



Thermal Activated Fire Safety Valves

For Natural Gas, Propane & Butane

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Agenda

- Identify the dangers of a gas fed fire
- What is a thermal activated shut-off (TAS)
- Risks associated with gas fed fires
- Features & Benefits of Fire Safety Thermal Shutoffs
- Case Studies
- Types of TAS devices available
- Federal & State Regulations
- Testing & Proposed safety standards
- Risk Analysis & Cost Benefits
- Q&A
- Summary



Goals

- Understand the inherent risks and liabilities associated with customer gas regulators and meters.
- As operators, as required by DIMP regulations, we must evaluate these risks and take actions to eliminate or reduce them.
- All meter sets and customer facilities are NOT equal.
- Technologies are available on the market to reduce or eliminate many of the risks that exist with meter sets.
- When fire impacts your meter set, you want the gas supply shut off before your metering components fail.



Fighting a Gas Fed Fire



https://youtu.be/v-C_ANYkfAU

Effects of a Fire on a Gas Meter

- Gas is typically delivered at high pressure up to / into the structure.
- Regulators constructed of aluminum, rubber, and plastic hold back and control the HP gas.
- Gas shutoff is typically located on riser at metering facility.
- Fires impacting a meter set will cause the regulator to fail open, no longer controlling gas pressure, and large volumes of gas will be released.
- Shut off valve is inaccessible due to fire.
- Gas is now a contributing factor in the fire, the fire departments focus, and all insurance claims.





Solution: Fire Safety Thermal Shutoffs



What these products do: Automatically stops the flow of gas when exposed to the heat of a fire.



How these products work: When exposed to fire and the temperature becomes elevated (165° - 400 F), a thermally designed mechanism will release and close the valve stopping the flow of gas during and after the fire.



Utility Applications: Installed on jurisdictional gas piping in meter set buildups upstream of heat-vulnerable regulator and meter. The FSV shuts off the gas prior to regulator eliminating supply of high-pressure gas and potential for additional loss.

Benefits of Fire Safety Thermal Shutoffs:



A passive safety device protecting jurisdictional gas meter and regulator facilities from the impacts of fire.

Eliminates the potential for the release of high-pressure gas as a secondary source to the fire..

Liability to utility is greatly reduced by eliminating the release of high-pressure gas in the event of a fire. A house fire remains a "house fire" and not a gas fed fire.

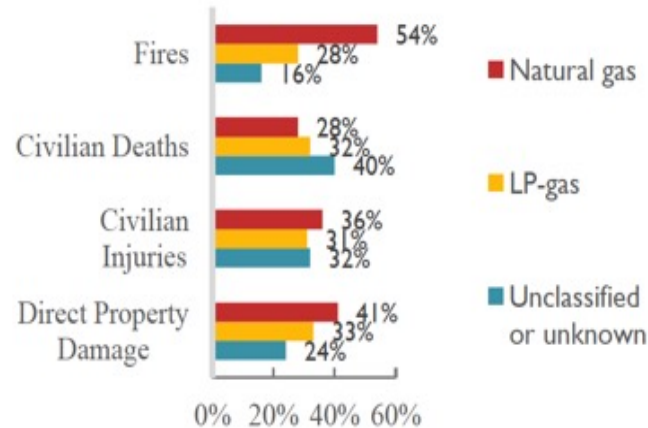
Eliminating the gas fed fire allows first responders to focus on people and property involved in the fire, as well as their own safety



