ASSE Series 7000
ISSUED: AUGUST, 2008

American Society of Sanitary Engineering

Professional Qualifications Standard for

Plumbing-Based Residential Fire Protection Systems Installers & Inspectors

TABLE OF CONTENTS

Plumbing-Based Residential Fire Protection Systems Installers and Inspectors Professional Qualifications Standard

GENERAL INFORMATION

Plumbing-Based Residential Fire Protection Systems Installers and Inspectors Professional Qualifications Standard

No product may be said to be ASSE approved unless the manufacturer has applied to the ASSE, has had the product tested by an official ASSE recognized independent laboratory, according to the applicable ASSE Standard, passed the test, and has been reviewed and approved by the consensus ASSE Seal Control Board. Having completed the aforementioned, the manufacturer may then display the ASSE Seal on the product.

Instructions for receiving the authorization to display the Seal are available from ASSE International Office. Organizations wishing to adopt or list any ASSE Standard should print the ASSE Standard number on the cover page first and in equal or larger type to that of the adopting or listing organization.

American Society of Sanitary Engineering
Westlake, Ohio

FOREWORD

Plumbing-Based Residential Fire Protection Systems Installers and Inspectors Professional Qualifications Standard

This foreword shall not be considered a part of the standard; however, it is offered to provide background information.

Neither this standard, nor any portion contained within, may be reproduced without the written consent of the American Society of Sanitary Engineering (ASSE).

The American Society of Sanitary Engineering is dedicated to the preservation of public health and safety through the use of proper plumbing and piping practices and approved materials. In 2006, the Board of Directors approved the development of a Professional Qualifications standard for plumbing based fire suppression systems.

With the proliferation of residential fire suppression systems being installed in compliance with the National Fire Protection Association Standard 13D, ASSE was requested to develop a standard series for Residential Plumbing Based Fire Suppression Systems Installers and Inspectors as part of their Professional Qualifications Standards program, which includes the ASSE Series 5000, *Professional Qualifications Standards for Backflow Prevention Assembly Testers, Repairers and Surveyors;* and the ASSE Series 6000, *Professional Qualifications Standards for Medical Gas Personnel.* These standards touch the lives of people every day.

More people die in their homes annually due to fires than in all natural disasters combined. We face an epidemic, and a plumbing based residential fire suppression system is a significant solution. The responsibility is tremendous because there are few second chances to do the job right. This document contains the uniform minimum requirements for qualified installers and inspectors of plumbing based residential fire suppression systems.

STANDARDS COMMITTEE (2007-2008)

Plumbing-Based Residential Fire Protection Systems Installers and Inspectors Professional Qualifications Standard

Donald Summers, Jr.
Standards Committee Chairman
U.A. Local 562
St. Louis, Missouri

Rand Ackroyd
Rand Technical Consulting
Rye, New Hampshire

Sean Cleary
International Association of Plumbing and Mechanical Officials (IAPMO)
Scranton, Pennsylvania

Laurence T. Coleman
Pipefitters Local Union #597 Training Fund
Chicago, Illinois

Michael Collins
Collins Backflow Specialists, Inc.
Palatine, Illinois

Shannon M. Corcoran
Standards Coordinator
American Society of Sanitary Engineering
Westlake, Ohio

Robert L. Cross
Houston Area Plumbing Joint Apprenticeship Committee
Houston, Texas

Joseph Fugelo
The Labov Company
Philadelphia, Pennsylvania

Scott Hamilton
Plumbers Union Local 75
Milwaukee, Wisconsin

Steven Hazzard
ASSE Staff Engineer
American Society of Sanitary Engineering
Westlake, Ohio

Leslie Kendall
U.A. Canada
Hamilton, Ontario, Canada

Edward Lyczko
Cleveland Clinic Foundation
Cleveland, Ohio

Jerry McManus
National ITC
Los Angeles, California

Ronald J. Murray, Chief, MPA
UA Plumbers & Steamfitters Local 290
Portland, Oregon

Barry Pines, CIPE/CPD
CRP Plumbing and Heating, Inc.
Shelby Township, Michigan

Anthony Rini, III, P.E.
Mottola-Rini Engineers, PC
New York, New York

Carl Schroeder
Plumbing Industry Training Center
Detroit, Michigan

Carl R. Triphahn
P.I.P.E. Arizona
Tempe, Arizona

SERIES 7000 WORKING GROUP

Plumbing-Based Residential Fire Protection Systems Installers and Inspectors Professional Qualifications Standard

Ronald J. Murray, Chief, MPA
Series 7000 Working Group Chairman
UA Plumbers & Steamfitters Local 290
Portland, Oregon

Julius A. Ballanco., P.E., CPD
JB Engineering & Code Consulting, P.C.
Munster, Indiana

Paul R. Bladdick, FASSE, MP
LPB Company, Inc.
White Lake, Michigan

Maribel Campos
International Association of Plumbing and Mechanical Officials (IAPMO)
Ontario, California

Sean Cleary
International Association of Plumbing and Mechanical Officials (IAPMO)
Scranton, Pennsylvania

Bill Dalton
U.A. Sprinkler Fitters Local #281
Alsip, Illinois

Scott Hamilton
Plumbers Union Local 75
Milwaukee, Wisconsin

Steven Hazzard
American Society of Sanitary Engineering
Westlake, Ohio

Joseph R. Mathews
U.A. Sprinkler Fitters Local #692
Philadelphia, Pennsylvania

Eric Packard
United Association
Washington, DC

Barry Pines, CIPE/CPD
CRP Plumbing and Heating, Inc.
Shelby Township, Michigan

Robin Scheldorn
U.A. Local #790 J.A.C
Los Angeles, California

Kenneth R. Schneider
Sprinkler Fitters Local 268 JATC
St. Louis, Missouri

Donald Summers, Jr.
U.A. Local #562
St. Louis, Missouri

General Information

1-1.1 Reference and Industry Standards and Codes

The following list of reference and industry standards and codes is part of the requirements of ASSE Standard 7010, and ASSE Standard 7020. Refer to Annex E, for information to contact the various standards organizations.

