



## Enhancing Data Center Safety and Resilience

### The Role of Fusible Link Safety Valves in Diesel Generator Systems

<https://cncontrolvalve.com/>  
[marketing@cncontrolvalve.com](mailto:marketing@cncontrolvalve.com)





# **FUSIBLE LINK SAFETY VALVES IN DIESEL GENERATOR SYSTEMS | WHITE PAPER**

Data centers are the backbone of today's digital economy, serving as the foundational infrastructure that enables a wide array of critical services and functions across various sectors. They house the computer systems, networking equipment, and storage resources necessary for processing, managing, and storing vast amounts of data. This data is integral to the operations of businesses, governments, and other organizations, driving everything from cloud computing and online retail to social media, streaming services, and beyond.

The reliability and safety of data center operations are paramount, given their critical role in supporting the digital economy, managing sensitive information, and ensuring the continuous availability of essential services. The operational integrity of data centers, particularly their onsite power generation systems such as diesel generators, is a cornerstone of this reliability and safety framework.

## **01 Reliability in Data Center Operations**

Data centers are designed to be highly reliable, with systems in place to ensure uninterrupted service even in the face of power outages or system failures. Onsite power generation systems, like diesel generators, play a crucial role in this architecture. They provide an immediate source of power in the event of a grid failure, ensuring that data centers can maintain operations without interruption. This uninterrupted service is vital not just for the data centers' direct customers but also for the broader economy, which increasingly relies on the cloud services, data storage, and processing capabilities that these centers provide.

## **02 Safety Concerns with Diesel Generators**

While diesel generators are essential for continuity, they come with their own set of safety concerns. These include the risk of fuel leaks, which can lead to fires, and the management of exhaust emissions, which must be minimized to protect both the environment and human health. Ensuring the safety of these systems is as crucial as maintaining their reliability, as any significant failure could lead to data loss, service interruption, and potentially catastrophic economic impacts.

## **03 Fusible Link Safety Valves: A Critical Component**

In this context, fusible link safety valves emerge as essential components in enhancing the safety of diesel generator systems within data centers. These valves are designed to automatically shut off fuel supply in the event of a fire or significant temperature increase, thereby mitigating the risk of fuel-fed fires that could endanger the entire facility. By acting as a critical fail safe, fusible link safety valves significantly reduce the risk of accidents that could lead to operational downtime or, worse, loss of life and property.

Fusible link safety valves thus serve a dual purpose: they not only contribute to the overall safety of data center operations by preventing potential fire hazards but also bolster the reliability of these operations by ensuring that diesel generators — a critical backup power source — can operate safely when

needed. This safety feature is in line with the broader objectives of data center operations, which prioritize uninterrupted service delivery and the safeguarding of physical and digital assets.

Fusible link safety valves are critical safety components in various mechanical and industrial systems, including diesel generator systems utilized in data centers. These valves play a pivotal role in ensuring operational safety, particularly in scenarios where there is a risk of fire or excessive heat. Understanding their function, safety mechanisms, and contribution to overall safety and compliance is essential for appreciating their significance in data center operations.



## **What are Fusible Link Safety Valves?**

Fusible link safety valves are designed to automatically shut off the flow of flammable or hazardous materials in the event of a fire or significant temperature increase. They consist of a valve mechanism that is held open by a fusible link—a component engineered to melt at a specific temperature. When the ambient temperature reaches the fusible link's melting point due to a fire or excessive heat, the link melts, triggering the valve to close and thereby cutting off the fuel supply or hazardous material flow. This automatic operation is crucial for preventing the escalation of fire and mitigating potential damage.

## Function and Safety Mechanisms



In diesel generator systems within data centers, fusible link safety valves are typically integrated into the fuel supply lines. Their primary safety mechanism is the prevention of fuel leaks during fires or high-temperature events. By automatically shutting off the fuel supply, these valves significantly reduce the risk of fuel contributing to a fire, which is especially important in environments like data centers where electrical equipment and cabling can create additional fire risks.

These valves function without the need for external power or manual intervention, making them highly reliable in emergency situations. The selection of the fusible link's melting point is critical and is typically chosen based on the specific application requirements and the temperatures that could be expected in a fire scenario.



## Contribution to Overall Safety and Compliance

Fusible link safety valves contribute significantly to the overall safety and compliance of data center operations in several ways:



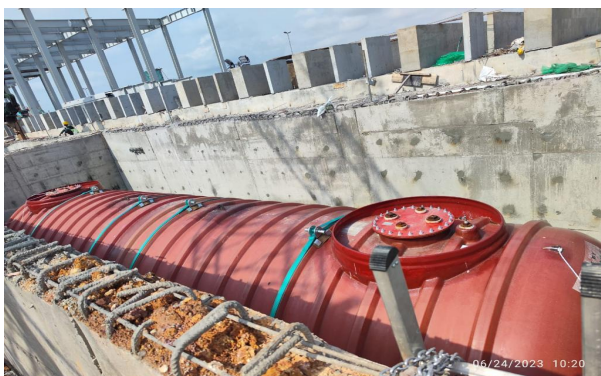
### Enhancing Fire Safety

By providing a failsafe mechanism that automatically shuts off fuel supplies during a fire, these valves help to prevent the spread of fire, thereby protecting both the physical infrastructure of the data center and the critical data housed within.