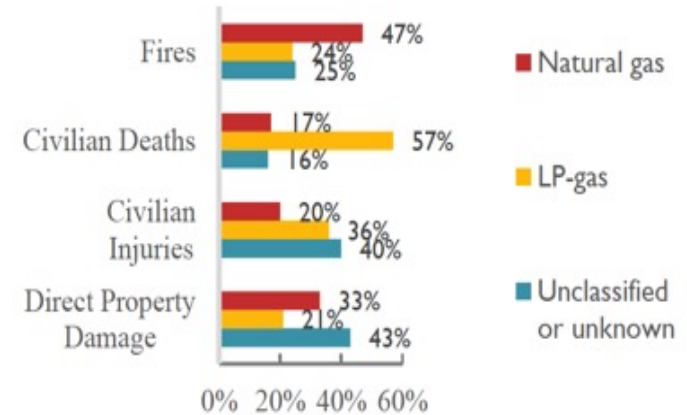
Gas Fire Traceability

National Fire Protection Association (NFPA): **FAR**

Home Structure Fires Involving Flammable Gas



Non-Home Structure Fires Involving Flammable Gas



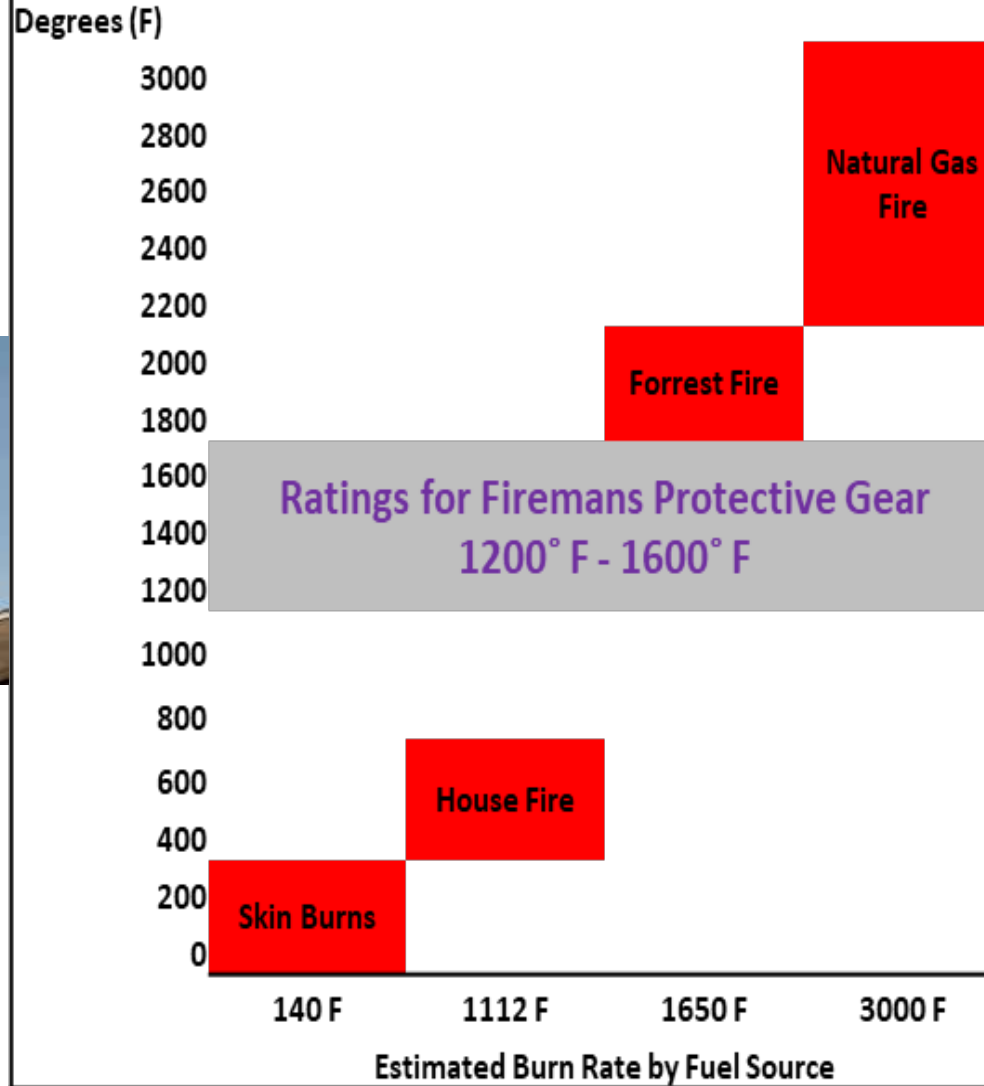
- **51,600 annual average** of home fire responses where **flammable gas was first material ignited** (2007 – 2011):
 - ❖ 168 civilian deaths per year
 - ❖ 1,029 civilian injuries per year
 - ❖ \$644M per year in direct property damage
- **Utility Evidence Lockers** – Numerous examples at every gas utility of impacted meter sets that led to gas-fed fires.
- **Primary Source Fires** – meter impacts, lightning strikes, tampering
- **Secondary Source Fires** – spread of structure fire, natural disaster

Protecting Our First Responders

Protective Gear vs. Exposure Temperatures



How well do you think your protected?





