

ANSI/ASSP A10.35-2020

Safety Requirements for Pressure Testing
Steel and Copper Piping Systems



AMERICAN SOCIETY OF
SAFETY PROFESSIONALS



The information and materials contained in this publication have been developed from sources believed to be reliable. However, the American Society of Safety Professionals (ASSP) as secretariat of the ANSI accredited A10 Committee or individual committee members accept no legal responsibility for the correctness or completeness of this material or its application to specific factual situations. By publication of this standard, ASSP or the A10 Committee does not ensure that adherence to these recommendations will protect the safety or health of any persons or preserve property.

ANSI®
ANSI/ASSP A10.35 – 2020

American National Standard
Construction and Demolition Operations
Safety Requirements for Pressure Testing
Steel and Copper Piping Systems

Secretariat

American Society of Safety Professionals
520 N. Northwest Highway
Park Ridge, Illinois 60068

Approved October 1, 2020

American National Standards Institute

American National Standard

Approval of an American National Standard requires verification by ANSI that the requirements for due process, consensus, and other criteria for approval have been met by the standards developer. Consensus is established when, in the judgment of the ANSI Board of Standards Review, substantial agreement has been reached by directly and materially affected interests. Substantial agreement means much more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that a concerted effort be made toward their resolution. The use of American National Standards is completely voluntary; their existence does not in any respect preclude anyone, whether he/she has approved the standards or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standards. The American National Standards Institute does not develop standards and will in no circumstance give an interpretation of any American National Standard. Moreover, no person shall have the right or authority to issue an interpretation of an American National Standard in the name of the American National Standards Institute. Requests for interpretation should be addressed to the secretariat or sponsor whose name appears on the title page of this standard.

Caution Notice: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken periodically to reaffirm, revise, or withdraw this standard. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute.

Published October 2020 by:

American Society of Safety Professionals
520 N. Northwest Highway
Park Ridge, IL 60068
(847) 699-2929 • www.assp.org

Copyright © 2020 by the American Society of Safety Professionals
All Rights Reserved.

No part of this publication may be reproduced in any form, in an electronic retrieval system or otherwise, without the prior written permission of the publisher.

Printed in the United States of America

Foreword (This Foreword is not a part of American National Standard A10.35-2020.)

This standard is one of a series of safety standards that have been formulated by the Accredited Standards Committee on Safety in Construction and Demolition Operations, A10. It is expected that the standards in the A10 series will find a major application in industry, serving as a guide to contractors, labor and equipment manufacturers. For the convenience of users, a list of existing and proposed standards and technical materials in the A10 series for Safety Requirements in Construction and Demolition Operations follows.

