

Application Bulletin 3

FirePro. UK & IRELAND

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Application Bulletin: **Diesel Generator Enclosures** • Technology: **FirePro Condensed Aerosol**

Application
Diesel Generator Enclosures

The Risk
Combustible fuels, lubricants, hot surfaces and electrical systems, with potential pressurised fuel leaks, compounded by confined spaces, vibration and high operating temperatures.

This Bulletin Covers
- Design considerations
- Environmental requirements
- End user responsibilities
- Post-discharge procedure
- Myths & comparative analysis

Mandatory Message to End Users
"Following discharge, all critical components (especially air filters, electrical panels, and control systems) must be inspected and cleaned as part of the re-commissioning process."

Condensed Aerosol Fire Suppression in Diesel Generator Enclosures

Design Considerations, Environmental Requirements, End User Responsibilities, Myths & Comparative Analysis

1. Introduction

Diesel generator enclosures present a unique and high-risk fire environment due to the presence of combustible fuels, lubricants, hot surfaces, electrical systems, and potential fuel leaks under pressure.

Fire risks are compounded by confined spaces, vibration, and high operating temperatures.

FirePro condensed aerosol (CA) technology provides an effective, LPCB-certified fire suppression solution for diesel generator enclosures, particularly where traditional systems (gaseous or water-based) are impractical due to space constraints, ventilation challenges, or installation complexity.

This bulletin outlines the design considerations, environmental requirements, end user responsibilities, and common misconceptions relevant to FirePro systems in diesel generator applications.

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Ground Floor, Egerton House, Baker Street, Weybridge, UK, KT13 8AL **T:** +44 (0)8000 314 333 **E:** sales@fireprouk.com **W:** www.fireprouk.com



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2. Purpose of FirePro in Diesel Generator Enclosures

FirePro is designed to rapidly suppress fire at its earliest stage, preventing escalation, reducing downtime, and protecting critical power infrastructure.

However, FirePro is not designed to:

- Prevent pre-existing mechanical failure
- Eliminate the need for maintenance
- Provide cooling of hot surfaces

> **Therefore:**
> *Regular inspection and maintenance of generator systems remains essential. This requirement must be clearly communicated to the end user during system design, installation, and handover.*

3. Important Note on Residue and Equipment Interaction

FirePro is not a clean gas agent and does not claim zero residue discharge.

A light, dry aerosol particulate may settle on surfaces following activation. Within generator enclosures, this may result in:

- Light surface deposits on engine housings and control panels
- Minor accumulation on air intake surfaces

> **Mandatory message to end users:**
> *"Following discharge, all critical components (especially air filters, electrical panels, and control systems) must be inspected and cleaned as part of the recommissioning process."*

This is a mandatory operational requirement.

4. Why Sprinklers and Water-Based Systems Are Unsuitable for Generator Enclosures

Water-based fire suppression systems present significant risks when applied to diesel generator environments.

4.1 Electrical Damage and Short Circuit Risk

- Water can cause immediate electrical failure in control panels, alternators, and switchgear
- Increased risk of short circuits and arc faults

4.2 Fuel Spread and Fire Escalation

- Water can spread burning diesel fuel, increasing the fire footprint
- Ineffective on pressurised fuel spray fires

4.3 Thermal Shock and Equipment Damage

- Sudden cooling of hot engine components can cause cracking or distortion

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- Damage to turbochargers, exhaust systems, and engine blocks

4.4 System-Wide Downtime

- Water discharge may render generators inoperable for extended periods
- Significant cleaning and drying required before restart

4.5 Water Mist Still Introduces Moisture

Even fine droplets can:

- Enter electrical housings
- Corrode components
- Affect long-term reliability

5. Why FirePro Is Better Suited for Diesel Generator Enclosures

FirePro offers significant advantages in generator protection environments.

5.1 No Water or Moisture

FirePro introduces no water or humidity, eliminating risks of:

- Electrical failure
- Corrosion due to moisture
- Insulation breakdown

5.2 Effective Across Fire Classes

Generator fires may involve:

- Diesel fuel (Class B)
- Insulation and cabling (Class A)
- Electrical components (Class C)

FirePro is proven across all these fire types.

