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Optional Requirements for Interim Credentials for Service Plumber

Level 1 1,700 – 2000 Hours OJL and 1st Year RI

- Completion of Brazing Certification UA-51 – The completed braze test assembly shall be visually examined for cleanliness and the presence of brazing filler metal all around the joint at the interface between the socket and the pipe. Outside surfaces shall be free of excessive braze metal and oxidation. Sectioning tests shall be in accordance with ASME Code Section IX.

- Soldering Certification – The Copper Development Association Inc. (CDA) regularly receives inquiries regarding the methods and procedures required to qualify installers for the installation of soldered-joint copper piping systems. Currently, there are no known qualifications requirements developed and certified by any consensus code-writing body. Therefore, to provide a qualified procedure for the testing and certification of solderers, the CDA has developed the following Soldering Procedure Specification. The attached documents satisfy the requirements and processes that contributed to the development of ASTM B 828, *Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings.*

- OSHA 10- or 30-Hour Course – Smart Mark is an OSHA approved safety and health training program. It is a standardized and intensive program that was developed in 1998 by the Construction Industry Partnership (CIP) that prepares construction industry workers to identify hazards and prevent on-the-job accidents.

- First Aid/CPR – The student will learn basic life support, which includes Cardiopulmonary Resuscitation, Automated External Defibrillation and related subjects such as initial care for Angina, Stroke and Foreign Body Airway Obstruction. The basic first aid portion includes procedures for emergency moving of the injured, wounds/bleeding, traumatic shock, fractures, burns with special emphasis on accidental electrical contact, eye injuries, allergic reactions, seizures, drug overdoses, temperature-related problems and many other job related emergencies.

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Level 2 3,400 – 4,000 Hours OJL and 2nd Year RI

- Confined Space – This training is a combination of OSHA's #2260 3-day classroom-based confined space course on OSHA's General Industry Standard with CPWR's 2-day hands-on simulated entry training. The OSHA 2260 course is designed to direct students to first determine if a space is a confined space, then to properly classify each confined space as either permit-required or a non-permit space. The course also allows students to determine which options are effective at protecting workers entering permit spaces. Topics include legal issues, permit programs, ventilation and rescue. CPWR's hands-on training includes air-monitoring, ventilation, supplied-air respiral (SARs), self-contained breathing apparatus (SCBAs) entry procedures, retrieval and other aspects of permit-required confined space entry.

- Forklift Certification – Upon successful completion of this course, the member will be able to differentiate the different types of forklifts and powered industrial equipment, understand material handling techniques, understand operating techniques, determine hazards associated with powered industrial equipment and implement and maintain a forklift/powered industrial equipment safety program. The student will take a comprehensive online exam at the end of the course. A score of 80% is required to receive certification.

Level 3 5,100 – 6,000 Hours OJL and 3rd Year RI

- UA Green Plumber Certification – The UA Green Plumber North American certification will require the Green Systems Awareness certification as a pre-requisite. This advanced certification will concentrate on the installation of solar thermal heating systems and water Audits of residential and commercial buildings. The manual will be written by the UA also using material from Green Plumbers USA. The certification test will be a one hundred question test and will be certified by NITC. The training curriculum is in the final stages of development and printing. We expect this credential to be final in early 2011. The exam is administered based on the skills developed around the work processes.

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- Green Systems Awareness Certification – The certification consists of four parts. In order to receive this certification a member must achieve an 80% on each four parts, which include Core, HVAC, Plumbing, and Electrical. No certification is given if they fail one or more sections.

- Crane Signalperson Certification – The Signalperson Training Program is a state of the art interactive training aid. The program covers all the pertinent requirements of the current OSHA 1926.550, ASME B30.5, B30.3, B30.23, and even the current OSHA Cranes and Derrick Standard 1926.1400. The course will cover theoretical and practical components of signaling and crane characteristics and limitations. Certification will be provided by the National Commission for the Certification of Crane Operators (NCCCO).

- Plumbing Code Certification – This certification is covered under the scope of the accreditation issued to National Inspection Testing Corporation (NITC) by the American National Standards Institute (ANSI) for operating a personnel certification program. The NITC Journey Level Plumber Certification Examination is based on the **2006 edition of the *Uniform Plumbing Code*** published by the International Association of Plumbing and Mechanical Officials (IAPMO).

- Backflow Prevention Assembly Testers – This course presents guidelines for the acceptable practices of testing, annual inspection, and the repair of backflow prevention assemblies used in cross-connection control programs. Course materials include information needed for identifying cross-connections; understanding how backflows occur; and the dangers they present; methods used to control backflows; and recommended applications for each type of backflow assembly, laws and liability; and hands-on testing and maintenance procedures for various assemblies. Students who successfully pass the voluntary certification exam administered at the conclusion of the course will be certified as Backflow Prevention Testers.

The apprentice must complete each level of the above requirements and certifications to be eligible to receive an Interim Credential Certification from the United States Department of Labor's, Office of Apprenticeship. The Interim Credential will read the following for each level:

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Level 1 – Brazing Certification UA-51

Soldering Certification

OSHA 10- and 30-Hour Course

First Aid/CPR

Level 2 – Confined Space

Forklift Certifications

Level 3 – UA Green Plumber Certification

Green System Awareness Certification

Crane Signalperson Certification

Plumbing Code Certification

Backflow Prevention Assembly Testers

The Certificate of Completion of Apprenticeship will be issued when the last year of apprenticeship is completed with all remaining requirements.

