Sloan Sensor Faucets and Best Practices for Thermal Disinfection

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Presenters

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Agenda

- Why are we talking about disinfection?
- Guidance and Applicable Standards
- Thermal vs Chemical Disinfection
- Thermal Disinfection and Sloan Sensor Faucets – Best Practices
- Summary
- Q&A

We will not be covering:

- Disinfection of other commercial restroom or building products
- Disinfection of Public water treatment systems
- Chemical Disinfection Procedures (in the interest of time)

Disclaimer

1. This presentation is an educational overview, not an authoritative reference.
2. Use the links we provide to access official guidance and standards from competent authorities like the CDC, EPA, VHA, and others.

Why Are We Talking About Disinfection?

- Many facilities closed or under-utilized for up to 1 year or more due to COVID-19
- 151,000+ different public water systems
- 5.6 million buildings (480,600 licensed plumbers, 12:1 ratio)
- 87 billion square feet (8.1 billion square meters)
- 102 primary and secondary contaminants
- There is no standard “checklist” for re-commissioning facilities
- No comprehensive study has ever been done to understand the impact of prolonged closure upon building water supplies

What Happens to Water in Unoccupied Buildings?

- Disinfectant loss
- Metals corrosion
- Sediment collection
- Biofilm growth

Disinfectant Loss

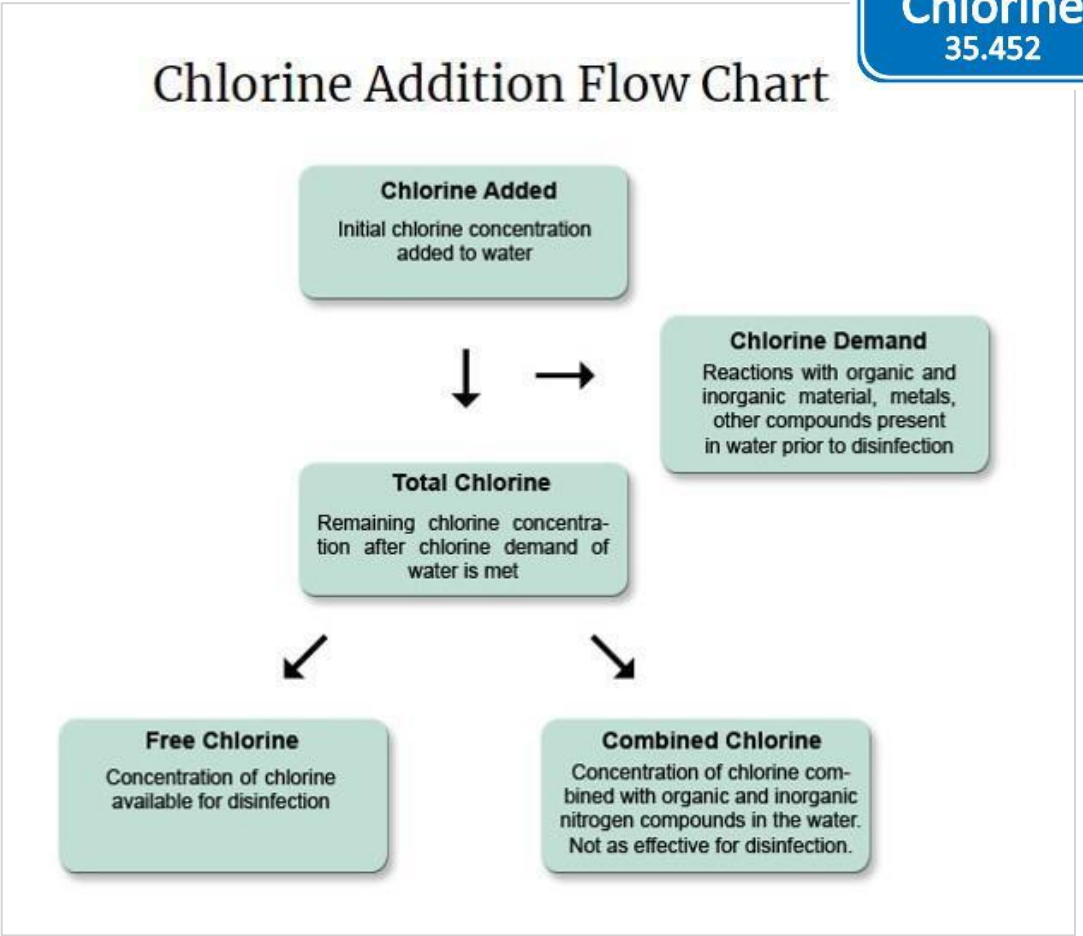
Chlorine is the primary disinfectant

Unstable – reacts with contaminants, diminishes over time

4.0 to 1.0 ppm (parts per million) Free Chlorine desired (4.0 to 1.0 mg/L)