1-1.1.1 ASTM A53/A53M-06a, *Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless*

1-1.1.2 ASTM A312/A312M-06, *Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes*

1-1.1.3 ASTM A778-01, *Standard Specification for Welded, Unannealed Austenitic Stainless Steel Tubular Products*

1-1.1.4 ASTM B32-04, *Standard Specification for Solder Metal*

1-1.1.5 ASTM B42-02e1, *Standard Specification for Seamless Copper Pipe, Standard Sizes*

1-1.1.6 ASTM B75-02, *Standard Specification for Seamless Copper Tube*

1-1.1.7 ASTM B43-98 (2004), *Standard Specification for Seamless Red Brass Pipe, Standard Sizes*

1-1.1.8 ASTM B75-02, *Standard Specification for Seamless Copper Tube*

1-1.1.9 ASTM B88-03, *Standard Specification for Seamless Copper Water Tube*

1-1.1.10 ASTM B251M-97(2003), *Standard Specification for General Requirements for Wrought Seamless Copper and Copper-Alloy Tube [Metric]*

1-1.1.11 ASTM B251-02e1, *Standard Specification for General Requirements for Wrought Seamless Copper and Copper-Alloy Tube*

1-1.1.12 ASTM B302-02, *Standard Specification for Threadless Copper Pipe, Standard Sizes*

1-1.1.13 ASTM B447-07, *Standard Specification for Welded Copper Tube*

1-1.1.14 ASTM B813-00e1, *Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube*

1-1.1.15 ASTM B828-02, *Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings*

1-1.1.16 ASTM D2846/D2846M-06, *Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Hot- and Cold-Water Distribution Systems*

1-1.1.17 ASTM F437-06, *Standard Specification for Threaded Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80*

1-1.1.18 ASTM F438-04, *Standard Specification for Socket-Type Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 40*

1-1.1.19 ASTM F439-06, *Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80*

1-1.1.20 ASTM F441/F441M-02, *Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80*

1-1.1.21 ASTM F442/F442M-99(2005), *Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR)*

1-1.1.22 ASTM F876-06, *Standard Specification for Crosslinked Polyethylene (PEX) Tubing*

1-1.1.23 ASTM F877-07, *Standard Specification for Crosslinked Polyethylene (PEX) Plastic Hot- and Cold-Water Distribution Systems*

1-1.1.24 AWS A5.8/A5.8M, *Specification for Filler Metals for Brazing and Braze Welding*

1-1.1.25 AWS A5.31 Type FB3-A or FB3-C *Specification for Fluxes for Brazing and Braze Welding*

1-1.1.26 CSA B137.5-05, *Crosslinked polyethylene (PEX) tubing systems for pressure applications*

1-1.1.27 CSA B137.6-05, *Chlorinated Polyvinylchloride (CPVC) Pipe, Tubing, and Fittings for Hot- and Cold-Water Distribution Systems*

1-1.1.28 IBC-2006, *International Building Code*

1-1.1.29 IFC-2006, *International Fire Code*

1-1.1.30 IRC-2006, *International Residential Code*

1-1.1.31 NFPA 13-2007, *Standard for the Installation of Sprinkler Systems*

1-1.1.32 NFPA 13-D-2007, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*

1-1.1.33 NFPA 13-R-2007, *Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height*

1-1.1.34 NSF 61-2007, *Drinking Water System Components, Health Effects*

1-1.1.35 NFPA 5000-2006, *Building Construction and Safety Code*

1-1.1.36 UL 1626-2001, *Residential Sprinklers for Fire-Protection Service*

1-1.1.37 UPC-2006, *Uniform Plumbing Code*

NOTE: All questions related to applicability shall be directed to the Authority Having Jurisdiction (AHJ).

1-1.2 Terminology

The following list of terms is part of the requirements of ASSE Standard 7010 and ASSE Standard 7020.

1-1.2.1 Absolute Pressure - Fluid pressure measured above a perfect vacuum. It is the pressure indicated by an ordinary pressure gauge plus the atmospheric pressure.

1.1.2.2 Administrative Authority - An individual official, board, department or agency established and authorized by a state, county, city or other political subdivision created by law to administer and enforce the provisions of the plumbing code as adopted or amended. Shall include the administrative authority's duly authorized representative.

1-1.2.3 Air-Gap (Air-Gap Separation) – the unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or outlet supplying water to a tank, plumbing fixture, or other device, and the flood-level rim of the receptacle.

1-1.2.4 Air Inlet – An opening, or series of openings, through the body of a device from the free atmosphere to the liquid passage.

1.1.2.5 Alternative Engineered Design - A plumbing system that performs in accordance with the intent of the plumbing code and provides an equivalent level of performance for the protection of public health, safety and welfare. System design is not specifically regulated by the plumbing code.

1.1.2.6 Ambient Temperature - The actual air or liquid temperature that occurs in the area encompassing where a test or an event is scheduled to take place.

1-1.2.7 Antifreeze Sprinkler System – A wet pipe sprinkler system employing automatic sprinklers that are attached to a system that contains an antifreeze solution and that are connected to a water supply. The antifreeze solution, followed by water, discharges immediately from sprinklers opened by a fire. [1] (add footnote stating: "This is for informational purposes only; and shall not be installed as part of a plumbing-based fire suppression system."

1-1.2.8 Approved – Acceptable to the authority having jurisdiction;

1-1.2.9 Arm-over – A horizontal pipe that extends from the branch line to a single sprinkler or a sprinkler above and below a ceiling.