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UA-51 BRAZE TEST SPECIFICATION

Manual Torch Brazing Process

Maximum Time Permitted for Test is Two Hours

COUPON MATERIALS

- Tube Material: SB-75 Seamless Tube (0.060" wall)
- Fitting Material: B16.22 Stop Coupling (0.055" wall)
- Fitting/Tube Size: 1 ½" Type L (1.625" OD Tube)
- Number of Coupons: Two Socket Couplings, Four Joints Total

JOINT CONFIGURATION

- Socket Joints Required
- Socket Clearance: 0.002" to 0.010"
- Overlap of Socket and Pipe: 1.09"

FLOW POSITION

- Two Joint in Each the Horizontal and Vertical Up-Flow Positions
- Face Fed Filler Metal

BRAZING FILLER MATERIALS

- Filler Metal: BCuP-2 Through BCuP-7
- Product Form: Round, Square, or Rectangular Rod

BRAZING FLUX

- None Permitted

FUEL GAS

Oxyacetylene, Natural, Propane, or MAPP® Gas

INTERNAL PURGING

- Oil Free Dry Nitrogen ≥ 5 CFH (The purge gas shall flow until the brazement is cool to the touch so that no oxidation forms on the I.D. of the tube and fitting.)

GENERAL BRAZING TECHNIQUES

- Prebraze Cleaning: Surface particles and dirt shall be removed using a clean lint-free cloth. Surface oxidation shall be removed with the use of a nylon abrasive cloth.

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- Postbraze Cleaning: Use a wet cloth or stainless steel wire brush to remove loose surface oxidation.
- Nature of Flame: Neutral
- Brazing Tip Sizes: (Optional) 54 Through 30: Use of Turbo Torch or Rosebud Permitted.

INSPECTION AND TESTING

- The completed braze test assembly shall be visually examined for cleanliness and the presence of brazing filler metal all around the joint at the interface between the socket and the pipe. Outside surfaces shall be free of excessive braze metal and oxidation.
- Assembly shall be examined by Sectioning Tests in accordance with ASME Code Section IX.

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SUMMARY SOLDERING CERTIFICATION

The Copper Development Association Inc. (CDA) regularly receives inquiries regarding the methods and procedures required to qualify installers for the installation of soldered-joint copper piping systems. Currently, there are no known qualifications requirements developed and certified by any consensus code-writing body. Therefore, to provide a qualified procedure for the testing and certification of solderers, the CDA has developed the following Soldering Procedure Specification. The attached documents satisfy the requirements and processes that contributed to the development of ASTM B 828, *Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings.*

These documents were developed by the CDA and tested by PRL Metallurgical Laboratory, a division of Regal Cast, Inc.* an ASME-recognized test laboratory.

It is the responsibility of the contractor using this specification and the supporting qualification records to ensure that the appropriate tests are conducted to qualify each solderer. It is also the contractor's responsibility to assure that these specifications meet any additional requirements of the referencing document. **The contractor shall maintain a signed and dated record of the Soldering Procedure Specifications, Procedure Qualification Records and the resulting Solderer Performance Qualifications and shall assume responsibility or liability of any kind in connection with the use of these documents. CDA makes no representation or warranties of any kind in the use of these documents.**

The documents are:

- Soldering Procedure Specification (SPS) – the document that specifies the required soldering variables for a specific application
- Procedure Qualification Record (PQR) – a record of soldering variables and conditions used to produce an acceptable test solder joint and the result of tests conducted to qualify a soldering procedure specification
- Solderer Performance Qualification Record (SPQR or SQR) – a record of the soldering conditions used to produce an acceptable test solder joint, and the results of the tests performed on the solder joint to qualify the solderer

* PRL Metallurgical Laboratory, P.O. Box 1170, 307 N. Ninth Avenue, Lebanon, PA 17046

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SPS No. CDA-S001

TITLE

Soldering Procedure Specification CDA-2001 for Soldering Copper and Copper Alloy Tube and Fittings Using a Manual Air-fuel Torch and ASTM B 828 Procedures

SCOPE

This procedure is applicable for the soldering of copper tube and copper alloy fittings in the range of 0.375" nominal to 8.0" nominal. Wall thickness range shall be from 0.023"to 0.298". The tube and fitting for the test solder joint shall be fabricated in the horizontal position.

BASE METAL

Base metals shall be UNS C12200 copper conforming to the requirements of Group BM No. 300 as listed in Table B1 of ANSI/AWS B2.2-91.

FILLER METAL

Filler metals shall meet the requirements of Table 5 of the latest revision of ASTM B 32, *Standard Specification for Solder Metals*. Filler metals shall contain less than 0.2% lead (Pb). Filler metals shall be stored in accordance with manufacturer's recommendations and shall be 0.125" wire.

SOLDERING FLUX

Soldering fluxes shall be in accordance with the requirements of ASTM B 813, *Standard Specification for Liquid and Paste Fluxes for Soldering Applications of Copper and Copper Alloy Tube and Fittings.*

PURGE

No purge gas required.

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JOINT DESIGN AND TOLERANCES

Joint type shall be socket/lap. The minimum and maximum joint clearance/capillary space shall be 0.002" to 0.010". Lap (overlap) shall meet the dimensional requirements of the latest revisions of ASME/ANSI B16.22 *Wrought Copper and Copper Alloy Solder Joint Pressure Fittings* or MSS SP-104 *Manufacturers Standardization Society, Wrought Copper Solder Joint Pressure Fittings.*

NOTE #1 BASE METAL (Preparation)

CUTTING

Cut tube ends square. Cutting process shall be performed in a manner that prevents tube ends from being deformed. If a tube cutter is used, it shall be free of oil, dirt, lint and other debris. The cutter wheel(s) shall be sharp and the rollers free-rolling.

REAMING

Ream all tube ends to the original I.D. of the tube to remove the small burr created by the cutting operation. Care shall be exercised to ensure that no shavings are left in the tube.

CLEANING

Surface oxidation on the I.D. of the fitting shall be removed with an appropriately sized fitting brush or abrasive cloth. Surface oxidation on the O.D. of the tube ends shall be removed with a wire brush or abrasive cloth for a distance slightly more than the depth of the fitting cup. Steel wool shall not be used.

