

SPECIAL REPORT:

Shower Valve Safety

SCALDING RISK

LEGIONELLA

AGING POPULATION

HIDDEN COSTS

CODES & STANDARDS

The Rising Need for

Advanced Shower Valve Technology

- Scalding Now a Healthcare Worry
- Legionella Cases on the Rise
- Aging Population Safety Issues
- Hidden Costs of Status Quo
- ASSE 1016 Update

Foreward



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Much of the information in this report was prepared in response to specifying engineers, healthcare facility managers, and an increasing number of inquiries from institutional and commercial facility managers who are concerned about shower valve safety. Powers welcomes any and all comments or questions regarding the content of this report.

Comments or Questions?

Please call 1-800-669-5430 x6207
Or email: info@powerscontrols.com

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Scalding Risk



More than 112,000 individuals are admitted into hospital emergency rooms each year for scald-related injuries.

— **American Hospital Association**

Medical statistics reveal that scald burns caused by hot water, flowing into the tub or shower, is the leading cause of severe burn injuries in the United States. Scalding cases have become so common in fact, that many hospitals have invested in scald victim treatment rooms.

Why Are Scalding Incidents Rising?

In 2001, an estimated 99,400 children were treated in hospital emergency rooms for burn related injuries. Of these, over 27,000 were scald burns.

— National Safe Kids Campaign

Children under the age of five, the elderly, and people with mental and physical disabilities are more susceptible to scald burns. However, while higher birth and aging trends have brought more incidents of scalding into the healthcare, public and legal arenas, the risk of scalding has long existed for several reasons.

- Plumbing that is lacking temperature control devices
- Improper plumbing maintenance or lack of maintenance
- Bathing of patients with delicate healing tissue concerns
- Inattentive bathing care of the elderly
- Unattended bathing of children, the handicapped, and the elderly (those with diminished or undeveloped mental and physical capacities)

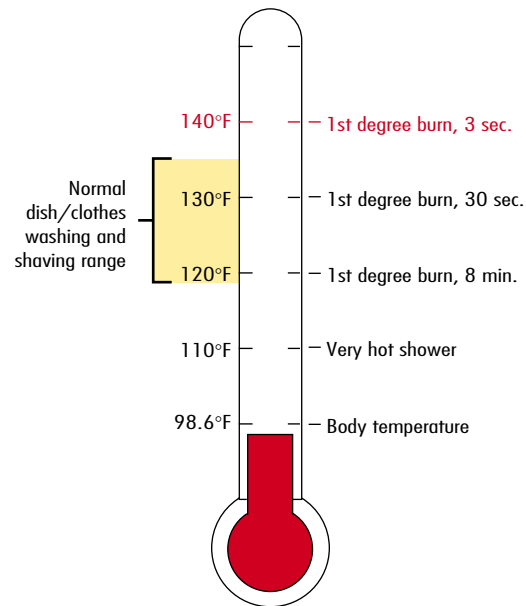
Causes of Temperature Change within a Plumbing System

- Seasonal temperature changes in water supply
- Authorized or unauthorized adjustment of upstream master tempering valve
- Failure of upstream tempering valve
- System pressure fluctuations, i.e. changing demand
- Boiler/hot water heater malfunction
- Improper valve selection (oversized) and/or hot water recirculation design

Thermal Shock is Another Danger

Thermal shock is the physical reaction of a person to a rapid and uncomfortable change in shower water temperature. The temperature change can be either toward colder or hotter water. The danger of thermal shock is that the individual's sudden movement away from the water coming from the shower could cause a fall and serious injury.

Effects of Water Temperature



Manufacturer Warnings / Forewarnings

For years, shower valve manufacturers have included scalding warnings in the installation manuals that come with their pressure-only compensating shower valves. These “pressure balancing” shower valves have remained the prevailing valve choice, largely due to their relatively lower cost to facility owners and long time familiarity among plumbing contractors. See page 7 of this report for additional information about improved shower valve options.