Est. time to diminish from 4.0 to 0.5 ppm:

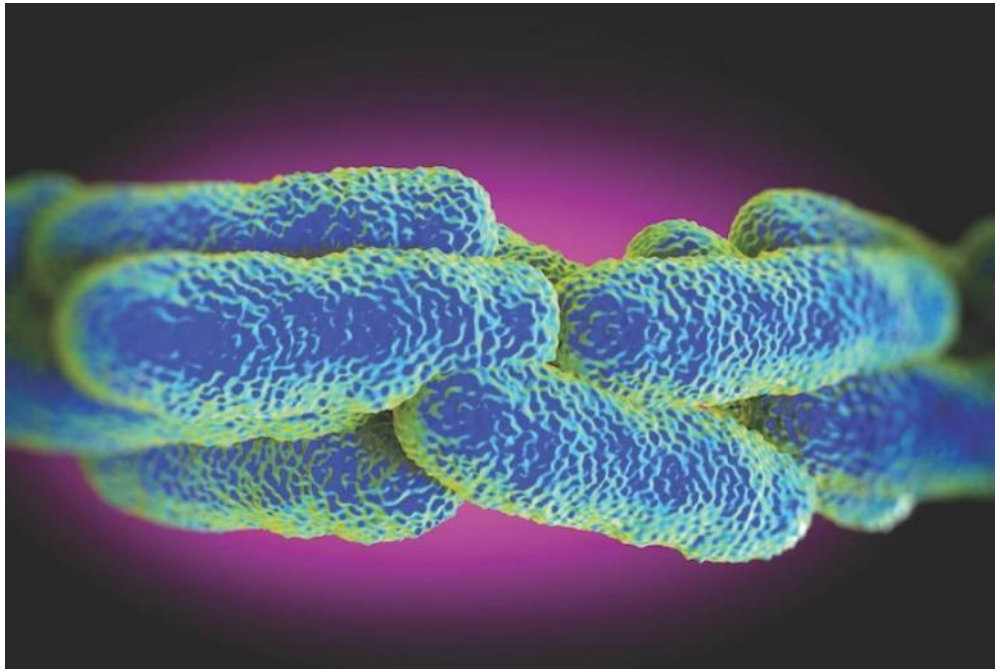
- Galvanized piping systems – 1.5 days
- Unlined cast iron systems – 4.5 days
- PVS or lined cast iron systems – 10 to 14 days



Source: US Centers for Disease Control

Consequences of Disinfectant Loss

- **OPPPs (Opportunistic Premise Plumbing Pathogens)**
  - Legionella pneumophila
  - Pseudomonas Aeruginosa
  - Mycobacterium avium
- Legionella is the cause of Legionnaires Disease.
- 8,000 – 18,000 people are hospitalized every year in the USA
- Exposure occurs when people inhale water droplets containing the bacteria (aerosols)
- Individuals at risk include
  - persons 50 years or older
  - current or former smokers
  - persons with chronic lung disease
  - immuno-compromised individuals
  - mortality is 1 in 10



Legionella pneumophila Source: Water Conditiioning and Purification Magazine

Metals Corrosion

Lead is the main concern

Stable scale can become unstable during stagnation

0.5 ppb (0.5 ug/L) is the USEPA Maximum Contaminant Limit (MCL)

- Dwell time
- Lack of inhibitors (phosphates or silicates)
- Changes to pH/alkalinity