FLUXING

Apply a thin even coating of flux with a brush to both tube and fitting as soon as possible after cleaning.

ASSEMBLY AND SUPPORT

Insert tube ends into the fitting cup, making sure that the tube end is seated against the

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base of the fitting cup. Support the tube and fitting assembly to ensure an adequate capillary space around the entire circumference of the joint.

NOTE #2 SOLDERING PROCESS (Post-Solder Procedures)

POST-SOLDER CLEANING

When the joint is cool to the touch, the outside shall be cleaned using a damp cloth to remove any remaining soldering flux and allow a clear visual inspection of the joint.

VISUAL EXAMINATION

The finished joint shall be visually examined. The following conditions shall be considered unacceptable according to this specification:

- Drips of excess solder on the outside of the tube and/or fitting
- Cracks in the tube or fitting
- Cracks in the solder filler metal

PEEL TEST

The finished joint shall be sectioned lengthwise and flattened to separate the tube from the fitting. Following sectioning of the finished solder joint, the joint shall be visually examined. The following conditions shall be considered unacceptable according to this specification (see **Appendix A**):

- A total area of defects (unsoldered area, flux inclusions, or incomplete bridging of solder metal between the tube and fitting [see **Appendix A,** Bridging]) of greater than 30% of the total faying area (the front edge to the rear edge of the overlap) of any of the individual joints.
- A sum of the lengths of the defects measured on any one line in the direction of the lap shall not exceed 30% of the length of the lap.
- Solder voids that extend from the inside edge of the fitting to the outside edge creating a leak path through the capillary space, regardless of the area of the void.

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APPENDIX A

ACCEPTANCE CRITERIA FOR VISUAL EXAMINATION AND PEEL TESTING OF SOLDER JOINTS

Solder Coverage:

Strength and pressure ratings of solder joints for copper tube and fittings are found in Annex A of ASME B16.22, *Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.* It is generally accepted that a minimum of 70% fill of solder material into the capillary space of the joint is required to ensure acceptable strength and pressure capabilities.[1-2] For purposes of qualifying individuals in soldering competency, this specification requires a minimum of 70% fill in any joint (see **Number of Joints**).

Note: *Grading of these joints can be accomplished by overlaying the soldered surface of the tube or fitting with a clear plastic sheet with a grid printed on it. By counting the squares in the grid covering areas not covered by solder (see* **Bridging***) and comparing them to the total number of squares covering the faying surface, a percentage of coverage can be calculated.*

Bridging:

Bridging is the spanning of the solder from the outside surface of the tube to the inside surface of the fitting, indicating complete fill of the capillary space. If bridging does not occur, the surfaces of the tube and fitting may just be "tinned," not adding anything of significance to strength and pressure capabilities. When joints are cold-peeled, areas that have been properly bridged will be a dull gray color on one or both corresponding surfaces indicating a physical separation of the solder material. There may be specks of copper indicating that the solder metal actually separated from the copper surface. Areas where this bridging has not taken place will show shiny silver surfaces on the corresponding faying surfaces, associated with an area where the solder depth is lower, indicating there was no physical separation of the solder metal when the joint was peeled.

The areas that have not been properly bridged shall be counted as part of the total void areas for purposes of calculating total solder coverage.

[1]American Society of Metals, Metals Handbook, Ninth Edition, Volume 6, (Menlo Park, OH: American Society of Metals, 1983) 1095.
[2]American Welding Society, Soldering Manual, 2nd ed., revised, (Miami: American Welding Society, 1978) 23.

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Location of Defects:

The location of defects in a soldered joint and their relation to each other can greatly affect the strength of the joint. Defects in a line from the front edge to the rear edge of the overlap (faying surfaces) will result in a leaking joint and will also reduce the strength of the joint. Therefore, for purposes of qualifying individuals, this specification also requires:

- The sum of the lengths of all defects, measured in a straight line in the direction of the lap (from front of cup to back of cup), are not to exceed 30% of the length of the lap.
- No solder void, or incomplete bridging, may extend continuously along the entire length of the capillary space from the inside of the fitting to the outside creating a leak path through the capillary space.

These requirements must be met for all joints in the test series.

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APPENDIX A

TEST JOINTS

Range of Diameters:

There can be significant differences in the equipment and technique used to solder larger diameters and smaller diameters. Consequently, test solder joints will qualify a solderer as follows:

- 1" nominal test joints will qualify a solderer for diameters up to 1 ½" nominal.
- 2" nominal test joints will qualify a solderer for diameters from 2" through 3" nominal.
- 4" nominal test joints will qualify a solderer for diameters from 2" through 5" nominal.
- 6" nominal test joints will qualify a solderer for diameters from 2" through 6" nominal.
- 8" nominal test joints will qualify a solderer for diameters from 2" through 8" nominal.

Number of Test Joints:

Four test joints will be required for each diameter range to be qualified. Test joints of all assemblies are to be soldered in the horizontal position.

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DESIGNATED TRAINING TOPICS
10-HOUR CONSTRUCTION INDUSTRY OUTREACH TRAINING PROGRAM
10-HOUR MANDATORY COURSE TOPICS

The 10-Hour Construction Industry Outreach Training Program is intended to provide an entry-level construction worker's general awareness on recognizing and preventing hazards on a construction site. The training covers a variety of construction safety and health hazards which a worker may encounter at a construction site. OSHA recommends this training as an orientation to occupational safety and health. Workers must receive additional training on hazards specific to their job. Training should emphasize hazard identification, avoidance, control and prevention, not OSHA standards. Instructional time must be a minimum of 10 hours.