1.1.2.10 Atmosphere - The air that surrounds the earth. The mass of gases that surrounds, or may surround, any heavenly body.

1-1.2.11 Atmospheric Air – The surrounding atmosphere and at its existing pressure.

1-1.2.12 Atmospheric Pressure – 1. A unit of pressure equal to 14.7 pounds per square inch. 2. The pressure exerted in every direction at any given point by the weight of the atmosphere; the pressure exerted by the air on the earth's surfac at sea level is about one (1) atmosphere.

1-1.2.13 Atmospheric Vacuum Breaker (AVB) – A term applied to backflow preventers or anti-siphon devices which may incorporate moving or movable parts, designed to operate only on the discharge side of a control valve, for the purpose of preventing backflow or backsiphonage in a water distribution system when the backflow source is subject to atmospheric pressure only.

1-1.2.14 Authority Having Jurisdiction (AHJ) – An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

1-1.2.15 Automatic Fire Detector – A device that detects abnormally high temperature, rate of temperature rise, visible or invisible particles, infrared or visible radiation, or gases produced by a fire.

1-1.2.16 Automatic Sprinkler – A fire suppression or control device that operates automatically when its heat-ac-

tuated element is heated to its thermal rating or above, allowing water to discharge over a specific area.

1-1.2.17 Auxiliary Water Supply - Any water supply on or available to the premises other than the water supplier's approved public potable water supply. These auxiliary sources of water may include water from another supplier's public potable water supply or any natural source, such as a well, spring, river, stream, harbor, etc., or used waters or industrial fluids. They may be polluted or contaminated, or they may be objectionable and constitute an unacceptable water source over which the water supplier does not have control.

1-1.2.18 Back Pressure - A reverse pressure greater than that in the intended normal direction and/or pressure of flow or thrust. An escape of liquid by virtue of the physics of a simple siphon. Pressure in plumbing pipes that is less than atmospheric pressure. The flowing back of used, contaminated or polluted water from a plumbing fixture or vessel or other source into a negative pressure in such a pipe. A pressure in the supplied system which, for some cause, becomes greater than the supply pressure (pressure above atmospheric.)

1-1.2.19 Backflow – A term which denotes the reversal of flow from that normally intended. The flow of water or other liquids, mixtures, or substances into the distributing pipes of a potable supply of water from any source or sources other than its intended source.

1.1.2.20 Backflow Preventer - Any approved assembly used to prevent backflow into a potable water system; the type of assembly or device used shall be based on the degree of hazard; existing or potential. A device or means to prevent backflow.

1-1.2.21 Backflow Prevention Assembly – Any assembly used to prevent backflow into a potable water system. The type of assembly, or device, used shall be based on the degree of hazard; existing or potential.

1-1.2.22 Backflow Prevention Method – A mechanism for preventing backflow. It includes mechanical backflow prevention assemblies (PVB, DCVA, RP) and devices (AVB) as well as air gaps.

1-1.2.23 Backsiphonage – The backflow of possible contaminated water into the potable water supply system or the potable water distribution systems as a result of the pressure in the potable water system becoming unintentionally less than the atmospheric pressure in the plumbing fixtures, pools, tanks or vats that may be connected to the potable water distribution system. The siphoning back of used, contaminated or polluted water or other substances from a plumbing fixture, vessel, or other source, into the water supply pipe due to negative pressure in the supply pipe.

1-1.2.24 Branch Lines – The pipes supplying sprinklers, either directly or through sprigs, drops, return bends, or arm-overs. A water supply line connecting one or more fixtures with a water supply main, riser or other branch.

1-1.2.25 Bypass – any arrangement of pipes, plumbing, or hoses designed to divert the flow around an installed device or assembly through which the flow normally passes.

1-1.2.26 Certified Backflow Assembly Tester – An individual who has shown competence to test and maintain backflow assemblies to the satisfaction of the administrative authority having jurisdiction.

1-1.2.27 Check Valve – A valve that permits flow in one direction but that closes automatically to retard the flow of fluid in a reverse direction.

1-1.2.28 Clapper – a mechanical device which closes and strikes another surface abruptly, such as a hinged check valve.

1-1.2.29 Compartment –Shall be a space that is completely enclosed by walls and a ceiling.

1-1.2.30 Condition of Service – an agreement between the water supplier and the consumer that specifies the obligation and responsibilities of each in order for service to be provided.

1-1.2.31 Consumer – person or facility receiving service from a potable water system.

1-1.2.32 Containment - A method of backflow prevention which requires a backflow prevention assembly or device at the water service entrance. Sometimes called premise isolation.

1-1.2.33 Containment Policy - To confine potential contamination caused by a cross-connection by installing a backflow prevention assembly at the point of service within a facility. (Sometimes called premise isolation.)

1-1.2.34 Contaminant - Any material (solid liquid or gas) which, if introduced into a potable water supply, would cause it to be unfit for human or animal consumption. An impairment of the quality of the water which creates an actual health hazard to the public through poisoning, or through the spread of disease by sewage, industrial fluids, or waste.

1-1.2.35 Contamination – An impairment of the quality of the water which creates an actual health hazard to the public health through poisoning or through the spread of disease by sewage, industrial fluids or waste.

1-1.2.36 Continuous Pressure – a condition in which upstream pressure is applied continuously (more than 12 hours) to a device or assembly. Continuous pressure can cause mechanical parts within a backflow preventer to become stuck or frozen in place, thus causing the backflow preventer to malfunction.

1-1.2.37 Control Valve – An indicating valve employed to control (shut) a supply of water to a sprinkler system.

1-1.2.38 Conversant – having knowledge or experience.

1-1.2.39 Critical Installation Level - A designated operational limitation prescribing a safe height for the installed vacuum breaker above the flood level rim of the fixture or receptacle served. In absence of physical mark on the device, indicating a height measurement reference point, the extreme bottom of the device shall be considered this height reference point.