Sediment Collection and Biofilm Growth

Increased chlorine demand

- Reduces free chlorine available for disinfection

Blocks key components

- Can prevent proper function, flow and flushing

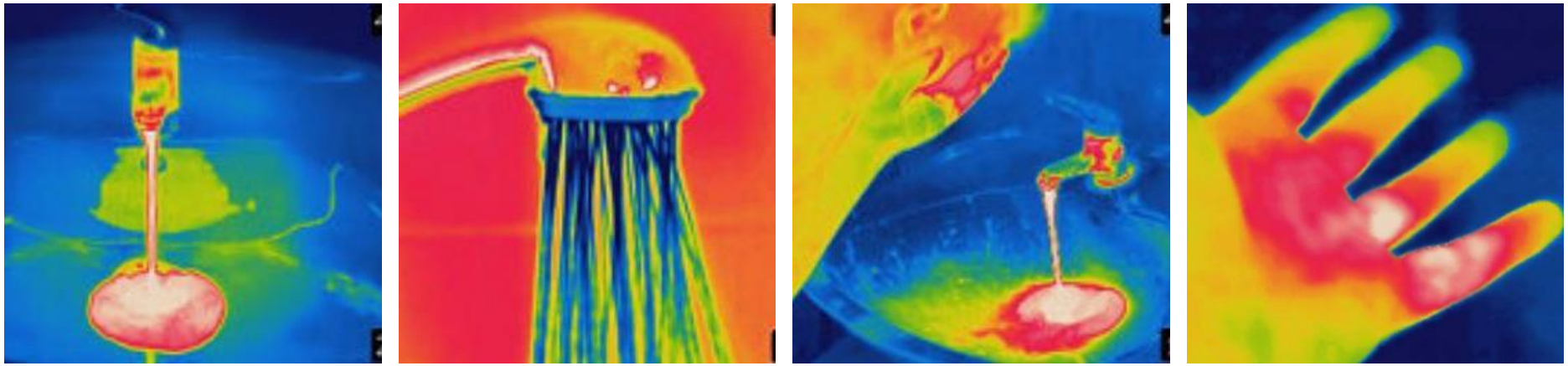
Easier to prevent than to control

- Flushing water regardless of occupancy can maintain chlorine residual

Source: Aquarius Water Conditioning

Source: Pharmig

Thermal vs Chemical Disinfection



Note: Disinfection procedures for regular maintenance and those to mitigate actual contamination may differ.

Characteristics of Thermal Disinfection

US Veterans Health Administration

Thermal remediation is the temporary resetting of the temperature in the water distribution system to **160°F - 170°F (71°C - 77°C)** while continuously flushing each outlet in the system for at least **30 minutes** (also known as “super heat and flush" and “thermal eradication”) to remediate the system.

https://www.va.gov/vhapublications/ViewPublication.asp?pub_ID=9181

US Environmental Protection Agency

The superheat-and-flush disinfection method involves raising the water temperature in the hot water heater sufficiently high to ensure hot water is delivered to outlets; circulating the hot water through all water outlets, faucets and showerheads; and then flushing with the hot water for a suitable period.

Where emergency remediation is required, raising the temperature of hot water tanks to **71–77 degrees C (160–170 degrees F)** and keeping the water temperature at outlets >65 degrees C (149 degrees F) during flushing are recommended The optimal flush time reported varies from **10 to 30 minutes** depending on the characteristics of the premise plumbing system.

A 30-minute flush, first adopted by Best et al. (1983), is recommended as a good practice.

https://www.epa.gov/sites/production/files/2016-09/documents/legionella_document_master_september_2016_final.pdf

Scalding Risk

The majority of injuries and deaths involving tap water scalds are to:

- The elderly
- Children under the age of 5

Most adults will suffer third-degree (skin and flesh destroying) burns if exposed to:

Temperature	Time
150°F / 66°C	2 seconds
140°F / 60°C	6 seconds
130°F / 54°C	30 seconds
120°F / 49°C	5 minutes

Source: U.S. Consumer Product Safety Commission

Anti-Scald Protection is a UPC and IPC Plumbing Code Requirement

From the 2018 Unified Plumbing Code (UPC)

407.3 Limitation of Hot Water Temperature for Public Lavatories

Hot water delivered from public-use lavatories shall be limited to a maximum temperature of **120 F (49 C)** by a device that complies with ASSE 1070/ASME A112.1070/CSA B125.70. The water heater thermostat shall not be considered a control for meeting this provision.