Breakdown of topics is as follows:

- **Mandatory – 4 hours**: Four topics to be taught, ranging from one-half to two hours each (Introduction to OSHA; OSHA Focus Four Hazards; Personal Protective and Lifesaving Equipment; Health Hazards in Construction).
- **Elective – 2 hours**: Choose at least two of these topics for a minimum of one-half hour each. Must cover at least two hours.
- **Optional – 4 hours**: Learn any other construction industry hazards or policies and/or expand on the mandatory or elective topics, minimum of one-half hour each.

10–HOUR CONSTRUCTION INDUSTRY REQUIREMENT COURSE TOPICS

Introduction to OSHA – One Hour

- OSH Act, General Duty Clause, Employer and Employee Rights and Responsibilities, Whistleblower Rights, Recordkeeping Basics
- Inspections, Citations, and Penalties
- General Safety and Health Provisions, Competent Person, Subpart C
- Value of Safety and Health
- OSHA Website, OSHA 800 Number and Available Resources

OSHA Focus Four Hazards – **Two Hours** (must cover all four areas—minimum 15 minutes on each)

- Fall Protection, Subpart M (e.g., floors, platform, roofs)
- Electrical, Subpart K (e.g., overhead power lines, power tools and cords, temporary

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wiring, grounding)
- Struck by (e.g., falling objects, trucks, cranes)
- Caught in/Between (e.g., trench hazards, equipment)

Personal Protection and Lifesaving Equipment – 30 Minutes, Subpart E

Health Hazards in Construction – 30 Minutes (e.g., noise, hazards communication and crystalline silica)

ELECTIVES

Choose at least two of the following topics – Must add up to at least two hours: Minimum one-half hour each

- Materials Handling, Storage, Use and Disposal, Subpart H
- Tools – Hand and Power, Subpart I
- Scaffolds, Subpart L
- Cranes, Derricks, Hoists, Elevators, and Conveyors, Subpart N
- Excavations, Subpart P
- Stairways and Ladders, Subpart X

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DESIGNATED TRAINING TOPICS
30-HOUR CONSTRUCTION INDUSTRY OUTREACH TRAINING PROGRAM
30-HOUR MANDATORY COURSE TOPICS

The 30-Hour Construction Outreach Training Program is intended to provide a variety of training to workers with some safety responsibility. Workers must receive additional training on hazards specific to their job. Training should emphasize hazard identification, avoidance, control and prevention, not OSHA standards. Instructional time must be a minimum of 30 hours. OSHA subpart references are provided for informational purposes; training should emphasize hazard awareness.

Breakdown of topics is as follows:

- **Mandatory – 12 hours**: Five topics to be taught, ranging from one to five hours each.
- **Elective – 12 hours**: Choose at least six of these topics for a minimum of one-half hour each.
- **Optional – 6 hours**: Learn any other construction industry hazards or policies and/or expand on the mandatory or elective topics, minimum of one-half hour each.

Introduction to OSHA – at least Two Hours

- OSH Act, General Duty Clause, Employer and Employee Rights and Responsibilities, Whistleblower Rights, Recordkeeping Basics
- Inspections, Citations, and Penalties
- General Safety and Health Provisions, Competent Person, Subpart C
- Value of Safety and Health
- OSHA Website, OSHA 800 Number and Available Resources

OSHA Focus Four Hazards – at least Five Hours (must cover all four areas – minimum 30 minutes on each)

- Fall Protection, Subpart M (e.g., floors, platform, roofs)
- Electrical, Subpart K (e.g., overhead power lines, power tools and cords, temporary wiring, grounding)
- Struck by (e.g., falling objects, trucks, constructing masonry walls)
- Caught in/between (e.g., trench hazards, unguarded machinery, equipment)

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Personal Protection and Lifesaving Equipment – at least Two Hours

Health Hazards in Construction – at least Two Hours

Stairways and Ladders, Subpart X – at least One Hour

ELECTIVES

30-Hour Elective Course Topics

Choose at least six of the following topics – Must add up to at least 12 hours

- Fire Protection and Prevention, Subpart F
- Materials Handling, Storage, Use and Disposal, Subpart H
- Tools – Hand and Power, Subpart I
- Welding and Cutting, Subpart J
- Scaffolds, Subpart L
- Cranes, Derricks, Hoists, Elevators, and Conveyors, Subpart N
- Motor Vehicles, Mechanized Equipment and Marine Operations; Rollover Protective Structures and Overhead Protection; and Signs, Signals and Barricades, Subpart O, W, and G
- Excavations, Subpart P
- Concrete and Masonry Construction, Subpart Q
- Steel Erection, Subpart R
- Confined Space Entry
- Powered Industrial Vehicles
- Ergonomics

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First Aid Course Syllabus

Course Intros

-Course, Instructor, and Student Introductions
-Facility Orientation
-General Course Information, Course Completion Requirements
-Emergency Action Plan (EAP)

First Aid

-Initial Assessment vs. Secondary Assessment
-Emergency Moves: Clothes Drag, Seat Carry
-Physical Exam and SAMPLE History
-Documentation and Legal Considerations
-Sudden Illness
-Wounds
-Water Sterilization Steps
-Bleeding
-Caring for Shock
-Burns
-Injuries to Muscles, Bones, and Joints
-Splints
-Bites and Stings
-Administering Epinephrine
-Assisting with Bronchodilators (inhalers)
-Heat Related Emergencies
-Cold Related Emergencies
-In-line Stabilization for Head, Neck and Back Injuries
-Backboard Techniques
-Common Types of Injuries in Your Area
-First Aid Kits

Course Review

-First Aid

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Course Written Exams

-First Aid

References: American Heart Association Guidelines, American Red Cross Guidelines

Adult CPR Course

Course Duration

Approximately 45-60 minutes

Note: It is strongly recommended that you read the entire course before taking the exam. However, we understand that many of our clients are trained professionals who simply need a quick refresher. If you are familiar with the material you can proceed directly to the exam immediately after registration, in which case you may be certified within a few minutes.