Legionella on the Rise



The CDC has estimated that the disease infects 10,000 to 15,000 persons annually in the US. OSHA estimates that over 25,000 cases of the illness occur each year, causing more than 4,000 deaths (CDC estimates 30% who contract will die), still others estimate as many as 100,000 annual cases...and between 2002 and 2003, the disease has doubled or tripled in some regions of the country.

— Association of Water Technologies *Legionella 2003, June, 2003*

Bacteria Thrives in Water 68-122° F

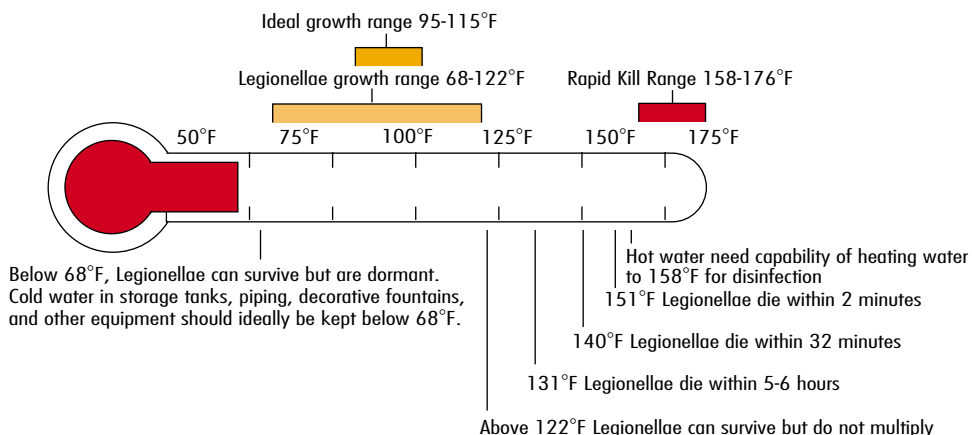
Legionella is a type of pneumonia caused by Legionella, a bacterium found primarily in warm water environments. The disease can be contracted by inhaling airborne water droplets containing the bacterium.

Legionella thrive within a narrow water temperature range of 68–122°F. Therein lies both the problem and the solution: To control the disease, facilities need to control the temperature of the water in their storage and delivery systems.

Unless specifically targeted, many cases of Legionella are misdiagnosed as pneumonia because of symptom similarities. Even if detected, Legionella often goes unreported to public health authorities if incidences are low or are not associated with an outbreak investigation.

Of the many hundreds of thousands of pneumonia cases that occur each year in the United States, some 10,000 to 100,000 are actually cases of Legionnaires' disease.

Effects of Water Temperature



Control of Water Temperature is Critical

OSHA, ASHRAE, the CDC and other authorities have all published recommendations to control Legionella. In every case, these authorities point to the water delivery system as being critical. OSHA recommends that domestic hot water should be stored at a minimum of 140°F and delivered at a minimum of 122°F to all outlets to minimize the growth of Legionella.

In their latest guidelines for bacteria control and Legionella risk reduction, both the CDC and ASHRAE recommend hot water

recirculation at a minimum of 124°F (51°C) and installing temperature control valves at the point-of-use to reduce scalding risk.

This health concern magnifies the importance of using a water delivery valve that is not of a pressure-only design, but is thermostatic or a combination of each to prevent scalding.



Our Aging Population



The number of US citizens aged 65 and older will reach 70.18 million by 2030. This represents the highest ever, a full 20% of the population.

— Source: U.S. Census Bureau

New High Risk of Scalding Injuries

By 2050, the U.S. Census Bureau estimates our senior population will grow to in excess of 80 million, more than double its current size. Add to this the percentage of young children, and the total population most at-risk to scalding injuries will exceed 75%.