From 2018 International Plumbing Code (IPC)

419.5 Tempered water for public handwashing facilities

Tempered water shall be delivered from lavatories and group wash fixtures located in public toilet facilities provided for customers, patrons and visitors. Tempered water shall be delivered through an approved water-temperature limiting device that conforms to ASSE 1070/ASME A112.1070 or CSA B125.3

Do not confuse with ASSE 1016, 1017, 1060, or other Mixing Valve Standards

Operational Considerations for Thermal Disinfection (Superheat & Flush)

- Scalding is a significant hazard
- Labor-intensive and time-consuming due to the need to monitor hot water temperature and flushing time
- Only effective when the water temperature at distal outlets reaches the required temperature and the flushing is conducted for the required duration
- Requires considerable energy and manpower resources
- Will not disinfect downstream of thermostatic mixer valves and so is of limited value where such valves are installed
- Flushing multiple outlets simultaneously can save time, but should not exceed the capacity of the water heater and the flow capacity of the system

United States Environmental Protection Agency

Source: USEPA: Technologies for Legionella Control

Operational Considerations for Thermal Disinfection (Superheat & Flush)

- Following a successful Legionella remediation procedure, recolonization of the water system is likely unless the underlying conditions supporting Legionella growth are addressed
- **Thermal shock of water systems is not recommended due to frequent failure and rapid recolonization of Legionella**

Source: US CDC Legionella Control Toolkit

Guidance and Applicable Standards

Building Water System Start-up Guidance

Recovering from COVID-19 Building Closures. AIHA 2020 Guidance Document (Prepared by Indoor Environmental Quality Committee of the American industrial Hygiene Society).

CDC Guidance for Reopening Buildings After Prolonged Shutdown or Reduced Operation

Environmental Science, Policy & Research Institute (ESPRI) and AH Environmental Consultants, Inc., ***Building Water Quality and Coronavirus: Flushing Guidance for Periods of Low or No Use***

Considerations for Large Building Water Quality after Extended Stagnation, Purdue University, June 16, 2020 Caitlin R. Proctor, William J. Rhoads, Tim Keane, Maryam Salehi, Kerry Hamilton, Kelsey J. Pieper, David M. Cwiertny, Michele Prévost, Andrew J. Whelton

REVIEW ARTICLE

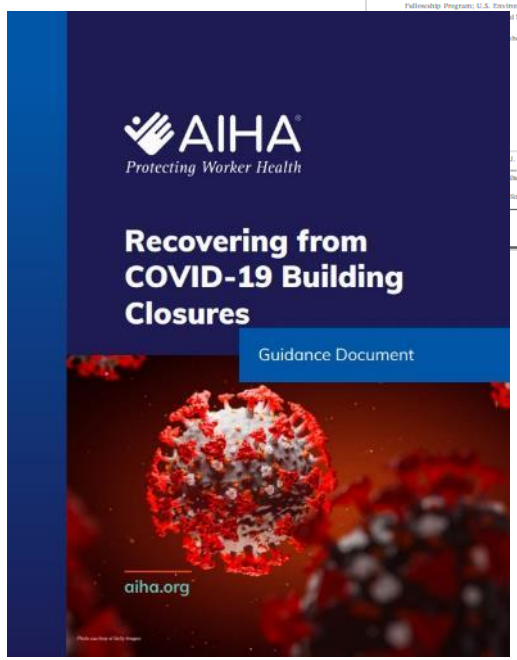
WATER SCIENCE

Considerations for large building water quality after extended stagnation

Caitlin R. Proctor | William J. Rhoads | Tim Keane | Maryam Salehi | Kerry Hamilton | Kelsey J. Pieper | David M. Cwiertny | Michele Prévost | Andrew J. Whelton

Abstract

The unprecedented number of building closures related to the coronavirus disease (COVID-19) pandemic is concerning because water stagnation will occur in many buildings that do not have water management plans in place. Stagnant water can have chemical and microbiological contaminants that pose potential health risks to occupants. Health officials, building owners, utilities, and other entities are rapidly developing guidance to address this issue, but the scope, applicability, and details included in the guidance vary widely. To provide a primer of large building water system preventative and remedial strategies, peer-reviewed, government, industry, and nonprofit literature relevant to water stagnation and decontamination practices for plumbing was synthesized. Preventative practices to help avoid the need for recommissioning (e.g., routine flushing) and specific actions, challenges, and limitations associated with recommissioning were identified and characterized. Considerations for worker and occupant safety were also indicated. The intended audience of this work includes organizations developing guidance.