Lesson 1: Introduction

Brief history of CPR

Mechanics of Artificial Life Support

Fundamentals of Human Physiology (circulatory system) and CPR Applications

What is Expected During an Emergency (including EMS response)

Lesson 2: Adult CPR

Definitions

Scene Assessment and Appropriate Response

A-B-Cs of Adult CPR for 1 rescuer

A-B-Cs of Adult CPR for 2 rescuers

Exam

Eight multiple choice and true-or-false questions

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Confined Space Rescue Technician

ORIENTATION MODULE

Introduction to Confined Space Rescue

Course Introduction - Preface
Confined Space Identification - Chapter 1
OSHA Regulation - Chapter 2
Confined Space Hazards - Chapter 4
Atmospheric Monitoring - Chapter 5
Hazard Control - Chapter 6
Personal Protective Equipment - Chapter 7
Phases of Confined Space Rescue - Chapter 8
Rescue Rope and Related Equipment - Chapter 9
High Point Anchor Systems - Chapter 10
Communications - Chapter 11
Permitting Confined Spaces - Chapter 12

Skills Module

Knots

Chapter 9
How to Tie a Figure Eight Stopper
How to Tie a Figure Eight on a Bight
How to Tie a Figure Eight Follow Through
How to Tie a Figure Eight Bend
How to Tie a Square Knot
How to Tie an Overhand Bend
How to Tie a Double Overhand Bend (Double Fisherman Knot)
How to Attach a 3-Wrap Prusik to a Rescue Rope
How to Construct a Modified Trucker's Hitch

Skills Module

Anchor Systems

Chapter 9
How to Tie a Single Loop Anchor Sling
How to Tie a Basket Sling
How to Tie a Multi-Loop Anchor Sling (Wrap Three, Pull Two)

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How to Tie a Tensionless Hitch
How to Construct a Back-Tied Anchor System

Skills Module
RPM
Chapter 9
How to Attach and Operate a Brake Bar Rack as Part of the RPM
How to Construct and Operate a Load Release Hitch as Part of the RPM
How to Attach a Prusik Loop to the RPM for Use in a Haul System
How to Construct and Operate the RPM

Skills Module
Belay Systems
Chapter 9
How to Construct and Operate a Tandem Prusik Belay System
How to Convert a Tandem Prusik Belay System to a Retrieval Line

Skills Module
Raising Systems
Chapter 9
How to Construct and Operate a 2:1 Ladder Rig Mechanical Advantage System
How to Construct and Operate a 3:1 Z-Rig Mechanical Advantage System Through a High Point Anchor
How to Construct and Operate a 3:1 Piggyback Mechanical Advantage System Through a High Point Anchor
How to Construct and Operate a 4:1 Mechanical Advantage System
How to Construct and Operate a 4:1 Pre-Rig Mechanical Advantage System

Skills Module
Rescuer and Victim Packaging
Chapter 9
How to Tie Two Half Hitches
How to Tie a Round Turn and Two Half Hitches
How to Tie and Attach a Hasty Chest Harness (Double Locking Lark's Foot) to a Victim
How to Tie and Attach Wristlets and Anklets
How to Secure a Victim to a Rescue Litter

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How to Rig a Litter for Vertical Rescue
How to Rig a Victim in a SKED Litter
How to Rig a Victim in a LSP Half Back or Equivalent
How to Don a Pre-Sewn Class III Rescue Harness

Skills Module
Respiratory Equipment
Chapter 7
How to Don and Operate a Self-Contained Breathing Apparatus (SCBA)
How to Don and Operate a Supplied Air Respirator (SAR) and Escape Pack
How to Operate a Supplied Air Respiratory System
How to Lay Out and Deploy Supplied Air Lines
How to Provide Victim Respiratory Protection

Skills Module
Communication Systems
Chapter 11
How to Perform a Verbal Communication System
How to Perform a Hand Signal Communication System
How to Operate a Rope Signal Communication System
How to Operate a Light Signal Communication System
How to Operate a Tapping and Rapping Communication System
How to Operate a Portable Radio Communication System
How to Operate a Hardwire Communication System

Skills Module
Hazard Control
Chapter 6
How to Lock-Out/Tag-Out an Electrical Equipment Switch
How to Lock-Out/Tag-Out an Electrical Circuit Switch
How to Lock-Out/Tag-Out a Gate Valve
How to Operate a Ventilation Ducting
How to Deploy Ventilation Ducting
How to Deploy a Manhole Saddle Vent
How to Perform Positive Pressure (Supply) Ventilation
How to Perform Negative Pressure (Exhaust) Ventilation

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How to Perform Combination Ventilation
How to Perform Local Supply Ventilation
How to Calculate Ventilation Air Exchanges

Skills Module
Atmospheric Monitoring
Chapter 5
How to Perform Instrument Start-Up
How to Determine the Instrument Target Gases
How to Bump Test the Instrument
How to Check the Peaks on the Instrument
How to Clear the Peaks on the Instrument
How to Perform Remote Sampling
How to Use a Conversion Chart to Assess Flammability
How to Perform Instrument Shut-Down

Skills Module
High Point Anchor Systems
Chapter 10
How to Construct and Operate Ladder Gin System
How to Construct and Operate a Ladder "A" Frame System
How to Set-Up and Operate a Tripod System
How to Operate Cable and Winch Systems

Confined Space Entry Module
Confined Space Entry
Confined Space Rescue – Vertical Entry
Confined Space Rescue – Horizontal Entry
Confined Space Rescue – Tapered Cross Section
Confined Space Rescue – In-Pipe
Confined Space Rescue – Non-Entry

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Forklift Safety Course Outline