| | |
|--------|---|
| A10.0 | The Construction and Demolition Compendium of Standards |
| A10.1 | Pre-Project & Pre-Task Safety & Health Planning |
| A10.2 | Safety, Health and Environmental Training (under development) |
| A10.3 | Powder-Actuated Fastening Systems |
| A10.4 | Personnel Hoists and Employee Elevators |
| A10.5 | Material Hoists |
| A10.6 | Demolition Operations |
| A10.7 | Use, Storage, Handling and Site Movement of Commercial Explosives and Blasting Agents |
| A10.8 | Scaffolding |
| A10.9 | Concrete and Masonry Construction |
| A10.10 | Temporary and Portable Space Heating Devices |
| A10.11 | Personnel Nets |
| A10.12 | Excavation |
| A10.13 | Steel Erection |
| A10.15 | Dredging |
| A10.16 | Tunnels, Shafts and Caissons |
| A10.17 | Safe Operating Practices for Hot Mix Asphalt (HMA) Construction |
| A10.18 | Temporary Roof and Floor Holes, Wall Openings, Stairways and Other Unprotected Edges |
| A10.19 | Pile Installation and Extraction Operations |
| A10.20 | Ceramic Tile, Terrazzo and Marble Work |
| A10.21 | Safe Construction and Demolition of Wind Generation/Turbine Facilities |
| A10.22 | Rope-Guided and Non-Guided Workers' Hoists |
| A10.23 | Safety Requirements for the Installation of Drilled Shafts |
| A10.24 | Roofing – Safety Requirements for Low-Sloped Roofs |
| A10.25 | Sanitation in Construction |
| A10.26 | Emergency Procedures for Construction Sites |
| A10.27 | Hot Mix Asphalt Facilities |
| A10.28 | Work Platforms Suspended from Cranes or Derricks |
| A10.30 | Installation of Anchors and Micropiles |
| A10.31 | Digger-Derricks |
| A10.32 | Personal Fall Protection Used in Construction and Demolition Operations |
| A10.33 | Safety and Health Program Requirements for Multi-Employer Projects |
| A10.34 | Public Protection |
| A10.35 | Pressure Testing Steel and Copper Piping Systems |
| A10.37 | Debris Nets |
| A10.38 | Basic Elements of a Program to Provide a Safe and Healthful Work Environment |
| A10.39 | Construction Safety and Health Audit Program |
| A10.40 | Reduction of Musculoskeletal Problems in Construction |
| A10.42 | Rigging Qualifications and Responsibilities in the Construction Industry |
| A10.43 | Confined Spaces in Construction and Demolition Operations |
| A10.44 | Lockout/Tagout in Construction |
| A10.46 | Hearing Loss Prevention |
| A10.47 | Highway Construction Safety |
| A10.48 | Communication Structures |
| A10.49 | Control of Health Hazards |
| A10.50 | Heat Stress Management in Construction and Demolition Operations (under development) |

- A10.100 Prevention through Design in Construction
- A10.101 Drones in Construction (under development)
- A10.102 Emerging Technology in Construction (under development)

One purpose of these standards is to serve as guides to governmental authorities having jurisdiction over subjects within the scope of the A10 Committee standards. If these standards are adopted for governmental use, the reference of other national codes or standards in individual volumes may be changed to refer to the corresponding regulations.

Normative Requirements: This standard uses the single column format common to many international standards. The normative requirements appear aligned to the left margin. To meet the requirements of this standard, machinery, equipment and process suppliers and users must conform to these normative requirements. These requirements typically use the verb “shall.”

NOTE: The informative or explanatory notes in this standard appear indented, in italics, in a reduced font size, which is an effort to provide a visual signal to the reader that this is informative note, not normative text, and is not to be considered part of the requirements of this standard; this text is advisory in nature only. The suppliers and users are not required to conform to the informative note. The informative note is presented in this manner in an attempt to enhance readability and to provide explanation or guidance to the sections they follow.

Revisions: The A10 Committee welcomes proposals for revisions to this standard. Revisions are made to the standard periodically (usually five years from the date of the standard) to incorporate changes that appear necessary or desirable, as demonstrated by experience gained from the application of the standard. Proposals should be as specific as possible, citing the relevant section number(s), the proposed wording and the reason for the proposal. Pertinent documentation would enable the A10 Committee to process the changes in a more-timely manner.

Interpretations: Upon a request in writing to the Secretariat, the A10 Committee will render an interpretation of any requirement of the standard. The request for interpretation should be clear, citing the relevant section number(s) and phrased as a request for a clarification of a specific requirement. Oral interpretations are not provided.

No one but the A10 Committee (through the A10 Secretariat) is authorized to provide any interpretation of this standard.

Approval: Neither the A10 Committee nor American National Standards Institute (ANSI) approves, certifies, rates or endorses any item, construction, proprietary device or activity.

Appendices: Appendices are included in most standards to provide the user with additional information related to the subject of the standard. Appendices are not part of the approved standard.

Checklists: Checklists included in A10 standards may be copied and used in non-commercial settings only.

Committee Meetings: The A10 Committee meets twice per year. Persons wishing to attend a meeting should contact the Secretariat for information.