1-1.2.40 Critical Level Marking – A point on a backflow prevention device or vacuum breaker that is usually stamped on the device by the manufacturer to specify the minimum elevation above the flood level rim of the fixture served. A plumbing code term.

1-1.2.41 Cross-Connection – A physical connection or arrangement between two otherwise separate (piping) systems, one of which contains potable water and the other water of questionable or unknown safety; such as steam, gas, or chemicals. There may be a flow from one system to the other, the direction of flow depending on the pressure differential between the two systems. Unintentional connection between two different systems, e.g. connections between hot and cold water piping.

1-1.2.42 Cross-Connection Control – The use of assemblies, devices, methods and procedures to prevent contamination or pollution of a potable water supply through cross connection.

1-1.2.43 Cross Mains – The pipes supplying the branch lines, either directly or through risers.

1-1.2.44 Degree of Hazard – Derived from the evaluation of conditions within a water system which can be classified as either a "health hazard" or "non-health hazard".

1-1.2.45 Demand - The flow necessary to satisfy system requirements.

1-1.2.46 Design Discharge – The rate of water discharged by an automatic sprinkler expressed in gpm (mm/min).

1-1.2.47 Dwelling – Any building that contains not more than one or two dwelling units intended to be used, rented, leased, let, or hired out to be occupied or that are occupied for habitation purposes.

1-1.2.48 Dwelling Unit – One or more rooms, arranged for the use of one or more individuals living together, as in a single housekeeping unit, that normally have cooking, living, sanitary, and sleeping facilities.

1-1.2.49 Diaphragm – a flexible, pliable barrier which provides a separation between two areas.

1-1.2.50 Diaphragm Plate – a flat plate, usually on opposing sides of a diaphragm, to maintain its position.

1-1.2.51 Differential Pressure – The difference in pressure of the fluid between two points in a piping system (i.e.: the difference between the inlet and outlet on a water filter or backflow preventer).

1-1.2.52 Direct Cross Connection – A continuous, enclosed interconnection or cross connection so that the flow of fluid from one system to the other can occur. Any arrangement of pipes, fixtures or devices connecting a potable water supply directly to a non-potable source.

1-1.2.53 Disc – a rubberized part which makes a seal against another surface (generally the seat).

1-1.2.54 Disc Holder – a part which actually holds the disc, usually within a depression (this cam also be a poppet or stem).

1-1.2.55 Disc Retainer – a flat washer-like part which holds the disc in the disc holder.

1-1.2.56 Distribution System – all pipes, fittings, fixtures used to convey liquid or gas from one point to another.

1-1.2.57 Double Check Detector Backflow Prevention Assembly - A specially designed assembly composed of a line-sized approved double check valve assembly with a specific bypass water meter and a meter-sized approved double check valve assembly. The meter shall register accurately for only very low rates of flow and shall show a registration for all rates of flow. This assembly shall only be used to protect against a non-health hazard, such as a pollutant.

1-1.2.58 Double Check Valve Assembly (DCVA) –An assembly composed of two independently acting approved check valves, including closing shut-off valves at each end of the assembly and fitted with properly located test cocks. Shall only be used to protect against a non-hazard pollutant.

1-1.2.59 Dry Pipe Sprinkler System – A sprinkler system employing automatic sprinklers that are attached to a piping system containing air or nitrogen under pressure, the release of which (as from the opening of a sprinkler) permits the water pressure to open a valve known as a dry pipe valve, and the water then flows into the piping system and out the opened sprinkler. [2] (add footnote stating: "This is for informational

purposes only; and shall not be installed as part of a plumbing-based fire suppression system."

1-1.2.60 Dual Check Valve Assembly – An assembly composed of two independently acting check valves, internally forced loaded to a normally closed position and designed and constructed to operate under intermittent or continuous pressure conditions. Shall be considered suitable for use only where there is no health hazard.

1-1.2.61 Effective Opening –The minimum cross-sectional area at the point of water supply discharge, measured or expressed in terms of : (a) the diameter of a circle, or (b) if the opening is not circular, the diameter of a circle of equivalent cross-sectional area. For faucets and similar fittings, the effective opening shall be measured at the smallest orifice in the fitting body or in the supply piping to the fitting.

1-1.2.62 Enteric Infection – contamination of the intestines with a disease producing substance or pathogen such as bacteria.

1-1.2.63 Feed Mains – The pipes supplying cross mains, either directly or through risers.

1-1.2.64 Fire Control – Limiting the size of a fire by distribution of water so as to decrease the heat release rate and pre-wet adjacent combustibles, while controlling ceiling gas temperatures to avoid structural damage.

1-1.2.65 Fire Suppression – Sharply reducing the heat release rate of a fire and preventing its regrowth by means of direct and sufficient application of water through the fire plume to the burning fuel surface.

1-1.2.66 Fire Tetrahedron – Fire requires four elements in order to start and continue to burn. These basic elements of fire are called the *fire tetrahedron* and include heat, fuel and oxygen. The forth element of fire is a self-sustaining chemical reaction called "combustion" that produces continued heat that serves to keep the fire burning

1-1.2.67 Fixture Unit Flow Rate - The total discharge flow in gallons per minute of a single fixture divided by 7.5 which provides the flow rate of that particular plumbing fixture as a unit of flow; fixtures are rated as multiples of this unit of flow.

1-1.2.68 Fixture Unit, Supply - A measure of the probable hydraulic demand on the water supply by various types of plumbing fixtures. The value for a particular fixture depends on its volume rate of supply, on the time duration for a single operation and on the average time between successive operations.

1-1.2.69 Flood Level Rim – The edge of the receptacle from which water overflows. The level from which liquid will flow to the floor when all drain and overflow openings built into the device are obstructed. The lowest point in a receptacle from which water overflows.