- Elderly people lose the ability to respond quickly
- Injuries occur due to falling when reacting suddenly to thermal shock
- Momentary exposure to excessively hot water can result in 2nd or 3rd degree burns
- Related incidents of scalding will increase with the aging population
- Increased scalding injuries will result in increased litigation
- The baby-boomer population will drive scald prevention legislation

Population Growth Chart (in millions)

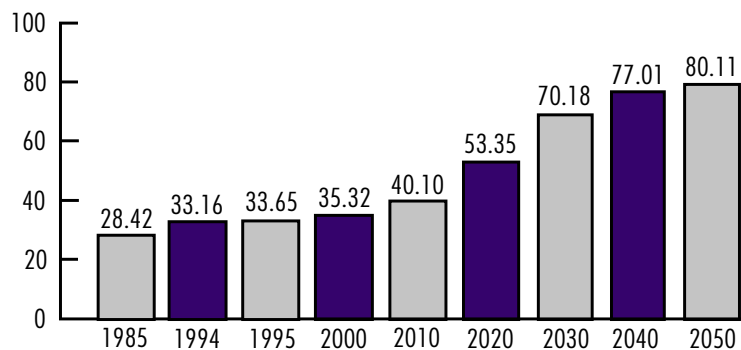


Table 1 - Population ages 65 Years and Over: 1985-2050
(Source: US Census Bureau)

A Painful Lesson Learned

Hospital patients, those with disabilities or in physical rehabilitation, and most people within nursing facilities are known to have delayed reactions to a sudden rise in water temperature. Pain is the body's means of protecting itself. Yet illness or medication, as well as the delayed reactions of the elderly, can all affect the pain warning mechanism. For this reason, the aging population is exponentially exposing more people to the risk of severe tissue damage, burns, and death.

Healthcare Facilities Finding the Cure

The healthcare industry has been the first to evaluate an apparent Catch-22 dilemma. Decreasing hot water temperature in a delivery system reduces the danger of scalding, but increases the risk of bacteria growth. Increase the hot water temperature and just the opposite risks occur. Now add to this the need for energy conservation and the common practice of reducing thermostat settings for water heaters...and the conclusion to all of this has revealed itself: Past methods of water delivery are no longer adequate.

Hidden Costs



“WARNING: Failure to adjust the limit stop screw properly may result in serious scalding.”

“CAUTION: This valve does not automatically adjust for inlet temperature changes, therefore someone must make the necessary Rotational Limit Stop adjustments at the time of the installation and further adjustments may be necessary due to seasonal water temperature change. **YOU MUST inform the owner!”**

“CAUTION: Due to season temperature change of the cold water supply, the temperature limit must be readjusted accordingly to maintain the desired maximum discharge temperature.”

— **Leading Manufacturers of Pressure Balancing Type Shower Valves**

Old Problem Under New Scrutiny

To prevent a person from drawing water that is dangerously hot, pressure balancing valves come with a limit stop that needs to be installed and adjusted seasonally to allow for cold water temperature changes flowing into the water system.

For decades, this limitation in pressure valve design has prevailed despite the manufacturer warnings and cautions.

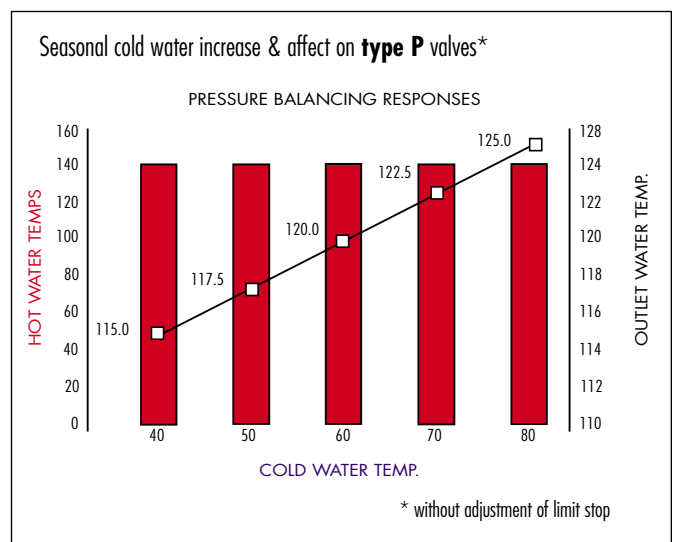
As early as the 1980's, the Consumer Product Safety Commission warned of the need to set the temperature-limiting devices on pressure balancing type shower valves. In a June 1984 report, the Commission reported it was aware of 12 incidents, including 4 deaths, associated with a single brand of pressure balancing shower valve. And yet, today, pressure balancing type shower valves continue to be specified at the risk of being improperly installed and without seasonal adjustment in motels, hotels, apartments, nursing homes, institutional care facilities and athletic facilities.