Powered Industrial Trucks
Definition
Scope of Standard
Forklift Accidents
Forklift Fatalities
Industries Where Powered Industrial Truck Accidents Occurred
Nonfatal Occupational Injuries and Illnesses by Source
Overview of Forklift Hazards
Four Major Areas of Concern:
-- General Hazards That Apply to the Operation of All or Most Powered Industrial Trucks
-- Hazards Associated with the Operation of Particular Types of Trucks
-- Hazards of Workplaces Generally
-- Hazards of the Particular Workplace Where the Vehicle Operates.
Training Requirements
Performance-Oriented
Safe Operations
Training Program Implementation
Training Program Content
Refresher Training and Evaluation
--Evaluation of Powered Industrial Truck Operator's
--After Initial Training
--After Refresher Training
--At Least Once Every Three Years
Employer Certification Shall Include:
--Name of Operator
--Date of Training
--Date of Evaluation
--Identity of Person(s) Performing the Training or Evaluation
Avoidance of Duplicative Training
Components of a Forklift
Certification
Classes of Commonly-Used Powered Industrial Trucks
Explanation of Types of Powered Industrial Trucks
Class I – Electric Motor Rider Trucks

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Counterbalanced Rider Type, Stand Up
Three-Wheel Electric Trucks, Sit-Down
Counterbalanced Rider Type, Cushion Tires, Sit-Down (High and Low Platform)
Counterbalanced Rider, Pneumatic Tire, Sit-Down (High and Low Platform)
Class II – Electric Motor Narrow Aisle Trucks
High Lift Straddle
Order Picker
Reach Type Outrigger
Side Loaders, Turret Trucks, Swing Mast and Convertible Turret/Stock Pickers
Low Lift Pallet and Platform (Rider)
Class III – Electric Motor Hand or Hand/Rider Trucks
Low Lift Platform
Low Lift Walkie Pallet
Reach Type Outrigger
High Lift Straddle
High Lift Counterbalanced
Low Lift Walkie/Rider Pallet
Class IV – Internal Combustion Engine Trucks - Cushion (Solid) Tire
Class V – Internal Combustion Engine Trucks - Pneumatic Tires
Class VI – Electric & Internal Combustion Engine Tractor
Rough Terrain Straight Mast Forklifts
Rough Terrain Extended-Reach Forklifts
Stability of Powered Industrial Trucks
Definitions
General
Basic Principles
Stability Triangle
Longitudinal Stability
Lateral Stability
Dynamic Stability

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UA Green Plumber Certification is to be completed by Early 2011.

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UA Green Systems Awareness Certification

Section I *Core*
Energy Analysis and Awareness
Renewable Energy & Sustainable Energy
Energy Management
Building Information Modeling (BIM)
Commercial Building Energy Consumption Survey (CBECS)
Energy Conservation Measures (ECM)
Energy Information Administration (EIA)
Energy Audit
Energy Consumption and Demand Analysis
Heat Load Calculation
Life Cycle Cost Analysis 1
Worksheet #1

Section II *HVAC/R*
Heating -Ventilation-Air Conditioning-Refrigeration
Energy Efficiency Ratings
Energy Efficiency Ratio
Seasonal Energy Efficiency Ratio
Annual Fuel Utilization Efficiency
Heating Season Performance Factor
Coefficient of Performance (COP)
Comfort Conditioning
Ventilation and Indoor Air Quality
Comfort Cooling Methods and Green Alternatives
Mechanical Air Conditioning
Evaporative Cooling
Passive Cooling Systems
Solar Cooling
Thermal Storage
Commercial Refrigeration
U.S. EPA GreenChill (Advanced Refrigeration Partnership)
Refrigerant Containment Practices
Energy Conservation Measures

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New and Replacement Equipment
Comfort Heating Methods and Green Alternatives
Combustion analysis
Forced Air
Condensing Furnaces
Modulating Furnaces
Condensing Boilers
Instantaneous Boiler
Solar Water Comfort Heating
Solar air heating
Waste Heat Recovery
Radiant Panel Systems
Thermal Mass
Optimized Steam Systems
Steam Traps
Comfort Heating and Cooling Combination Systems and Green Alternatives
Geothermal Systems
Air to Air Heat Pumps
Packaged Terminal Air Conditioners (PTAC)
Mini-Split Systems
Worksheet #2

Section III *Electrical*
Electrical Production and Consumption
Electrical Power
Nuclear Energy
Fuel Cells
Photovoltaic
Wind Turbines
Motor Efficiency
Lighting
Fluorescent
LED
Tidal and Ocean Energy
Ghost Loads

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Residential Major Appliances
Worksheet #3

Section IV *Plumbing*
Hydrologic Cycle
Potable Water Conservation
Flow Restriction
Faucets/Showerheads/Pre-Rinse Spray Valves
High Efficiency Plumbing Fixtures
Water Closets
Ultra Low Flush
Dual Flush
Ultra Low Flush Urinal
Waterless Fixtures
Removable Cartridge/Insert Waterless Urinal
Cartridge Free Waterless Urinals
Composting Toilet
High Efficiency Plumbing Appliances
Clothes Washers
Dishwashers
Ice Machines
Garbage Disposals
Hot Water Distribution Systems
Hot Water Circulating Systems
On Demand Water Circulating System
Gravity Water Circulating Systems
Dedicated Line Water Circulating Systems
Water Distribution Piping Installation
Protection of the Water Distribution System
Water Heating Equipment
Storage Water Heaters
Demand (Tankless) Water Heaters
Heat Pump Water Heaters
Indirect Water Heaters
Solar Water Heaters
First Hour Rating

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Wastewater Reuse Systems
Landscape Irrigation Systems
Drain Water Heat Recovery System
Gray Water and Reclaimed Water Reuse Systems
Reclaimed Water Systems
Gray Water Systems
Rain Water Harvesting
Fire Protection Systems and the Environment
Industrial Fire Protection Systems
Residential Fire Protection Systems
Green Plumbing System Relevance to LEED
Worksheet #4
LEED Worksheet
Summary