1-1.2.70 Flow Rate - An empirical value of a rate of flow of a liquid or other mobile substances, expressed in an accepted unit of measure, through a pipe, fitting valve, or device that characterizes its capacity. The rate of flow of water, silt, or other mobile substance which emerges from an opening, pump, or turbine or passes along a conduit or channel, usually expressed as cubic feet per second, cubic meters per second, gallons per minute, or million gallons per day.

1-1.2.71 Flush Tank – A container for a measured quantity of water, fitted with an inlet valve (ballcock) and a flush valve, either wall hung or close coupled (with closet bowl), used to flush a water closet, or urinal, by gravity discharge.

1-1.2.72 Friction - Resistance to the relative motion of a liquid, or body, sliding, rolling or flowing over another with which it is in contact. The resultant drag, or diminishment, of velocity of a fluid at the surface with which it is in contact.

1-1.2.73 Gauge - A device for determining whether the dimensions of a part are within specified limits. A measuring instrument. To measure exactly.

1-1.2.74 Gauge Pressure - The pressure at a point in a fluid above that of the atmosphere. Compare with absolute pressure.

1-1.2.75 Generally Accepted Standard - A specification, code, rule guide, or procedure in the field of construction or related thereto, recognized and accepted as authoritative.

1-1.2.76 Guide – anything which directs the movement or placement or another item.

1-1.2.77 Guide/Retainer – an item which combines the functions or retaining and guiding an item.

1-1.2.78 Hanger – Something that hangs, overhangs, or is suspended. A depending part containing a bearing for a revolving piece, especially a metal frame secured to the ceiling and carrying a bearing for overhead shafting. A device or contrivance by which or to which something is hung or hangs. A metal strap used to hold an eave in place. A vertical tension member receiving its stress only from the part of the structure directly attached to it. An iron box secured to any projection from a wall or beam to carry one end of a joist or girder. Devices for supporting and securing pipe, fixtures and equipment to walls, ceilings, floors, or any other structural member.

1-1.2.79 Hazard - A possible source of danger or peril. A condition that tends to create or increase the possibility of loss or harm.

1-1.2.80 Hazard, Health (High) – An actual or potential threat of contamination or pollution of a physical or toxic nature to the potable water system to such a degree that there would be a danger to health.

1-1.2.81 Hazard, High - A connection made to the potable water system whereby the risk of backflow occurring would be from toxic or chemically charge sources.

1-1.2.82 Hazard, Low – A connection made to the potable water system whereby the risk of backflow occurring would be limited to the contamination of the potable water with objectionable, but nontoxic substances such as steam, air food, beverage, etc. Any actual, or potential, threat of pollution to the potable water supply that is considered aesthetically objectionable and would make the water look, smell, or taste bad but would not kill or cause illness.

1-1.2.83 Head Pressure - The resulting pressure of the fluid at the lower point expressible at this height; broadly: pressure of fluid.

1-1.2.84 Hydraulic - Operated by or employing water or other liquids in motion. Operated by water, or other liquids, under pressure.

1-1.2.85 Hydrostatic Test – A test of a closed piping system and its attached appurtenances consisting of subjecting the piping to an increased internal pressure for a specified period of duration to verify system integrity and leak rates.

1-1.2.86 Indicating Valve – A valve that has components that show if the valve is open or closed. Examples are outside screw and yoke (OS&Y) gate valves and ball valves.

1-1.2.87 Indirect Cross Connection – A potential cross connection in which the interconnection is not continuously enclosed and the completion of the cross connection depends on the occurrence of one or more abnormal conditions.

1-1.2.88 Inspector, Plumbing – A trained person qualified to pass judgement. Administrative authority.

1-1.2.89 Isolation (Policy) – to confine a potential source of contamination to the non-potable system being served; to provide a backflow prevention mechanism at each actual or potential cross-connection. (Sometimes called: Internal Isolation.)

1-1.2.90 Kinetic Energy - Energy available from a flowing column of water due to its velocity.

1-1.2.91 Labeled – Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

1-1.2.92 Liability – legally responsible for or being obligated by law for the protection of the potable water supply.

1-1.2.93 Listed – Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.

1-1.2.94 Manifold - The conduit of an appliance which supplies gas to the individual burners. A fitting or pipe with many outlets or connections relatively close together.

1-1.2.95 Main Drain – The primary drain connection located on the system riser and also utilized as a flow test connection.

1-1.2.96 Manufactured Home – A structure, transportable in one or more sections, which, in the traveling mode, is 8 body-ft. (2.4 m) or more in width or 40 body-ft (12.2 m) or more in length or, when erected on site, is 320 sq. ft. 2 (29.7 m2) or more and which is built on a permanent chassis and designed to be used as a dwelling, with or without a permanent foundation, when connected to the required utilities, and includes plumbing, heating, air-conditioning, and electrical systems contained therein; except that such terms shall include any structure which meets all the requirements of this paragraph except the size requirements and with respect to which the manufacturer voluntarily files a certification required by the regulatory agency. Calculations used to determine the number of square feet in a structure are based on the structure's exterior dimensions, measured at the largest horizontal projections when erected on site. These dimensions include all expandable rooms, cabinets, and other projections containing interior space, but do not include bay windows.

1-1.2.97 Multipurpose Piping System – A piping system intended to serve both domestic and fire protection needs.

1-1.2.98 Negative Pressure – pressure that is less than atmospheric. Negative pressure in a pipe can induce a partial vacuum which can siphon non-potable liquids into the potable water distribution system.

1-1.2.99 Negligence – not meeting one's responsibilities and causing harm.

1-1.2.100 Network System – A type of multipurpose system utilizing a common piping system supplying domestic fixtures and fire sprinklers where each sprinkler is supplied by a minimum of three separate paths.

