



MEETING THE OSHA SAFETY CHALLENGE IN A METAL MANUFACTURING FACILITY:

How Jason Desler – an Environmental Health and Safety Engineer – met the OSHA standard with an ANSI Z358.1 compliant tankless water heating solution, and saved his company \$349,000 annually in reduced energy costs

About Keltech Tankless Water Heaters

Keltech, Inc. provides electric tankless water heaters for safety shower systems and emergency eyewash solutions that protect workers at risk from chemical injury. Keltech tankless water heaters include patented tepid water control processes that:

- Reach tepid water temperatures quickly
- Provide injured workers with an unlimited supply of tepid water (up to 40 gallons per minute), exceeding the ANSI Z358.1 15 minute drenching standard

About Jason Desler and the Metal Manufacturing Process

Jason Desler is an Environmental Health and Safety Engineer for one of the world's largest manufacturers of specialty metals and chemicals. Extensive industry experience has provided Mr. Desler with a diverse knowledge base of the metal manufacturing process and the potential hazards it presents to employees.

Caustic chemicals, extreme furnace heat, and highly corrosive gases are a necessary part of the metal manufacturing process and pose a serious challenge. Strict safety standards must be followed. As a health, safety and environmental engineer, Mr. Desler strives to provide employees with protection that meets or exceeds OSHA standards (29CFR1910.151) and corporate expectations.



➤ DESIGN

➤ ENGINEERING

➤ VALUE



Industry Served

Metal Manufacturing. The finished products are used in a variety of industries including:

- Energy production
- Chemical and mineral processing
- Aerospace
- Medical
- Research and consumer products

Project type

Providing safety shower and emergency eyewash solutions for multiple metal manufacturing facilities in hazardous and extreme industrial environments.

Challenges

- **Remote Location**
The plant's remote location makes safety of paramount importance. Situated 70 miles from the nearest emergent care facility, the necessity for strict safety protocols and incident response equipment is critical. To protect plant workers, Mr. Desler depends on engineering controls such as safety equipment, and administrative controls such as advanced first aid training to prevent and quickly address on site accidents.
- **Large Scope and Scale of the Project**
The scope and scale of the project poses power and water distribution challenges as well as utility cost concerns:
 - 13 structures spread over 180 acres of desert
 - Safety shower and eyewash fixtures every 45 - 55 ft throughout the various facilities
 - Providing a continuous supply of tepid water on demand to over 100 specified fixtures
- **Extreme Environmental Conditions**
Safety shower performance is affected by the high desert environment where ambient

temperature conditions range from sub-zero to well above tepid water standards.

- **Initial Investment and Utility Costs**
The solution must provide an energy efficient and cost effective solution without the compromise of worker safety.

Applicable Standard Summary OSHA 29CFR1910.151

Safety Standard regarding Exposure to Injurious Corrosive Materials

Employers must provide suitable facilities for quick drenching or flushing of the eyes and body when employees may be exposed to injurious corrosive materials.

ANSI Z358.1 Safety Standard regarding Supply and Flow of Tepid Water

Section 4.1 of ANSI Z358.1 specifies that emergency shower heads shall be capable of delivering tepid water at a minimum of 75.7 liters per minute (20 GPM (76 L/min)) of flushing fluid to the user for a minimum 15 minute period.

Solution

Keltech's engineers carefully evaluated the project requirements and challenges with Mr. Desler. Throughout this collaborative process, shower and eyewash fixture specifications were paired with a variety of Keltech CLE (emergency eyewash) and SN (safety shower) heaters. Standard options were added as needed to meet location and environmental particulars within and outside the manufacturing facilities. Keltech provided over 116 safety shower and emergency eyewash heaters, fixtures, and integrated systems. Employees have access to a safety shower system or emergency eyewash station every 45 - 55 feet throughout the 13 facilities and surrounding environment.



Key Project Attributes Addressed:

Compliance with Safety Standards

Keltech's solution complied with OSHA standards and exceeded ANSI requirements as well as other industry and company standards. Keltech SN series safety shower heaters and CLE series emergency eyewash heaters rapidly heat water safely to the ANSI standard and provide an unlimited and continuous supply of tepid water (80 °F (62 °C)).

In the event of a chemical injury, Keltech tepid water solutions act as a primary source of first aid treatment for incident victims. In such cases, a continuous flow of tepid water is critical to worker safety as comfort plays a key roll in compliance with 15 minute drench requirements. Engineered temperature controls provide a precise and stable tepid water source, insuring compliance with safety standards.

Additional Product Safety Features:

- ETL/cETL Listed
- Conforms to UL and CSA standards
- Incoloy 800 sheathed heating elements
- Externally mounted emergency stop button
- Safety only circuits ensure water temperatures do not exceed ANSI standards for tepid water

Performance in a Hazardous Environment

Keltech CLE and SN Series heaters are equipped with NEMA 4 enclosures to meet the challenge of operating in a hazardous environment that included corrosive chemicals (e.g. hydrochloric acid). NEMA 4 enclosures keep out water, snow and ice, windblown dust and other airborne contaminants from internal components and protect the unit from corrosion and premature failure.

Performance in Extreme Temperatures

Keltech's solution considered the varying temperature extremes that many of the units would face. To overcome these adverse conditions, some heaters were engineered to include optional freeze protection packages to perform as needed in sub-zero temperatures as low as -23 °F (-31 °C) with a constant 11 mph wind. To maintain the proper tepid water range regardless of the ambient temperature, patented internal controls monitor conditions within the unit and purge water exceeding tepid standards from the supply system as conditions dictate.

Energy Savings and Lower Operating Costs

The cost benefit analysis was conclusive. Based on an electricity cost of ten cents per kilowatt/hour and a weekly compliance test of 69 safety systems (showers, eyewash, and face-wash), an alternative closed-loop hot water supply system with mixing valves could cost over \$352,000 annually to operate. Due to their on-demand nature of energy consumption, Keltech's tankless water heating solution would cost only \$2,300 annually.

Keltech tankless water heaters have a built-in energy advantage over boilers and mixing valves. Boilers must maintain system temperatures 24/7/365 regardless if the supply is ever drawn. By comparison, Keltech tankless water heaters only heat water when needed. The minimal operational costs incurred for the Keltech tankless heaters are derived from mandated weekly functional tests and any emergency use.*



Keltech tankless water heating solution provided an immediate return on investment through lower operating costs. Keltech safety shower and emergency eyewash heaters are projected to save Mr. Desler's employer over \$349,000 per year in energy costs alone.

Results

Keltech safety shower and emergency eyewash heaters provided a tepid water solution that met a compliance challenge and provided an immediate return on investment through lower operating costs. Mr. Desler provided workers with an exemplary level of safety equipment that meets OSHA standards and corporate expectations. The organization also realized tremendous operational savings without sacrificing employee safety.

** Keltech's optional freeze protection package includes a thermostatically controlled heating device within the insulated enclosure that consumes a small amount of energy when activated.*

Customer Feedback

"We specified Keltech safety shower and emergency eyewash heaters for a lot of reasons:

- Minimal cost to operate for the safety value provided*
- Price per unit*
- Delivery availability and flexibility*
- Cost-benefit analysis versus a hot water loop system*
- Potential energy tax benefits*
- Customer service availability and support*
- Engineering support during our plant design*

These were all value-added tasks that didn't cost my company anything, but all-the-while provided a substantial element of efficiency, comfort, and a well thought-out plant wide tepid water safety shower system."

*– Jason Desler
Health/Safety/Environmental Engineer*



Keltech CLE Series for safety eye/face wash applications



Keltech SN Series for safety shower applications