Safety & Wellness Recommendations

- Updated best practices for workers in a COVID-19 environment can be found on the CDC website HERE
- Worker safety while flushing the buildings plumbing system must be considered. Initial flushes of stagnant water have the potential to release concentrations of chemical and microbiological contaminants. You can find guidance on worker safety for Legionella control and prevention on the OSHA website

Additional Resources

US CDC (Centers for Disease Control)

CDC Guidance for Cleaning and Disinfecting Public Spaces, Workplaces, Businesses, Schools, and Homes:

CDC Toolkit: Developing a Water Management Program to Reduce Legionella Growth and Spread in Buildings

CDC Preventing Legionnaires' Disease: A Training on Legionella Water Management Programs (PreventLD Training)

CDC Coronavirus Disease 2019 - Guidance for Building Water Systems

US Army

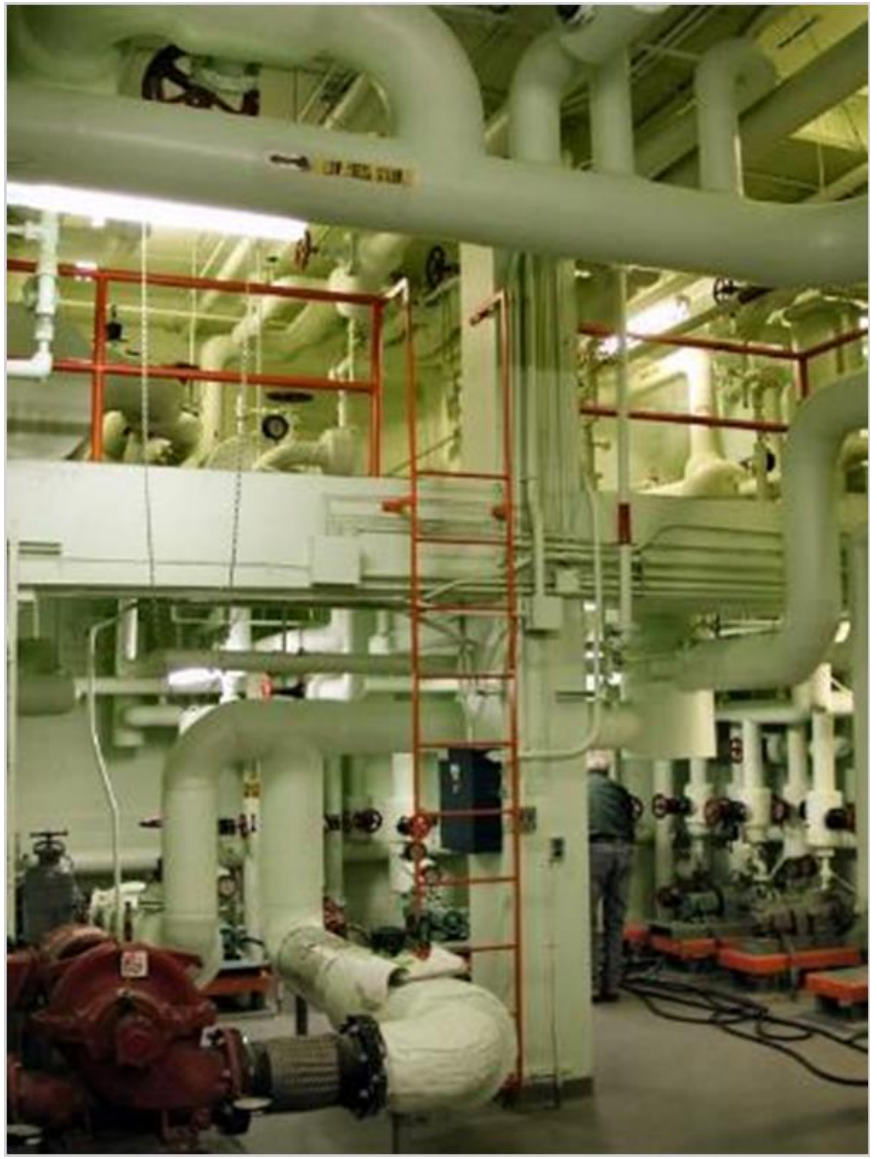
Returning Building Water Systems to Service

US GBC (Green Building Council)

Develop and implement a water quality management plan for the building water system and all devices that use water.