Standard Approval: This standard was processed and approved for submittal to ANSI by the American National Standards Committee on Safety in Construction and Demolition Operations, A10. Approval of the standard does not necessarily imply (nor is it required) that all Committee members voted for its approval. At the time of approval of this standard, the A10 Committee had the following members:

John Johnson, CSP, Chair
 Steven Rank, Vice Chair
 Timothy R. Fisher, CSP, CHMM, ARM, CPEA, CAE, STS, Secretary
 Lauren Bauerschmidt, MS Engr, CSP, STS, Assistant Secretary
 Jennie Dalesandro, Administrative Technical Support

| Organization Represented | Name of Representative |
|--|--|
| 3M | Raymond Mann Heidi Lopez-Hidalgo, P.E. |
| AGC of America | Michael McCaffrey Kevin Cannon |
| Alliance of Hazardous Materials Professionals | Carl Heinlein, CSP, ARM, CRIS |
| American Insurance Services Group | Thad Nosal James Borchardt, CSP, CPE |
| American Society of Civil Engineers | John O'Connor, P.E. Harlan Fair, P.E. |
| American Society of Safety Professionals | Ken Shorter, CSP, ARM, TCDS A. David Brayton, CSP, CPC |
| American Wind Energy Association | Christopher Daniels Michele Myers Mihelic |
| APT Research, Inc. | Saralyn Dwyer |
| Associated Builders & Contractors, Inc. | Stephen Wiltshire, MSc Greg Sizemore |
| Barton Malow Company | Mark Haggemaker, CHST, CCHT Ryan Monahan |
| Black & Veatch | John Johnson, CSP Jason Scollin, CSP, MS, STSC, CRIS |
| Building & Construction Trades Department | Chris Cain, CIH Gary Gustafson |
| Century Elevators | Paula Manning Eric Schmidt, P.E. |
| Clark Construction Group | Kurt Dunmire, CSP, CHST |
| Cole-Preferred Safety Consulting, Inc. | Barry Cole |
| Conner Strong & Buckelew | Eric Voight, CSP Ken Bogdan |
| Construction & Realty Safety Group, Inc. | Ron Lattanzio Frank Marino |
| CPWR - The Center for Construction Research & Training | Bruce Lippy, Ph.D., CIH, CSP Babak Memarian, Ph.D., CSP, CHST |
| Eckstine & Associates, Inc. | Dennis Eckstine Matthew Eckstine |
| Edison Electric Institute | Joseph DiPlacido, MS CSP Carren Spencer |

| | |
|---|---------------------------------------|
| Elevator Industry Work Preservation Fund | Michael Morand |
| | James Demmel |
| Ellis Fall Safety Solutions, LLC | J. Nigel Ellis, Ph.D., P.E., CSP, CPE |
| | John Whitty, P.E. |
| Engineering Systems, Inc. | David Ahearn, P.E. |
| | Edward Tuczak, P.E. |
| Fluor Corporation | Michael Weatherred, CSP |
| | Jim Bates, CSP |
| Gilbane Building Co. | Robert Hinderliter, ASP |
| | Thomas Trauger, CSP, ARM, CRIS |
| Hislop, Richard D. | Richard Hislop, P.E., CSP, ARM |
| | Shawn Bradfield, CSP |
| Independent Electrical Contractors, Inc. | Paul Dolenc |
| | Jerry Rivera |
| Innovative Safety, LLC | Barbara Paine |
| Institute of Makers of Explosives | Joshua Hoffman, Ph.D., P.E. |
| | Susan Flanagan |
| International Association of Bridge, Structural, Ornamental & Reinforcing Iron Workers | Steven Rank |
| | Wayne Creasap II |
| International Association of Heat & Frost Insulators & Allied Workers | Tim Keane |
| International Brotherhood of Boilermakers | Mark Garrett |
| | Bridget Connors |
| International Brotherhood of Electrical Workers | David Mullen |
| | Dan Gardner |
| International Brotherhood of Teamsters | LaMont Byrd, CIH |
| International Safety Equipment Association | Cristine Fargo |
| | Daniel Glucksman |
| International Union of Bricklayers & Allied Craftworkers | David Wysocki |
| | Jeremiah Sullivan |
| International Union of Operating Engineers | Christopher Tremi |
| | Russell Duke |
| IUPAT | Kenneth Seal |
| Kiewit Power Constructors Co. | Rusty Brown, CSP |
| | Cody Williams, ASP |
| Laborers' International Union of North America | Walter Jones, MS, CIH |
| | Travis Parsons |
| Lamar Advertising Company | Chuck Wigger, CSP |
| | Beth Phelps |
| Lendlease Corporation | Joel Pickering, CET, CHMM |
| | Michael Lentz |
| Liberty Mutual | Stan Williams, ARM, CHST |
| | Kevin Newlan, ASP, CHST |