Anticipating a rise in litigation related to scalding injuries, specifiers, installers, and facility managers now have an additional potential cost to consider when installing pressure type shower valves — a cost that can be significantly higher than the proper installation of limit stops and perennial limit stop adjustments.

Limit Stops Are Rarely Adjusted

Common sense and common practice are two different things. While manufacturers have long warned facility managers to routinely and seasonally set the limit the stop on all of their shower valves, the cost and aggravation of doing so defies common practice. Take for example, a 500-room facility. With twice-annual seasonal adjustments, and allowing just 10 minutes per valve, and at an hourly rate of \$25 per hour, the annual cost for setting the limit stops would be \$4,166.

Seasonal Cold Water Adjustments



A Higher Standard

The American Society of Sanitary Engineers (ASSE), with its membership of shower safety valve manufacturers, has authored performance standards that govern water safety valves. ASSE 1016 governs point-of-use shower valves...



ASSE recognizes three basic types of bath and shower valves...

- Type P – Pressure balancing valves for pressure regulation
- Type T – Temperature valves for temp and some pressure regulation
- Type T/P – Both temperature and pressure regulating valves

The Limits of Pressure Balancing Valves – Type P

While pressure-balancing valves will compensate for pressure fluctuations within a plumbing system, these types of valves cannot make adjustments for sudden or gradual changes in supply temperature. If hot water supply line temperature unexpectedly increases to a dangerous level while inlet water pressure remains constant, the pressure balancing valve will continue to pass water but at a dramatically increased temperature.

- Pressure balancing valves react to water pressure changes only. They are not designed to sense temperature changes and so do not provide true temperature regulation.
- Pressure balancing valves can provide some level of protection against scalding — when limit stops are adjusted seasonally.
- Pressure balancing valves do not provide complete protection when coupled with upstream thermostatic valves (master mixers) in the event of a valve failure.

“WARNING: This shower system may not protect the user from scalding when there is a failure of other temperature controlling devices elsewhere in the plumbing system.”

— *Leading Shower Valve Manufacturer*

The Limits of Common Thermostatic Valves – Type T

- Handle only 20% pressure fluctuations, not 50%
- Very expensive, 3 to 4 times that of pressure balancing

Type T/P Valves Prevent Problems

Also known as combination valves, Type T/P valves are required to meet ASSE 1016’s most stringent performance requirements for both temperature and pressure changes.

Type T/P valves allow water to be generated at higher temperatures, distributed at higher temperatures, and delivered at safe temperatures to the bather — alleviating the risks of scalding and the growth of Legionella bacteria in a water delivery system.

In addition, Type T/P valves require no seasonal adjustment of the limit stop, saving potentially thousands of dollars over the life of a system.

Valve Type	Protection Provided per ASSE 1016	
Point-of-use	Hot Water temperature increases	Supply pressure fluctuations up to 50%
-Type P- Pressure Balance	NO	YES
-Type T- Thermostatic	YES	NO
-Type T/P- Combination	YES	YES

Other ASSE Standards

ASSE 1017 Hot water distribution (Powers e430, 1430 series)

ASSE 1070* Water tempering at sinks and lavatories (Powers model e480)

ASSE 1069* Water tempering to gang or multiple showers (Powers model e427/e428)

ASSE 1062 Temperature activated, flow reduction valves (Powers model HT115)

*under development

ASSE 1016 T/P Technology

Total Protection is Now Affordable

Powers has developed the first affordable type T/P shower valve to minimize the risk against scalding, Legionella, and the elimination of labor costs associated with pressure balancing valve limit stop adjustments.

The e700 features an improved valve design and actuation technology, and is priced competitively with less protective Type P and T valves.

Originally developed for healthcare facilities, the e700 valve is now being widely specified for institutional, commercial, lodging, sports and recreational facilities to provide the highest ASSE 1016 rated solution. Powers has also introduced the first T/P valve for lavatory tempering as well, the e480 for total bathroom protection.



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