Flower Branch Gas Incident

Silver Spring, MD



<https://youtu.be/Ve7keiQjkrS>

Flower Branch - Lessons Learned

- Large high-pressure gas-fed fire stopped rescue efforts
 - 1 Hour for gas company to respond and shut off gas system.
- 7 died, over 60 injured
 - 1 death due to explosion
 - 6 deaths likely due to gas fire (including two young boys)
- NTSB recommendation – Use of Methane Detectors, Move Regulators (high Pressure Gas) outside on Multifamily buildings.
- Utility Recommendation – Use of Fire Safety Thermal Valves (FSTV).
- A FSTV would likely have eliminated the gas-fed fire allowing emergency responders to engage the structure, additional people could have been rescued.
- **Gas company emergency response – 1:10 to gas off. “fire Immediately subsides” NTSB Report**



Merrimack Valley Incident
Lawrence, MA
September 13, 2018

Headline News:

- 120+ homes in flames
- 1 fatality
- 100's injured
- 8,000 customer outages
- **\$3 BILLION** + in claims



Advances in Fire Safety Devices



- Smoke Detectors (1976)
- Carbon Monoxide Detectors (2011)
- Methane Detectors (2020)
- Oil Burner fire shutoffs (1958)
- Excess Flow Valves (1980)
- **Low Pressure - Excess Flow Valves (1995)**
- Earthquake Valves
- Break-Away Valves
- **Fire Safety Thermal Gas Shut offs (1974)**

Various Fire Safety Thermal Shutoffs



LP Meter Swivel Adapter



High Pressure Thermal Activated Shut-Off



Range Connector



Meter Regulator



Commercial Thermal Shut-Off



Oil Burner Fusible Link



GTI - OTD Testing – July 2019

“Installation of thermally activated gas shutoff devices at single meter, multi-meter, and appliance locations can significantly improve fire safety for natural gas customers.”

“Performance testing results of Teco FireBag® devices confirmed that this device is effective for controlling the flow of gas at high temperatures for prolonged periods of time”

“Based on performance testing, the Teco FireBag® device should be considered as a primary safety device to install upstream and downstream of meter set assemblies to protect customer premises in the event of a structure fire event. “

“Develop efforts for creating a U.S. and Canadian standard(s) for governing the installation of thermal activated shut-off devices.”



CFR-DOT-192



U.S. DEPARTMENT OF TRANSPORTATION
PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION
OFFICE OF PIPELINE SAFETY



PIPELINE SAFETY REGULATIONS

49 CFR PART 192

TRANSPORTATION OF NATURAL AND OTHER GAS BY PIPELINE:
MINIMUM FEDERAL SAFETY STANDARDS
(Current through Amendment 120, as of March 2015)

Pipeline and Hazardous Materials Safety Administration
INSPECTOR TRAINING & QUALIFICATIONS DIVISION (PHIP-70)
1700 South MacArthur Blvd., Suite B
Oklahoma City, OK 73179-7812

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DIMP (P+R+C)

Threat Drivers:

- Fires Happen - beyond our control
- Higher risks meter locations – outside hazards
- Building density = higher probability of fire
- Areas prone to wild / brush fires

Risks Drivers:

- Gas pressure
- Regulator / meter location
- Regulator Size
- Valve accessibility
- Structure type
- CSST piping

Consequence Drivers:

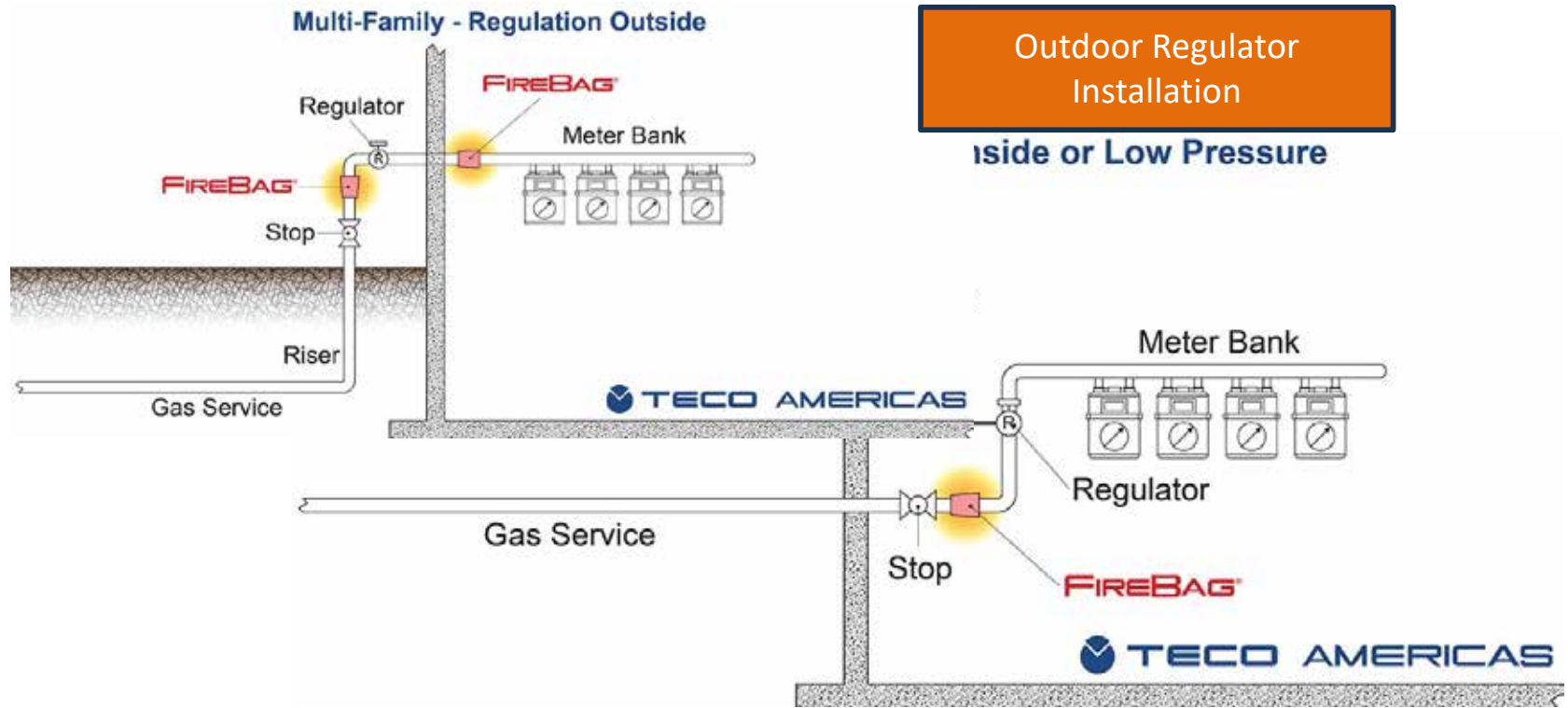
- Number of occupants
- Insurance claim value
- Company reputation / liability

Single & Multi-Meter Applications





Inside Meter Piping Schematic (Multifamily-Typical)



Outdoor Regulator
Installation

inside or Low Pressure

Indoor Regulator
Installation



Who's Protecting Your Assets?



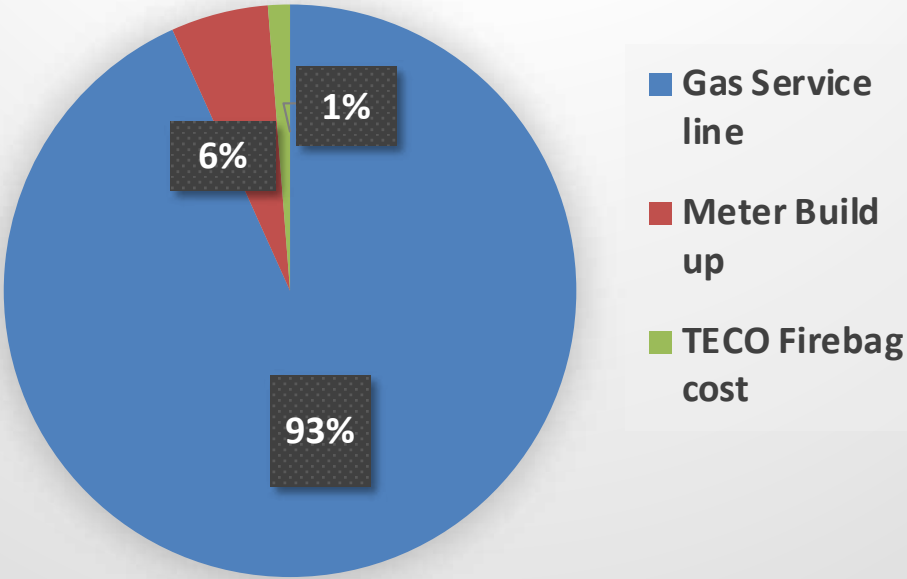
Who's Protecting Your Assets?