### Compliance with Safety Regulations

Many jurisdictions have specific safety regulations and codes that require the use of automatic shutoff devices in fuel supply systems. Fusible link safety valves help data centers comply with these regulations, avoiding potential legal and financial penalties.



### Mitigating Operational Risks

The use of fusible link safety valves in diesel generator systems mitigates operational risks by ensuring that backup power systems can be safely deployed during power outages, without increasing the risk of fire or damage to the data center.

## **The Significance of Fusible Link Safety Valves**

Fusible link safety valves are crucial components designed to enhance the safety of systems where there's a risk of fire, particularly in facilities like data centers that rely on diesel generators for backup power. These valves play a vital role in preventing fuel leaks and mitigating fire risks, thus contributing significantly to the overall safety and compliance of data center operation

## **Understanding Fusible Link Safety Valves**

Fusible link safety valves are engineered to automatically close off the flow of flammable liquids or gases in the event of a fire. They incorporate a fusible link—a component designed to melt at a specific temperature threshold. When exposed to excessive heat, such as in a fire, the fusible link melts, triggering the valve to shut off. This action blocks the flow of fuel or other hazardous materials, preventing them from feeding the fire or causing further hazards.

## **Function and Safety Mechanisms**

In the context of diesel generator systems within data centers, fusible link safety valves serve as a critical safety layer by:

- **Automatically shutting off fuel supply:** During a fire or when temperatures rise beyond safe levels, these valves instantly block the fuel supply to the diesel generators, significantly reducing the risk of fuel leaks that could exacerbate the fire.



- **No need for external power or manual intervention:** Fusible link safety valves operate independently of external power sources or manual activation, ensuring reliability even in complete power failure scenarios.
- **Customizable activation temperatures:** The melting point of the fusible link is carefully selected based on the specific needs of the application and the environmental conditions, providing tailored protection against fire risks.



## Case Study 1: Proactive Fire Risk Mitigation During Power Outages

**Situation:** A large data center experiences a sudden power outage due to a severe storm. The facility's diesel generators activate to maintain operations. during a power outage, there is a risk of electrical short circuits due to storms, which can lead to fires. If a fire spread to diesel fuel supply lines, it would pose a significant hazard. A fuel leak during a fire could result in a catastrophic event, endangering the entire facility and its critical data infrastructure.

**Proactive Solution:** After understanding the seriousness of the situation, THINKTANK assisted the engineering company in making the preemptive decision to equip the diesel supply line with an advanced fuse safety valve. The measure is designed to ensure that the fuel supply is automatically shut off when temperatures rise.

**Solution:** The data center is equipped with THINKTANK's fusible link safety valves on all diesel fuel supply lines. As the fire's temperature escalates, the fusible links in the safety valves nearest the fire melt, automatically shutting off the fuel supply in those areas.

**Prevented Outcome:** This proactive upgrade played a crucial role when a small fire broke out, ensuring that the fire did not escalate by automatically

cutting off the diesel supply, thus preserving the data center's operational integrity and avoiding significant damage.

## Case Study 2: Anticipating Overheating Risks in Generator Rooms

**Situation:** In a high-density server farm within a data center, an unexpected failure of the cooling system occurs while the facility is running on backup diesel generators during a grid outage. The temperature in the generator room begins to rise dangerously.

**Challenge:** The overheating not only threatens the servers but also increases the risk of igniting the diesel fuel, potentially leading to a fire that could spread rapidly through the facility.

**Solution:** The diesel generator system is equipped with fusible link safety valves designed to trigger at specific high temperatures. As the room temperature reaches these critical levels, the fusible links melt, automatically shutting off the diesel supply to the generators.

**Result:** The immediate shutdown of the diesel supply prevents a possible fire, giving the facility's operations team time to address the cooling failure and implement emergency measures without the additional risk of a fire.

### Case Study 3: Compliance and Insurance Benefits

**Description:** A data center operator plans to expand their facility, requiring additional diesel generators to support the increased load. The expansion is in a region with strict environmental and safety regulations for diesel storage and use.

**Challenge:** To comply with local regulations and qualify for insurance coverage at reasonable rates, the expanded facility must demonstrate enhanced safety measures for its diesel fuel system.

**Solution:** As part of the expansion, the contractor bought advanced fusible link safety valves from THINKTANK to install diesel generators, equipped with these valves not only enhance safety by providing automatic fuel shutoff in the event of a fire, but also show to regulators and insurers facility's commitment to high safety standards(all fusible link valves achieve ATEX and PED certificate).

**Result:** The use of fusible link safety valves helps the data center meet regulatory requirements and achieve favorable insurance premiums. This proactive approach to safety and compliance further establishes the data center as a reliable and responsible operator in the eyes of stakeholders and customers.