5.3 Rapid Flame Knockdown

- Interrupts free radical chain reactions
- Effective on fast-developing fuel spray fires

5.4 No Cylinders or Pipework

- Ideal for compact enclosures
- Simplifies installation and retrofit

5.5 Minimal Pressure Rise

- No pressure relief venting required
- Suitable for robust but non-sealed enclosures

5.6 High Leakage Tolerance

- Performs effectively even in ventilated housings

5.7 Long Service Life (15 Years)

- Reduced lifecycle cost and maintenance

6. Generator Protection Requirements (Mandatory)

6.1 Routine Maintenance

- Fuel lines, seals, and injectors must be regularly inspected
- Oil leaks must be addressed immediately
- Air filters must be kept clean

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6.2 Enclosure Integrity

- Doors and access panels should remain closed during operation
- Excessive ventilation openings should be assessed

6.3 Electrical Safety Measures

- Emergency shutdown must be integrated with fire detection
- Automatic fuel shut-off recommended

6.4 Post-Discharge Cleaning Obligation

- Air intake systems must be checked and cleaned
- Electrical enclosures must be inspected before restart

7. Environmental Conditions

Maintaining stable conditions enhances FirePro performance:

TEMPERATURE Typically within generator operating range	**AIRFLOW** Ventilation should shut down upon activation
HUMIDITY Not critical, but excessive moisture should be avoided	**POST-DISCHARGE VENTILATION** Ventilate enclosure within 10–15 minutes

8. Design Considerations for Generator Enclosures

8.1 Fire Load and Volume Calculation

- Include total enclosure volume
- Consider airflow and leakage
- Apply appropriate design factors

8.2 Generator Placement and Discharge Direction

- Avoid direct discharge into air intakes where possible
- Ensure unobstructed aerosol distribution

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8.3 Detection and Control Integration

- Early detection (heat or flame detection recommended)
- Automatic shutdown of:
  - ◆ Engine
  - ◆ Fuel supply
  - ◆ Ventilation fans

8.4 Vibration and Mounting

- Generators produce vibration; ensure secure mounting of units
- Use vibration-resistant brackets where required

9. Post-Discharge Procedure

1. Shut down generator (if not already automatic)
2. Ventilate the enclosure within 10–15 minutes
3. Inspect all components
4. Clean:
   - Air filters
   - Electrical panels
   - Control units
5. Verify no residual fire risk
6. Recommission FirePro system

10. Common Myths & Factual Counterpoints

Myth 1: "Aerosol systems damage engines."

Fact: FirePro produces a dry particulate that does not damage mechanical components when properly maintained and cleaned post-discharge.

Myth 2: "Water is safer for generator fires."

Fact: Water introduces electrical hazards and can spread fuel fires; often causing greater damage than the fire itself.

Myth 3: "Gas systems are better for generator enclosures."

Fact: Gas systems require sealed enclosures and pressure venting; rarely achievable in generator housings. FirePro works effectively without these constraints.

11. Transparency Statement

FirePro UK maintains full transparency:

- FirePro is designed to suppress fire, not repair mechanical faults

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- FirePro is not a zero-residue system; a light particulate is produced
- Post-discharge inspection and cleaning are mandatory
- FirePro does not provide cooling of hot surfaces
- FirePro is not certificated for deep-seated fires
- FirePro is often the most practical solution where gas or water systems are unsuitable
- FirePro introduces no water, avoiding electrical and moisture-related damage

12. Summary

FirePro condensed aerosol provides an effective and reliable fire suppression solution for diesel generator enclosures, offering significant advantages over traditional systems in terms of installation simplicity, operational reliability, and reduced collateral damage.

Unlike water-based systems, FirePro does not introduce moisture or create electrical hazards. Unlike gaseous systems, it does not require sealed environments or complex infrastructure.

With correct system design, integration, and adherence to maintenance and post-discharge procedures, FirePro delivers robust protection for critical generator installations.

Key operational requirement:
All systems must be supported by proper maintenance, inspection, and post-discharge cleaning procedures to ensure safe and effective operation.

If you would like to learn more about FirePro, or discuss a diesel generator application, please visit us at **www.fireprouk.com** – see contact details below.

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