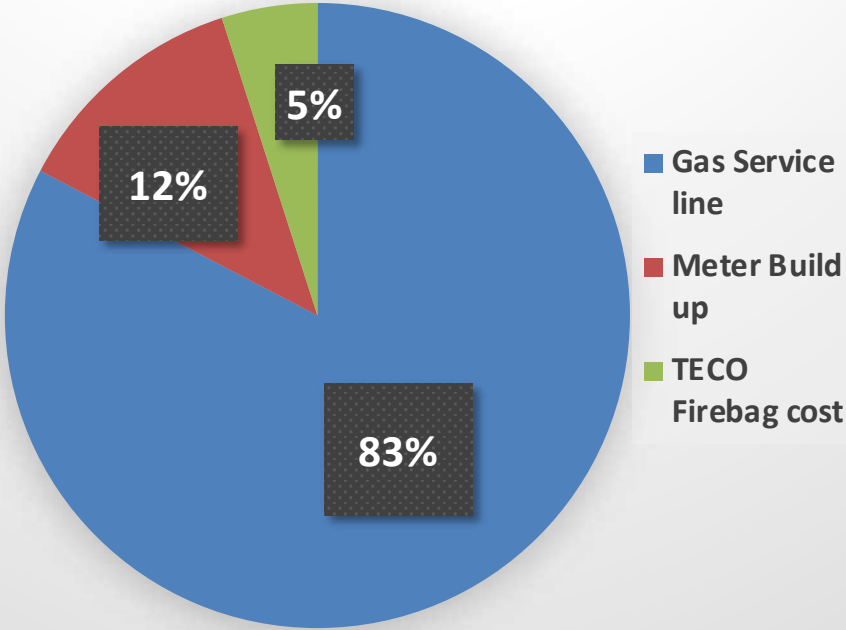
Investment



**3/4" New/Replacement
Gas Service
~ \$5,650**



**2" New/Replacement
Gas Service
~ \$8,750**





Fire Safety Thermal Shutoff Summary

Stops gas flow when the ambient temp reaches 165°F – 400F

- **If There is a fire, you want the gas off before it impacts the regulator and meter!**

Prevents the involvement of gas from the jurisdictional supply system

- Reducing the spread of primary source fires
- Eliminates the potential for secondary source gas fires

Minimal Capital Investment

DIMP threat mitigation and risks reduction measure

Fire Safety Valves Are Used to Protect:

- **Families, First Responders, Employees, General Public & Property**



Q&A

A)

B)

C)

“The only bad question is an unasked one?”

Albert Einstein



How are you protecting your gas meter assets?

As natural gas system operators, we have an obligation to employ the known and proven safety technology, equipment, and practices to protect customers, the public, our employees, and first responders.





Thank You!

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TECO Firebag®



Utilities Can Now
Stop Gas Fed
Fires With

FireBag®
Automatic
Thermal
Shutoffs



FireBag®

Thermal-activated Shut-off Device for Natural, Propane & Butane Gas Metering Applications



The FireBag® automatically shuts off gas supply in the event of fire, preventing explosions and the spreading of fire.

When the ambient temperature reaches 203°F to 212°F (95°C to 100°C), the metal alloy that keeps the plug and cartridge together melts and the spring pressure pushes the plug against the gas opening to make a gas tight closure. The FireBag® closes within 60 seconds, per DIN 3586. No fire or heat detectors are required to automatically stop gas flow.