| | |
|---|---|
| Lockton Companies | Marcus Reiter, CSP, ARM, CRIS |
| | Drew Youpel, CRIS, STSC |
| Marsh LLC | Timothy Bergeron, CSP, CRIS |
| Maryland Occupational Safety & Health | Mischelle Vanreusel |
| | Matthew Helminiak |
| Mechanical Contractors Association of America | Peter Chaney, MS, CSP |
| Miller & Long Co., Inc. | Frank Trujillo |
| | Alex Rodas, CHST |
| National Association of Home Builders | Robert Matuga |
| | Christian Culligan |
| National Electrical Contractors Association | Michael Johnston |
| | Wesley Wheeler |
| National Institute for Occupational Safety & Health | Thomas Bobick, Ph.D., P.E., CSP, CPE |
| | G. Scott Earnest, Ph.D., P.E., CSP |
| National Railroad Construction & Maintenance Association | Jeffrey Meddin, CSP, CHEP, CHCM |
| | Greg Coleman, M.S. |
| National Roofing Contractors Association | Harry Dietz |
| | Thomas Shanahan |
| National Society of Professional Engineers | E. Ross Curtis, P.E., DFE, F.ASCE, F.NSPE |
| NESTI, Inc. | Michael Hayslip, P.E., CSP |
| | Jack Madeley, M.S., P.E., CSP |
| Operative Plasterers & Cement Masons International Association | Deven Johnson |
| PATMI | |
| Phoenix Fabricators & Erectors, Inc. | James Borchers |
| Professional Safety Consultants, Inc. | Frank Massey |
| | Jim Lapping, MS, P.E., CSP |
| Safety Environmental Engineering, Inc. | Kathy Stieler |
| Scaffold & Access Industry Association | Matthew Murphy |
| | DeAnna Martin |
| | Jackie Brown |
| Sheet Metal & Air Conditioning Contractors National Association | Mike McCullion, CSP, ARM |
| | |
| SMART Union | Jamie Devan, CHST |
| SPA, LLC | Randall Krocka |
| Stock Enterprises | Stanley Pulz, CSP, P.E. |
| The Association of Union Constructors | Steve Stock, P.E., PLS |
| | Alex Kopp |
| | Kathleen Dobson, CSP, CHST, STS.C |
| Turner Construction Company | Cindy DePrater, ALCM |
| | Abdon Friend, CSP |
| U.S. Army Corps of Engineers | Todd "Marty" Werdebaugh, MS, CSP, PMP |
| U.S. Department of Energy | Craig Schumann |
| | Maurice Haygood |

United Association of Plumbers and Pipefitters

Cheryl Ambrose, CHST, OHST

Rita Neiderheiser, CHST, CIT

United Brotherhood of Carpenters & Joiners of America

William Irwin

Royce Peters

United Union of Roofers, Waterproofers & Allied Workers

Richard Tessier

Keith Vitkovich

West Virginia University Extension Service

Brandon Takacs, CSP, CSHM

Mark Fullen, Ed.D., CSP

ZBD Constructors, Inc.

Greg Thompson, CSP

Jeffrey Meddin, CSP, CHEP, CHCM

Independent Experts & Observers

Alberici Constructors

Kathleen Dobson, CSP, CHST, STS.C

Bo Cooper

DPR Construction

James Alexander, CSP, CHST, CET

Paul Butler, CSP, CHST

National Association of Tower Erectors

John "JP" Jones

Kathryn Stieler

U.S. Department of Labor - OSHA

Scott Ketcham

Eric Kampert, P.E., CSP, OHST

Warfel Construction Company

Jeffrey Pierce

Kevin Stoltzfus

Subgroup A10.35 had the following members:

Peter Chaney, MS, CSP, Chair

Cheryl Ambrose, CHST, OHST, Vice Chair

David Batrony

Rich Benkowski

Raymond Boyd

Don Campbell

Leonard Crosby

Anne Ehrmann, CSP

Ken Gallagher

Carl Heinlein, CSP, ARM, CRIS

Roger Hendrix

Lou Iantorno

Scott Limpus

Pete Mahowald

Phillip Martin

Suzanne May

Chris Moulden

Rita Neiderheiser, CHST, CIT

Dennis Quinn

Dejan Ristic

Contents

| | |
|--|----|
| 1. Scope, Purpose and Exceptions | 11 |
| 1.1 Scope..... | 11 |
| 1.2 Purpose..... | 11 |
| 1.3 Exceptions | 11 |
| 2. References | 11 |
| 3. Definitions | 11 |
| 4. General Requirements | 13 |
| 5. Training Requirements..... | 14 |
| 6. Personal Protective Equipment (PPE)..... | 15 |
| 7. Pre-Test Plan | 15 |
| 8. Pre-Test Briefing | 16 |
| 9. Pre-Test Procedures | 16 |
| 10. Testing Procedures | 18 |
| 11. Post-Test Procedures | 19 |
| Appendix A – Primary Pressure Testing Hazards..... | 20 |
| Appendix B – Primary Causes of Pressure Testing Failures | 21 |
| Appendix C – Establishing Safe Test Pressures | 24 |
| Appendix D – Hydrostatic vs. Pneumatic Testing | 25 |
| Appendix E – Sample Hydrostatic Pressure Testing Checklist..... | 27 |
| Appendix F – Sample Pneumatic Pressure Testing Checklist | 29 |
| Appendix G – Calculating Safe Distance from Pressurized Components | 31 |
| Appendix H – Sample Leak Test Report | 37 |
| Appendix I – Sample Pneumatic Test Permit | 39 |

AMERICAN NATIONAL STANDARD A10.35 SAFETY REQUIREMENTS FOR PRESSURE TESTING STEEL AND COPPER PIPING SYSTEMS

1. Scope, Purpose and Exceptions

1.1 Scope

This standard establishes the elements and activities for the safe pressure testing of steel and copper piping systems.

1.2 Purpose

The primary purpose of this standard is to provide construction companies that are engaged in the installation, modification, or repair of steel and/or copper piping systems with the safe work practices and procedures that are necessary to help prevent injuries resulting from pressure testing failures.

1.3 Exceptions

1.3.1 This standard does not apply to piping systems made from cast iron, fiberglass, plastic, PVC, CPVC or any materials other than steel and copper.

1.3.2 In cases of practical difficulties, unnecessary hardships or new developments, the construction owner or project constructor may grant exceptions to literal requirements of this standard. These exceptions may permit use of other methods, but only when it is clearly indicated and documented that the chosen alternative method(s) provides adequate workplace safety and health protection.

1.3.3 This standard is not intended for residential construction.

2. References

The most current versions of the following ASME codes and one ANSI/ASSP standard are referenced in this standard.

ASME B31.1, *Power Piping* (piping in power stations)

ASME B31.3, *Process Piping* (industrial processes, i.e., petrochemical, fuels, etc.)

ASME B31.5, *Refrigeration Piping and Heat Transfer Components*

ASME B31.9, *Building Services Piping*

ASME Article 501 – For more information about energy generated by pneumatic pressure, refer to the five pages from ASME Article 501, *Pressure and Tightness Testing of Piping and Equipment* – ASME PCC-2-2018, *Repair of Pressure Equipment and Piping*, in Appendix G

ANSI/ASSP A10.44 Lockout/Tagout in Construction

3. Definitions

Affected Worker. Any worker or supervisor who will be actively participating in a pressure testing operation or any other worker who is not at least the safe distance away from all applicable parts of the pressure test as specified in Appendix G.

Building Services Piping. Piping systems designed for industrial, institutional, commercial, and public buildings, and multi-unit residences, which do not require the range of sizes, pressures and temperatures required in power piping applications.