1-1.2.101 Non-Health Hazard – a cross-connection or potential cross-connection involving any pollutant or contaminant (at low levels) that will not create a health hazard but will create a nuisance, or be aesthetically objectional, if introduced into the potable water supply.

1-1.2.102 Non-Potable Water or System – Water not safe for drinking, personal, or culinary use.

1-1.2.103 Nontoxic – not poisonous; a substance that will not cause illness or discomfort if consumed.

1-1.2.104 Obstructed Construction – Panel construction and other construction where beams, trusses, or other members impede heat flow or water distribution in a manner that materially affects the ability of sprinklers to control or suppress a fire.

1-1.2.105 One and Two Family Dwelling – Any building that contains not more than two dwelling units intended to be occupied for habitation purposes, including townhouses constructed in accordance with the *International Residential Code*.

1-1.2.106 Pathogen – a disease causing agent or organism.

1-1.2.107 Pipe – A cylindrical conduit or conductor, the wall thickness of which is sufficient to receive a standard pipe thread conforming to national standards for United States standard tapered pipe thread. May be installed plain ended or threaded. Compare with tube.

1-1.2.108 Pipe Hanger - A device for suspending pipe. A bracket, clamp, clip or loop used to suspend pipe (as from ceilings, overhead beams).

1-1.2.109 Pipe Support - A bracket, or brace, which supports pipes. Also called pipe rest.

1-1.2.110 Plumbing – Includes the work and/or practice, materials and fixtures used in the installation, removal, maintenance, extension, and alterations of a plumbing system of all piping, fixtures, fixed appliances and appurtenances in connection with any of the following: sanitary drainage, storm drainage facilities, special wastes, the venting system and the public or private water supply systems, within or adjacent to any building, structure, or conveyance to their connection with any point of public disposal or other acceptable terminal within the property line. The pipes fixtures and all other apparatus concerned in the introduction, distribution and disposal of water in a building. The pipes, fixtures and other apparatus of a water, gas or sewage system.

1-1.2.111 Plumbing-Based Residential Fire Protection Systems – A single multipurpose residential piping system serving both domestic and fire protection needs.

1-1.2.112 Poison – a substance that can injure, impair, or cause death to a living organism.

1-1.2.113 Pollutant – The addition to a natural body of water of any material which diminishes the optimal economical use of the water body by the population which it serves, and has an adverse effect on the surrounding environment. A substance that deteriorates the aesthetic equality of water, or other materials, but is not harmful to health. The impairment of the quality of water to a degree which does not create an actual hazard to the public health, but which does adversely and unreasonable affect such waters for domestic use.

1-1.2.114 Poppet – a valve which floats free or is lifted bodily from its point of sealing (usually the seat) instead of being hinged.

1-1.2.115 Potable Water – Water which is suitable for drinking, culinary, and personal purposes. Water free from impurities present in amounts sufficient to cause disease or harmful physiological effects. Water from any source which has been approved for human consumption by the health agency having jurisdiction.

1-1.2.116 Pre-engineered System – A packaged sprinkler system including all components connected to the water supply and designed to be installed according to pretested limitations.

1-1.2.117 Pressure – the force exerted on a surface, generally expressed in units of pounds per square inch (psi).

1-1.2.118 Pressure, Differential - The difference in pressure of the fluid between two points in a piping system (i.e.: the difference between the inlet and outlet on a water filter or backflow preventer).

1-1.2.119 Pressure Supply – the water distribution system pressure available at the utility service connection is considered supply pressure. Some locations describe supply pressure as that water distribution pressure available to a fixture or appliance.

1-1.2.120 Pressure Loss - The reduction of pressure that occurs when liquid passes through an assembly. The decrease in pressure in a piping system due to the

resistance caused by pipes, fittings, valves, filters, water meters, backflow assemblies, etc.

1-1.2.121 Pressure Reducing Valve - A valve which maintains a uniform pressure on its outlet side irrespective of how the pressure on its inlet side may vary above the pressure to be maintained.

1-1.2.122 Pressure Vacuum Breaker Assembly (PVB) – The term shall apply to an assembly containing an independently operating loaded check valve and an independently operated loaded air inlet valve located on the discharge side of the check valve. The assembly is to be equipped with properly loaded test cocks and tightly closing shut-off valves located at each end of the assembly. This assembly is designed to protect against a health hazard (i.e.: contaminant) under a backsiphonage condition only.

1-1.2.123 Protected Cross-Connection – A cross-connection between a potable and non-potable system where adequate methods are provided to prevent backflow.

1-1.2.124 PSID (psid) – Pounds per square inch differential.

1-1.2.125 PSIG (psig) – Pounds per square inch gauge.

1-1.2.126 Pump – A device, or machine, that raises, transfers, or compresses fluids or that attenuates gases especially by suction or pressure or both. Apparatus for raising, exhausting, driving or compressing fluids, air, or gases by means of a piston, plunger, or rotating vanes.

1-1.2.127 Pyrolysis – A form of incineration that chemically decomposes organic materials by heat in the absence of oxygen. Pyrolysis typically occurs under pressure and at operating temperatures above 430 °C (800 °F).

1-1.2.128 Reduced Pressure Principle Backflow Preventer Assembly (RP) –An assembly containing two independently acting, approved check valves together with a hydraulically operating, mechanically independent pressure differential relief valve located between the check valves and at the same time, below the first check valve. The unit shall include properly located test cocks and tightly closing shut-off valves at each end of the assembly. The assembly is designed to protect against a health hazard (i.e.: contaminant).zone between the checks. The zone contains a relief port which will open to atmosphere if the pressure in the zone falls within 2 psi of the supply pressure. The assembly provides protection against both back pressure and backsiphonage.

1-1.2.129 Refusal of Service (Shut off Policy) – a formal policy adopted by a utilities governing board to enable the utility to refuse or discontinue service where a known or potential hazard exists and corrective measures are not undertaken to eliminate the hazards.

