

CLARKE®

Don't Risk Under-Pressurization: Equip Your Clarke Fire Pump Engine with PLD-S

Reliable suction pressure is the lifeblood of any fire protection system. Sprinkler systems must respond immediately and uncompromisingly when called into action.

Under-pressurization in the suction line must be prevented to guarantee a fire pump is reliably functioning. Without sufficient suction pressure, water supply lines can collapse, pumps can cavitate and sprinkler heads may fail to deliver necessary coverage to suppress a fire.

You don't want a system that appears sound on paper but falters at the moment of greatest need. You need a solution designed to safeguard the suction side of your fire pump system.

Suction Pressure Control Matters

Suction pressure fluctuates with system demand. Pressure is highest in no-flow or static conditions. As flow increases during pump operation, suction pressure drops.

The danger arises when the pump begins drawing water faster than the supply can replenish. There can be consequences if residual suction pressure falls below 20 psi, including:



Cavitation

Pressure buildup can lead to bubbles or voids that create shockwaves when they collapse. A collapse will not only damage the pump but also reduce water flow, potentially rendering sprinkler systems ineffective during a fire emergency.



Collapsed Supply Lines

Negative pressures can cause thin-walled supply pipes to buckle or fail.



Inadequate Sprinkler Performance

When suction pressure is insufficient, sprinkler heads may not discharge the correct volume or pattern of water.



System Failure in Emergencies

A fire pump that cavitates or starves the sprinkler network during a fire event risks catastrophic property damage and loss of life.

Municipalities and state regulators recognize these risks, which is why an increasing number of jurisdictions mandate low suction pressure safeguards on fire pump systems.

**Compliance is not optional — it is a regulatory necessity.
Federal standards and state requirements across the United States reinforce the importance of suction pressure protection:**



Clarke's suction PLDs can be used in Ohio in lieu of the low suction valve... I like that because the valves are a maintenance issue. If they fail, they fail... I would prefer that our customers do it with a control like what you [Clarke] have with a Suction PLD.



—Doug Dockus, Sales Engineer,
Corporate Equipment Company

Regulatory Requirements Across Jurisdictions



NFPA 20

Fire pump positive suction pressure at 150% rated capacity. 20+ psi residual is recommended, but variable speed suction limiting controls are a compliant alternative.



Ohio EPA

Fire pumps must maintain suction pressure at or above 10 psi with low-pressure cutoffs, suction throttling valves or variable frequency drives.



Texas

Low suction pressure control when intake pressure drops below 30 psi at 150% rated pump capacity or when underground mains are shared with private hydrants.



Georgia

At 150% rated capacity or below, pump suction supply must stay above 20 psi.



Arkansas

Low suction pressure controls on every fire pump system.

Design Challenges Without Suction Pressure Control

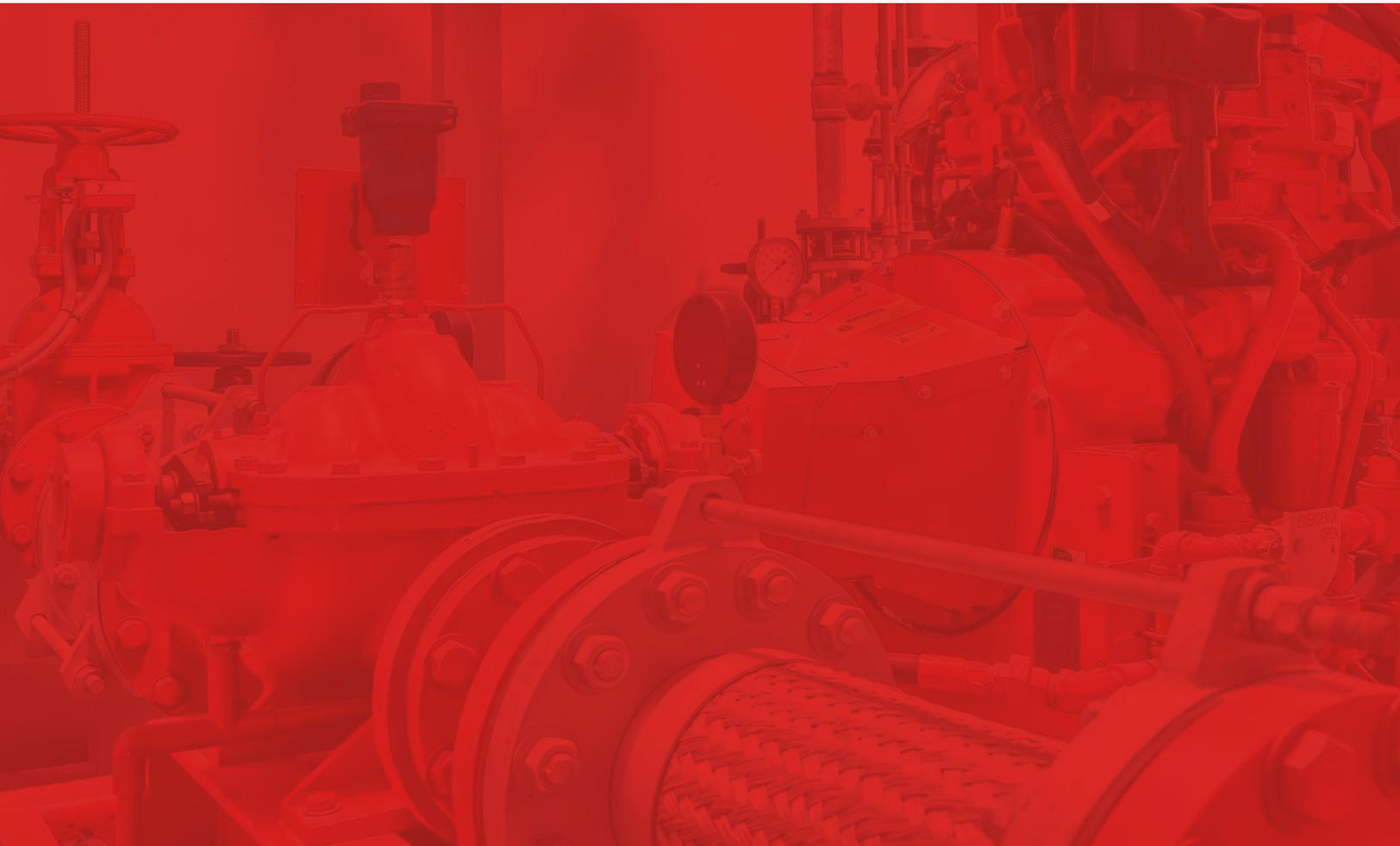
Fire protection engineers face significant design hurdles in systems with weak or variable supply. Without suction pressure control, the options are limited and costly:

- Installing low pressure suction valves, which add complexity, creates additional failure points and require ongoing maintenance.
- Constructing on-site water storage tanks sized to meet total fire flow demand. This expensive solution consumes valuable space.
- Relying on oversized piping networks or multiple water sources. These systems can drive installation costs beyond budget tolerances.

While these methods can help, they introduce cost, complexity and reliability issues. They are less than ideal for modern fire protection systems.

Clarke's PLD-S: The Smarter Solution

Clarke's PLD-S for Suction Pressure Limiting Control directly addresses these challenges. The PLD-S is a UL/FM certified diesel engine fire pump driver that reduces engine speed to maintain a minimum positive suction pressure value to prevent under-pressurization of the sprinkler water supply.



How it works:

- The PLD-S engine continuously senses suction pressure via a dedicated sensing line connected to the pump inlet.
- The PLD-S automatically reduces engine speed if suction pressure begins to drop toward unsafe levels, preventing further drawdown.
- The system maintains positive suction pressure at or above a setpoint pressure. This setpoint is factory set and can be configured within the ranges below:

5-30 psi

for standard engines

8-30 psi

for C18H0 engines (FM only)

- If pressure cannot be maintained, the PLD-S triggers alerts to the system controller. This protocol empowers operators to be aware of supply issues before they escalate.

Unlike traditional valves or tanks, the PLD-S introduces no inline devices that could fail or cause pressure losses. The engine protects supply integrity without jeopardizing flow or adding mechanical vulnerabilities.

Customer Benefits

Building owners, facility managers and fire protection engineers benefit from Clarke's PLD-S beyond technical performance:



Reliability in Critical Moments

Ensures systems activate and deliver designed sprinkler performance during fire emergencies.



Simplified Compliance

Streamlines approval processes with AHJs (Authorities Having Jurisdiction).



Lower Capital Costs

Eliminates the need for break tanks, suction control valves, or oversized infrastructure.



Peace of Mind

Backed by Clarke's reputation, UL/FM listings and experience in pressure limiting driver technology.

Clarke PLD-S Technical & Operational Advantages

- UL/FM Certified – Meeting the rigorous standards of UL 1247A and FM 1333 ensures proven reliability.
- No Inline Valves – Eliminates failure points and simplifies piping design.
- Cavitation Protection – Maintains positive suction pressure, protecting pumps and sprinklers.
- System Continuity – Does not shut down pump operations during a fire event and instead maintains safe operation.
- Regulatory Compliance – Meets NFPA 20 requirements and aligns with state-specific mandates.
- Cost Efficiency – Reduces the need for separate suction control valves, oversized tanks, or redundant infrastructure.

In high-rise and campus applications where suction variability is most pronounced, these advantages translate into reliability, compliance and reduced lifecycle costs.

PLD-D and PLD-S: Better Together

While the PLD-S safeguards against under-pressurization, its companion product — the PLD-D (Discharge Pressure Limiting Driver) — protects against over-pressurization by controlling pump discharge pressure.

Clarke offers the PLD-DS for systems facing both suction and discharge pressure challenges. This combined solution ensures complete system balance. Engineers can use Clarke's online calculators sequentially (PLD-S followed by PLD-D) to configure the optimal settings for their installation.

Together, PLD-D and PLD-S represent a comprehensive, code-compliant approach to fire system pressure management.

REFERENCES

<https://codes.ohio.gov/ohio-administrative-code/rule-3745-95-07>

<https://rules.sos.ga.gov/gac/120-3-3>

https://clarkefire.com/docs/default-source/default-document-library/c133760-n-pld-brochure.pdf?sfvrsn=7334e613_0

https://clarkefire.com/docs/default-source/white-papers/pldwhitepaper.pdf?sfvrsn=5705713_2

<https://healthy.arkansas.gov/wp-content/uploads/xcfire.pdf>

<https://www.elpasotexas.gov/assets/Documents/CoEP/Fire/International-Fire-Prevention-Code-Ordinance-new.pdf>

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