CERTIFICATIONS

- Meets and exceeds DIN 3586 thermo activated safety device for gas applications
- European UNI EN 1775 Standard for indoor gas installations
- European Directive 90/396/CEE certification for durability in mechanical or thermal stress
- German DVGW TRGI 86/96 Standard for thermo activated locking systems on gas heaters, water heaters & domestic gas fittings
- German Standard Muster-Feuerverordnung (FeuVo v. 02/95 - edition 09/97) for thermo activated devices
- Italian UNI 7129 Ed 2001 Standard for fire protection and gas supply line components
- Independent testing by GTI certifies the FireBag® meets or exceeds requirements per Massachusetts D.P.U. MGL Section 75A of Chapter 164, Ruling #14899 (March 1974) Section 8 (c) and (d).

MAXIMUM PRESSURE
100 PSI (NPT)

AMBIENT TEMPERATURE RANGE
-40°F to +176°F (-40°C to 80°C)

MATERIALS OF CONSTRUCTION
Housing and Finishing:
Zinc-plated steel

SPECIFICATIONS
Actuation Temperature:
203°F to 212°F (95°C to 100°C)

High Temperature Resistance (Fire Resistance)*
1,700°F (927°C) for
60 minutes at 100 PSI (NPT)
Leakage: 1.06 ft³/h (30L/h)**

* The FireBag meets and exceeds the DIN3586 High Temperature requirements: 1,200°F (650°C) for 30 minutes at 72.5 PSI
** Measured using the same testing method as described in DIN3586 paragraph 5.10.2

Cv FACTORS

SIZE	CV
1/2"	3.7
3/4"	6.7
1"	10.3
1 1/4"	25.7
1 1/2"	42.7
2"	66.7

*Used for Natural Gas
and Propane Gas in
metering applications,
as well as residential and
commercial applications*

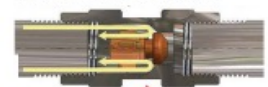
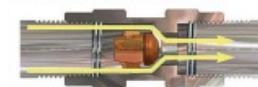


CROSS SECTIONS

The FireBag® is triggered when the ambient temperature reaches 212°F, blocking the flow of gas for at least 60 minutes at the temperature of 1,700°F (927°C).

Inactive, temperature below 203°F

Active, temperature above 212°F

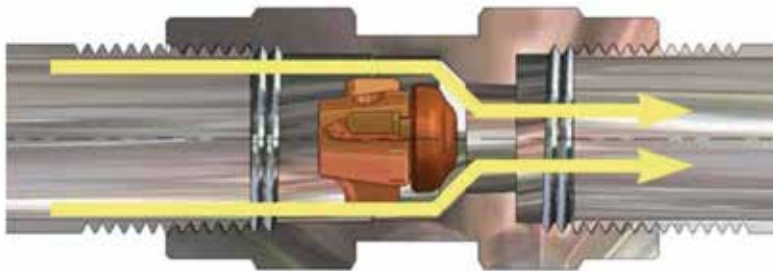




FireBag® Operations

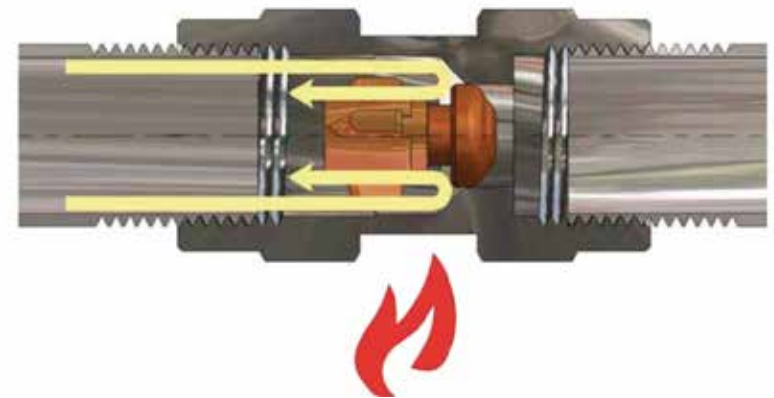
FIREBAG®

Inactive = $T < 95^{\circ}\text{C}$



FIREBAG®

Active = $T > 100^{\circ}\text{C}$



The FireBag® is triggered when the ambient temperature reaches 212°F , blocking the flow of gas for a minimum of 60 minutes at $1,697^{\circ}\text{F}$, per DIN 3586 standards.