1-1.2.130 Regulating Agency – any local, state or federal authority given the power to issue rules or regulations having the force or law for the purpose of providing uniformity in details and procedures.

1-1.2.131 Relief Device – A safety device designed to forestall the development of a dangerous condition in the medium being heated by relieving either the pressure, temperature or vacuum built up in the appliance. An automatic device which opens or closes a relief vent, depending on whether the pressure is above or below a predetermined value.

1-1.2.132 Residential Sprinkler – A type of fast-response sprinkler having a thermal element with an RTI of 50 (meters-seconds)1/2 or less, that has been specifically investigated for its ability to enhance survivability in the room of fire origin, and that is listed for use in the protection of dwelling units.

1-1.2.133 Residual Pressure – The pressure that exists in the distribution system, measured at the residual hydrant at the time the flow readings are taken at the flow hydrants.

1-1.2.134 Risers – Vertical principal pipes. A water supply pipe that extends vertically one full story or more to convey water to branches or to a group of fixtures.

1-1.2.135 Rough-In The installation of all parts of a plumbing system which can be completed prior to the installation of fixtures which includes drainage, water supply, vent piping and all necessary fixture supports. The dimension from the finished wall or floor to center of waste or supply opening, or mounting hoes. Dimension from the finished wall, floor to center of waste, supply opening or mounting holes.

1-1.2.136 Safe Drinking Water Act - Act of 1974 the Federal Government established, through the Environmental Protection Agency (EPA), national standards of safe drinking water.

1-1.2.137 Seat – A part, or surface, upon which the base of something rests. In plumbing, the fixed portion in a valve, usually a smooth surface, to receive the moving stem and thereby accomplishing a seal.

1-1.2.138 Separation (physical disconnection) – removal of pipes, fittings or fixtures that connect a potable water supply to a non-potable system or one of questionable quality.

1-1.2.139 Service Connection – a piping connection between the water purveyor's main and a user system.

1-1.2.140 Shall – The term, when used in a plumbing code has a mandatory meaning. Compare "may" which is permissive rather than mandatory. A mandatory re-

quirement.

1-1.2.141 Should –A term which indicated a feature, or requirement, which is desirable but not mandatory. Indicates a recommended procedure, technique, or requirement.

1-1.2.142 Sprig – A pipe that rises vertically and supplies a single sprinkler.

1-1.2.143 Sprinkler System – For fire protection purposes, an integrated system of underground and overhead piping designed in accordance with fire protection engineering standards. The installation includes one or more automatic water supplies. The portion of the sprinkler system above ground is a network of specially sized or hydraulically designed piping installed in a building, structure, or area, generally overhead, and to which sprinklers are attached in a systematic pattern. The system is usually activated by heat from a fire and discharges water over the fire area.

1-1.2.144 Stand-Alone Fire Protection Systems - A sprinkler system that is completely independent of the domestic potable water piping after the service connection or at a protected connection within the dwelling or system, commonly at the water meter.

1-1.2.145 Standard – A document, the main text of which contains only mandatory provisions using the word "shall" to indicate requirements and which is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Non-mandatory provisions shall be located in an appendix or annex, footnote, or fine-print note and are not to be considered a part of the requirements of a standard.

1-1.2.146 Static Pressure – The pressure that exists at a given point under normal distribution system conditions measured at the residual hydrant with no hydrants flowing.

1-1.2.147 Stem – a part which moves up and down, thereby, producing opening and closing and which often has other parts attached to it.

1-1.2.148 Submerged Inlet – In water supply, the opening of an inlet pipe, faucet or valve below the flood level rim of a receptacle. In waste systems, the terminal end of the discharge pipe from a fixture to a device in a drainage system.

1-1.2.149 Superior Pressure – see back pressure.

1-1.2.150 Supervisory Device – A device arranged to supervise the operative condition of automatic sprinkler systems.

1-1.2.151 Supply Pressure – The pressure within the supply (e.g., city or private supply water source).

1-1.2.152 System Pressure – The pressure within the system (e.g., above the control valve).

1-1.2.153 System Riser – The above ground horizontal or vertical pipe between the water supply and the mains (cross or feed) that contains a control valve (either directly or within its supply pipe) and a waterflow alarm device.

1-1.2.154 System Working Pressure – The maximum anticipated static (non-flowing) or flowing pressure applied to sprinkler system components exclusive of surge pressures.

1-1.2.155 Test Cock – an appurtenance used on an assembly or valve when testing the assembly.

1-1.2.156 Thermal Barrier – A material that will limit the average temperature rise of the unexposed surface to not more than 250°F (121°C) after 15 minutes of fire exposure, which complies with the standard time-temperature curve of NFPA 251, *Standard Methods of Tests of Fire Resistance of Building Construction and Materials*.

1-1.2.157 Thermal Expansion - The increase in volume of water when its temperature is increased, or decreased, from 39.10F or 3.80C. The increase of pressure in a closed system due to the heating and expanding of water.

1-1.2.158 Toggle Joint – two arms which are connected together at their inner ends and connected to something else at their outer ends.

1-1.2.159 Toxic – A substance which is poisonous and capable of causing injury or death. A toxin may be ingested, inhaled or absorbed through the skin. A substance which has not been approved for human consumption by the health agency having jurisdiction.

1-1.2.160 Unobstructed Construction – Construction where beams, trusses, or other members do not impede heat flow or water distribution in a manner that materially affects the ability of sprinklers to control or suppress a fire. Unobstructed construction has horizontal structural members that are not solid, where the openings are at least 70 percent of the cross-section area and the depth of the member does not exceed the least dimension of the openings, or all construction types where the spacing of structural members exceeds 7 ft. (2.3 m) on center.