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United Association Crane Signalperson Training Course

Student Task List

ASME Standard Hand Signals, Section B30.5 and B30.3 – Student will demonstrate ability to correctly signal:

- Hoist
- Lower
- Use Whip Line
- Use Main Hoist
- Raise Boom
- Lower Boom
- Move Slowly
- Lower the Boom and Raise the Load
- Raise the Boom and Lower the load
- Swing
- Stop
- Emergency Stop
- Travel
- Dog Everything
- Travel – Track Machine on Both Tracks
- Travel – Track Machine on One Track
- Extend Boom
- Retract Boom
- Extend Boom (One-Hand Signal)
- Retract Boom (One-Hand Signal)
- Trolley Travel
- Tower Travel

Operations and Limitations – Student will demonstrate knowledge of:

- Drift
- Radius
- Boom Angle
- Two-Blocking
- Boom Deflection
- Dynamic Loading
- Dynamic Unloading
- Side Loading
- Rated Capacity
- Quadrants of Operation
- Wind

Signalperson Requirements – Students must demonstrate knowledge of:

- Crane Function Names
- Special Signals
- Audible Travel Signals
- Safe Work Practices
- Working Near Energized Power Lines: ASME
- Working Near Energized Power Lines: OSHA (Current)
- Working Near Energized Power Lines: OSHA (Proposed)
- Occupant Qualifications
- Occupant Responsibilities
- Communications

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OSHA 1926.550 Cranes and Derricks; students will demonstrate knowledge of:

- OSHA 1926.550(a) General Requirements
- OSHA 1926.550(b) Crawler, Locomotive, and Truck Cranes
- OSHA 1926.550(c) Hammerhead Tower Cranes
- OSHA 1926.550(d) Overhead and Gantry Cranes
- OSHA 1926.550(e) Derricks
- OSHA 1926.550(f) Mobile Cranes and Barges
- OSHA 1926.550(g) Crane and Derrick Suspended Platforms

ASME B30.3, B30.5, and B30.23 – Students will demonstrate knowledge of:

- Excerpts from ASME B30.3 – 3.3 Signals
  - Signals; Operating Near Electric Power Lines
- Excerpts from ASME B30.5 – 3.5 Operating Practices
  - Operating Practices; Moving the Load
- Excerpts from ASME B30.5 – 3.3 Signals
  - Signals; General
- Excerpts from ASME B30.23
  - Management

Student will demonstrate knowledge of subject matter by proficiently answering review questions prior to successfully completing <u>proctored written and practical testing by third party agency</u>.

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To ensure that all United Association apprentices and journeyworkers receive the appropriate skills and knowledge from any of the 330 UA authorized training centers (covering 284 registered apprenticeship programs and over 40,000 registered apprentices), the International Pipe Trades Joint Training Committee (IPTJTC) has committed tremendous resources to the development of curriculum, standards and certifications (including 3rd party groups[1]). The IPTJTC works in partnership with government, education, and industry groups (private and non-profit) in the development and validation of this material to assist in preparing these individuals for a successful career in the piping industry.

Plumbing Code Certification

This certification is covered under the scope of the accreditation issued to NITC by the American National Standards Institute (ANSI) for operating a personnel certification program. The NITC Journey Level Plumber Certification Examination is based on the **2006 edition of the *Uniform Plumbing Code*** published by the International Association of Plumbing and Mechanical Officials (IAPMO) and consists of 100 multiple choice questions. This is an open book examination. These questions are designed for the average candidate to be able to complete the examination within 2 ½ hours. They are divided into the following four parts:

- General knowledge of the *Uniform Plumbing Code*
- Sanitary drainage and vents
- Water supply and distribution
- Fuel piping

To pass this examination you must receive an average score of 75 points overall. Questions 1 through 25 are based on general knowledge of the uniform plumbing code. Approximately 95 percent of these first 25 questions are based on the **2006 edition of the *Uniform Plumbing Code***. There may be several questions that are related to trade experience in this section.

Questions 26 through 50 are based on a sanitary drainage and vent plan. To pass this portion of the examination you must be thoroughly familiar with the sanitary drainage and vent sections of the **2006 edition of the *Uniform Plumbing Code***. You may also be required to answer some general knowledge questions from the code on sanitary drainage and vents.

Questions 51 through 75 are based on a water supply and distribution system plan. To pass this portion of this examination you must be thoroughly familiar with the water supply and distribution system sizing requirements of the **2006 edition of the *Uniform Plumbing Code***.

Questions 76 through 100 are based on a fuel gas piping system plan. To pass this portion of this examination you must be thoroughly familiar with the requirements for sizing of fuel gas piping systems in the **2006 edition of the *Uniform Plumbing Code***.

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ASSE SERIES 5000 • STANDARD #5110 *Professional Qualifications Standard for Backflow Prevention Assembly Testers*

1.0 Scope, Purpose and Requirements

1.1 Scope

This standard applies to any individual who is certified in accordance with this standard and who will test all types of backflow preventers.

1.2 Purpose

The purpose of this standard is to provide minimum qualification criteria, as defined by the scope.

1.3 Educational Requirements

- **A.** The backflow prevention assembly tester shall have successfully completed a minimum of forty (40) hours of ASSE approved backflow assembly testing instruction.
- **B.** The tester shall pass a one hundred-question examination with a score of 70% or higher.
- **C.** The tester shall provide verification of five (5) years experience in plumbing or a related industry field.
- **D.** The tester shall pass a practical examination which includes successfully testing an ASSE 1013, 1015, 1020 and 1056 assembly.

2.0 Limitations for a Backflow Prevention Assembly Tester

2.1 The certification shall be valid for a period of three (3) years. The individual may recertify by attending a minimum of a 3-hour approved backflow tester recertification course and passing a 25-question written exam with a minimum score of 70% and passing a practical exam testing an ASSE 1013 and 1015.