ASHRAE Detroit Chapter

Flushing and Disinfecting Building Water Systems of Unoccupied Buildings.



Thermal Disinfection & Sloan Sensor Faucets – Best Practices

Benefits of Automatic Sensor Faucets

- Touch-free Hygienic Operation
- Programmable Line Flush Capability
- Water Savings

Dr. Anthony Fauci washing his hands in the White House with a Sloan EBF-85 Touch-free Automatic Sensor Faucet

Sloan Faucet Temperature Limits





	SF	ETF	EBF	EAF	EFX
Maximum Sustained Operations Temperature Rating (more than 30 minutes)	160°F (71°C)	160°F (71°C)	160°F (71°C)	176°F (80°C)	176°F (80°C)
Maximum Excursion (Temporary - up to 30 minutes) Disinfection Temperature Rating	176°F (80°C)	176°F (80°C)	176°F (80°C)	176°F (80°C)	176°F (80°C)

All Sloan Automatic Sensor Faucets can accommodate recommended “Superheat and Flush” Thermal Disinfection Requirements of 160°F - 170°F (71°C - 77°C) while continuously flushing each outlet in a system for at least 30 minutes and up to 120 psi (827 kPa)

Prerequisites for Thermal Disinfection of Installed Sloan Sensor Faucets

- System heating and flow capacity must be able to generate the required temperature and water volumes
- The distribution system and connected devices must be able to withstand the required combination of temperature, time, and pressure
- Scald prevention devices must be removed or disabled (Sloan thermostatic mixing valves cannot be disabled)
- Sprayheads should be removed to prevent sediment build-up and be disinfected separately
- Disinfection personnel will need to stand by the units to activate them

Image Courtesy of Plumbing + HVAC (Canada)

Summary

- Sloan Automatic Sensor Faucets are capable of meeting recommended temperature and time requirements for Thermal Disinfection
- Prevention is easier than remediation. Programmable line flushing devices to avoid stagnation during shut-downs are beneficial
- Site variables and operational considerations will dictate whether Thermal Disinfection or Chemical Disinfection is the simpler, easier, and more cost effective solution for you


Questions?

Find your local Sloan representative for more information

Sloan Rep Locator tool

- Local code knowledge
- Familiarity with existing sites
- Product knowledge
- Available for onsite consultation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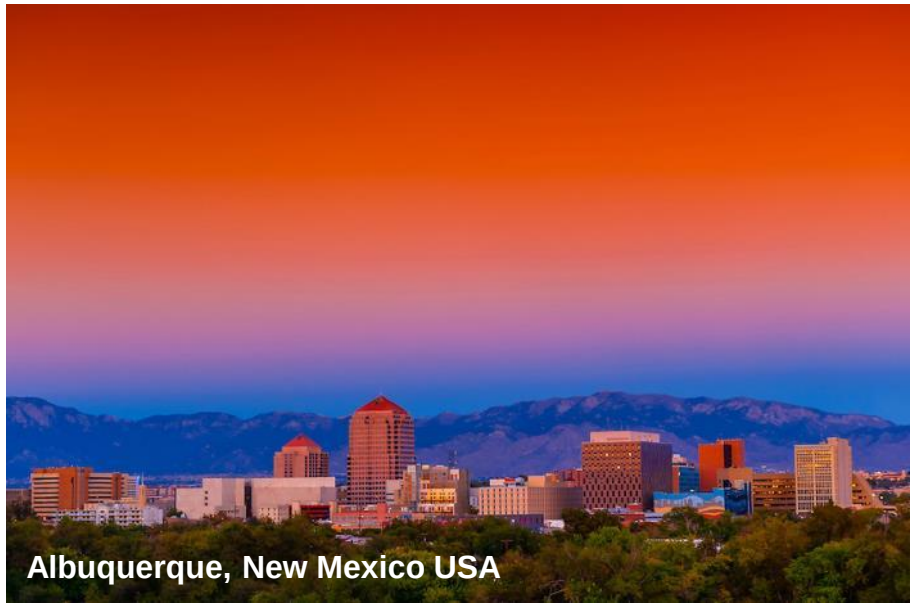
Int'l Balloon Fiesta


El Paso, Texas USA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Training Comments, Questions, or Suggestions?

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