1-1.2.161 Unprotected Cross-Connection – A cross connection between a potable and non-potable system where inadequate methods are provided to prevent backflow.

1-1.2.162 Vacuum – pressure below atmospheric pressure. A condition induced by negative (subatmospheric) pressure that causes backsiphonage to occur.

1-1.2.163 Vacuum Breaker – A device to prevent the creation, or formation, of a vacuum by admitting air at atmospheric pressure and used to prevent backsiphonage.

1-1.2.164 Valve - A device by which the flow may be started, stopped, or regulated by a moveable part which opens, or obstructs, the passage. A type of lawn faucet.

1-1.2.165 Water - The liquid that descends from the clouds as rain; forms streams, lakes and seas; issues from the ground in springs, and is a major constituent of all living matter and, when pure, consists of an oxide of hydrogen H_2O), in the proportion of two atoms of hydrogen to one atom of oxygen. It is an odorless, tasteless, very slightly compressible liquid which appears bluish in thick layers. Freezes at 32 °F (0 °C) and boils at 212 °F (100 °C). Has a maximum density at 39.2 °F (4 °C), and a high specific heat, contains very small equal concentrations of hydrogen ions and hydroxide ions, reacts neutrally and constitutes a poor conductor of electricity, a good ionizing agent.

1-1.2.166 Water Purveyor - Any agency charged with the delivery, distribution and protection of potable water to the consumer. The municipal water department, water board, public service district or other administrative authority invested with the authority and responsibility for the implementation of a cross connection control program and for the enforcement of the provisions of the ordinance.

1-1.2.167 Water Spray – The use of water in a form having a predetermined pattern, particle size, velocity, and density discharged from specially designed nozzles or devices. Water spray fixed systems are usually applied to special fire protection problems, since the protection can be specifically designed to provide for fire control, extinguishment, or exposure protection. Water spray fixed systems shall be permitted to be independent of, or supplementary to, other forms of protection.

1-1.2.168 Water Supplier – The public/private owner or operator of a potable water distribution system that supplies water to consumers in compliance with the requirements of the Safe Drinking Water Act (SDWA). An organization that is engaged in producing and/or distributing potable water.

1-1.2.169 Water Supply – The sources of water for public, or private, use. The furnishing of a good, potable water under pressure for domestic, commercial, industrial and public service and an adequate quantity of water under pressure for fire fighting.

1-1.2.170 Waterborne Disease – any disease that is primarily transmitted through water (for example – typhoid, cholera, giardiasis).

1-1.2.171 Waterflow Alarm – A sounding device activated by a waterflow detector or alarm check valve.

1-1.2.172 Waterflow Detector – An electric signaling indicator or alarm check valve actuated by waterflow in one direction only.

1-1.2.173 Wet Pipe Sprinkler System – A sprinkler system employing automatic sprinklers attached to a piping system containing water and connected to a water supply so that water discharges immediately from sprinklers opened by heat from a fire.

1-1.2.174 Working Pressure - The maximum pressure in a water piping system or its appurtenances allowable under normal working conditions (i.e.: the maximum pressure a storage tank can be subjected to under normal working conditions).

Plumbing-Based Residential Fire Protection Systems Installers for One- and Two-Family Dwellings

10-1.1 Scope

This standard applies to an individual who provides layout, detail, and calculations for plumbing-based residential fire protection systems for one- and two-family dwellings, and installs such systems. The standard shall not apply to the installation of stand-alone fire protection systems.

10-1.2 Purpose

The purpose of this standard is to provide minimum performance criteria, identified by industry consensus, for Plumbing-Based Fire Protection Systems Installers ("herein referred to as the "Installer"), to assure compliance with the referenced standards in Section 10-1.4.

10-1.3 Limitations

This standard applies to Installers only. Compliance with this standard in itself shall not constitute compliance with the requirements for a Plumbing-Based Fire Protection Systems Inspector. For requirements for Inspectors, see ASSE Standard 7020.

10-1.3.1 This standard shall apply to systems such as those identified in NFPA 13-D and other internationally recognized codes.

10-1.4 Reference and Industry Standards and Codes

The Reference and Industry Standards listed in ASSE Standard 7001 are a part of this standard.

10-2.1 General Knowledge

10-2.1.1 The Installer shall be able to identify and demonstrate knowledge of the applicable laws, codes, rules, listing agencies, and regulations from the federal, state and local levels pertaining to plumbing systems and plumbing-based fire protection systems.

10-2.1.2 The Installer shall be able to identify the proper procedures to notify all of the Authorities Having Jurisdiction (AHJ).

10-2.1.3 The Installer shall be able to demonstrate a knowledge of the following concepts:

- Acceptance Testing (Rough-in and Final Inspections)
- Anti-Freeze Systems [3] (add footnote stating: "This is for informational purposes only; and shall not be installed as part of a plumbing-based fire suppression system."
- Area of Coverage / Target Area
- Backflow Protection
- Clearances
- Compartments
- Dry Systems [3] (add footnote stating: "This is for informational purposes only; and shall not be installed as part of a plumbing-based fire suppression system."
  Dry Type Sprinklers
- Elevation Losses and Friction Losses
- Fire Dynamics and Heat Transfer
- Flow and Pressure Demands
- Inspection Testing and Maintenance
- Internationally recognized model codes
- Life Safety Protection
- Multi-Family Dwelling
- Multi-Purpose System
- NFPA 13
- NFPA 13-D
- NFPA 13-R [3] (add footnote stating: "This is for informational purposes only; and shall not be installed as part of a plumbing-based fire suppression system."
- One- and Two-Family Dwelling
- Pipe Configurations (Tree, Branch, Loop, Network, Combination)
- Plumbing-Based Fire Protection System
- Quick Response Sprinklers
- Residential Sprinklers
- Types of Sprinklers (recessed, concealed, sidewall, pendant, upright)
- Wet Systems