2.2 Compliance with this Standard in itself shall not constitute the requirements for a Cross-Connection Control Surveyor as identified by ASSE Standard 5120, a Backflow Prevention Assembly Repairer as identified by ASSE Standard 5130, a Fire-Sprinkler System Cross-Connection Control Tester as identified by ASSE Standard 5140, a Backflow Prevention Program Administrator as identified by ASSE Standard 5150 or as required by local jurisdiction.

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3.0 General Knowledge

3.1 With respect to backflow prevention, the tester shall be knowledgeable of codes and regulations from the federal, state, and local levels and approved listing agencies. The individual shall be knowledgeable on testing procedures under all applicable ASSE standards.

3.2 The tester shall be able to identify and describe the basics pertaining to:

A. ASSE Standards 5013, 5015, 5020, 5047, 5048, 5052 and 5056
B. Backflow
C. Backpressure
D. Backsiphonage
E. Cavitation
F. Check Design
G. Differential Pressure
H. FDA Approved Lubricants
I. General Knowledge of Test Procedures
J. Special Tool Requirements
K. Thermal Expansion
L. Turbulence

3.3 Safety The tester shall be able to describe the safety precautions and hazards during backflow prevention assembly testing relating to:

A. Animals and Insects
B. Confined Spaces
C. Electricity
D. Falling Objects
E. Noise
F. Toxic Fumes
G. Vehicle Traffic

4.0 Product Performance Knowledge

4.1 The tester shall be able to identify and describe the performance characteristics of the following backflow prevention devices and assemblies:

A. Airgaps in Plumbing Systems (ANSI A112.1.2)
B. Atmospheric Type Vacuum Breakers (ASSE 1001 – current edition)
C. Anti-siphon Fill Valves (13 allcocks) for Gravity Water Closet Flush Tanks (ASSE 1002 – current edition)
D. Hose Connection Vacuum Breakers (ASSE 1011 – current edition)

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E. Backflow Preventer with Intermediate Atmospheric Vent (ASSE 1012 – current edition)
F. Reduced Pressure Principle Backflow Prevention Assembly and Reduced Pressure Principle Fire Protection Backflow Prevention Assembly (ASSE 1013 – current edition)
G. Double Check Backflow Prevention Assembly and Double Check Fire Protection Backflow Prevention Assembly (ASSE 1015 – current edition)
H. Vacuum Breaker Wall Hydrants, Freeze Resistant Automatic Draining Type (ASSE 1019 – current edition)
I. Pressure Vacuum Breaker Assembly (ASSE 1020 – current edition)
J. Drain Airgaps for Domestic Dishwasher Applications (ASSE 1021 – current edition)
K. Backflow Preventer for Beverage Dispensing Machines (ASSE 1022 – current edition)
L. Dual Check Backflow Preventers (ASSE 1024 – current edition)
M. Dual Check Valve Type Backflow Preventers for Carbonated Beverage Dispensers - Post Mix Type (ASSE 1032 – current edition)
N. Laboratory Faucet Backflow Preventers (ASSE 1035 – current edition)
O. Reduced Pressure Detector Fire Protection Backflow Prevention Assembly (ASSE 1047 – current edition)
P. Double Check Detector Fire Protection Assembly Backflow Prevention Assembly (ASSE 1048 – current edition)
Q. Hose Connection Backflow Preventers (ASSE 1052 – current edition)
R. Spill Resistance Vacuum Breakers (ASSE 1056 – current edition)
S. Backflow Prevention Assembly Field Test Kits (ASSE 1064 – current edition)
T. Pressurized Flushing Devices (Flushometers) for Plumbing Fixtures (ASSE 1037 – current edition)
U. Outdoor Enclosures for Fluid Conveying Components (ASSE 1060 – current edition)
V. Chemical Dispensing Systems (ASSE 1055 – current edition)

5.0 Reporting

5.1 The test report shall contain, but not be limited to, the following information: manufacturer's name, model number, serial number and size of assembly; owner's name and address; building address; physical location of assembly within the building (as descriptive as possible); description of application (i.e. equipment or system served); initial test results (pass-fail of first check and second check, relief valve discharge, static line pressure); test gauge manufacturer, model number, serial number and expiration date/last date of calibration; repairs made; repair parts used; cleaning performed; final test results, as applicable; printed name, signature and certification number of the tester/repairer; type of assembly; affirmation statement of assembly performance at the date and time of the test.

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5.2 The tester shall provide copies of the test results to the owner and other appropriate parties as required. The tester shall maintain a copy of the report for the records in accordance with the requirements of the authority having jurisdiction.

6.0 Product Installation Knowledge

6.1 The tester shall be able to describe the proper installation requirements for the backflow prevention assemblies relating to:

A. Manufacturer's Recommendations
B. Physical Location and Accessibility
C. Local Jurisdiction Requirements

6.2 The tester shall be able to identify and describe the problems resulting from the improper installation of backflow prevention assemblies including but not limited to:

A. Environment
B. Flow Capacity
C. Location
D. Orientation
E. Temperature

7.0 Product Test Equipment Knowledge

7.1 The tester shall have knowledge of ASSE 1064 (Performance Requirements for Backflow Prevention Assembly Field Test Kits).

7.2 The tester shall be able to identify and describe test procedures for the following equipment:

A. Differential Pressure Gage
B. Multipurpose Transducer (Digital Readout)
C. Sight Tube (Water Column)

7.3 All testing equipment shall be verified for accuracy and operation as per testing equipment manufacturer's instructions.

7.4 All testing equipment shall be verified for accuracy and operation as required by local jurisdiction.

8.0 Terminology

The backflow prevention assembly tester shall demonstrate a basic working knowledge of the terms located in Appendix G.

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