)
- Special Joint Supplemental Qualification (1 day)

### **Class Size**

- Maximum 6 delegates

### **Course Content**

- General health and safety precautions
- Joint component identification, functionality, and limitations
- Bolting principles and techniques for load control
- Inspection and reporting of defects or faults
- Joint disassembly, inspection, alignment, assembly and tightening procedures
- Importance of joint quality assurance procedures, certification, and records
- Selecting the target bolt assembly load and appropriate bolt tightening tooling
- Calibration and maintenance of bolting equipment



### **Program Title**

- ASME PCC-1 Appendix A

### **Course Title**

- **Powered Equipment Supplemental Training**

### **Course Summary**

- This course is one of four standard training modules as specified within the ASME PCC-1 Guidelines for Pressure Boundary Bolted Flange Joint Assembly and its Appendix A specific to the training, qualification, and certification of joint assembly personnel.
- The course will deliver a thorough understanding of bolted flange joint disassembly, assembly and tightening techniques using powered tightening equipment.

### **Certification**

- Hydratight Certification
- Training Certificates – Open validity
- Qualification Certificates – 3 years validity

### **Course Combinations**

- Training of Fundamentals & Piping (2 days)
- Powered Equipment Supplemental Qualification (1 day)
- Heat Exchanger Supplemental Qualification (1 day)
- Special Joint Supplemental Qualification (1 day)

### **Class Size**

- Maximum 6 delegates

### **Course Content**

- General health & safety precautions
- Joint tightening using hydraulic and pneumatic torque joint tightening
- Joint tightening using tensioning equipment
- Calibration and maintenance of hydraulic bolt-tightening equipment
- Selecting appropriate bolt-tightening tooling

### **Pre-requisites**

- Training of Fundamentals & Piping (2 days)



### **Program Title**

- ASME PCC-1 Appendix A

### **Course Title**

- **Heat Exchanger Supplemental Training**

### **Course Summary**

- This course is one of four standard training modules as specified within the ASME PCC-1 Guidelines for Pressure Boundary Bolted Flange Joint Assembly and its Appendix A specific to the training, qualification, and certification of joint assembly personnel.
- The course will deliver a thorough understanding of heat exchanger joint disassembly, assembly and tightening techniques using hydraulic torque and bolt tensioning equipment.

### **Certification**

- Hydratight Certification
- Training Certificates – Open validity
- Qualification Certificates – 3 years validity

### **Course Combinations**

- Training of Fundamentals & Piping (2 days)
- Powered Equipment Supplemental Qualification (1 day)
- Heat Exchanger Supplemental Qualification (1 day)
- Special Joint Supplemental Qualification (1 day)

### **Class Size**

- Maximum 6 delegates

### **Course Content**

- General health & safety precautions
- Types of exchangers Tubular Exchanger Manufacturers Association (TEMA) designations] and their joints
- Bundle pushing and considerations for assembly
- Tubesheet joint considerations, shell side gasket damage, and recompression of shell side gaskets on tube-sheet joints
- Joint tightening using hydraulic and pneumatic torque joint tightening
- Joint tightening using tensioning equipment

### **Pre-requisites**

- Training of Fundamentals & Piping (2 days)
- Powered Equipment Supplemental Qualification (1 day)



### **Program Title**

- ASME PCC-1 Appendix A

### **Course Title**

- **Special Joint Supplemental Training**

### **Course Summary**

- This course is one of four standard training modules as specified within the ASME PCC-1 Guidelines for Pressure Boundary Bolted Flange Joint Assembly and its Appendix A specific to the training, qualification, and certification of joint assembly personnel.
- The course will deliver a thorough understanding of clamp connectors and compact flange special joint disassembly, assembly and tightening techniques using hand, hydraulic torque and bolt tensioning equipment.

### **Certification**

- Hydratight Certification
- Training Certificates – Open validity
- Qualification Certificates – 3 years validity

### **Course Combinations**

- Training of Fundamentals & Piping (2 days)
- Powered Equipment Supplemental Qualification (1 day)
- Heat Exchanger Supplemental Qualification (1 day)
- Special Joint Supplemental Qualification (1 day)

### **Class Size**

- Maximum 6 delegates

### **Course Content**

- General health and safety precautions
- Joint component identification, functionality, and limitations
- Inspection and reporting of defects or faults
- Joint disassembly, inspection, alignment, assembly and tightening procedures
- Importance of joint quality assurance procedures, certification, and records
- Selecting the target bolt assembly load and appropriate bolt tightening tooling

### **Pre-requisites**

- Training of Fundamentals & Piping (2 days)
- Powered Equipment Supplemental Qualification (1 day)





### ASME PCC-1 Appendix A – Introduction eLearning Courses



Training of Fundamentals & Piping



Powered Equipment Supplemental Training



Heat Exchanger Supplemental Training



Special Joint Supplemental Training

Hydratight certified ASME PCC-1 introduction eLearning courses are derived from our Appendix A instructor led classroom courses and are suited to individuals who wish to complete refresher training or pre-learning prior to enrolment on our full training and qualification program.

These courses cover the health, safety, quality and technical knowledge learning objectives relevant to the disassembly, inspection, assembly and tightening of bolted flange and clamp joint assemblies.

Contact [eLearning@hydratight.com](mailto:eLearning@hydratight.com) to enrol on Hydratight Academy ASME PCC-1 Appendix A eLearning courses.

Available from Q3 2022.