

Application Bulletin 14

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Application Bulletin: **Smart Waste Bins** • Technology: **FirePro Condensed Aerosol**

Application
Smart Waste Bins

The Risk
Paper, packaging and mixed waste in public areas, at risk from discarded cigarettes, lithium-ion batteries and vapes, or arson.

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

Mandatory Message to End Users
"Following any discharge, the bin must be taken out of use, emptied, inspected and cleaned, and the FirePro unit replaced before the bin is returned to service."

Condensed Aerosol Fire Suppression in Smart Waste Bins

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

1. Introduction

Smart waste bins and compactor bins are now installed in public spaces, hospitals, transport hubs, campuses and town centres. They report fill levels in real time and mechanically compact waste so that collections are only made when needed.

Inside, they hold a concentrated mix of paper, packaging, plastics and food waste, alongside a compactor mechanism and electronics. Fires can start from carelessly discarded cigarettes, lithium-ion batteries and vapes thrown in with general waste, or deliberate arson, and a bin fire in a busy public area puts people and nearby property at risk.

FirePro condensed aerosol (CA) technology provides an effective, LPCB-certified suppression solution for smart bins, using a compact standalone unit that needs no power, wiring or pipework.

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

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2. Purpose of FirePro in Smart Waste Bins

FirePro is designed to:

- Automatically detect and suppress fire inside the bin
- Control surface fires in the waste storage area
- Reduce the risk of fire spreading beyond the bin
- Reduce the risk of harm to the public and nearby property

However, FirePro is **not designed to**:

- Guarantee full extinguishment of deep-seated fires within compacted waste
- Prevent lithium-ion battery thermal runaway
- Replace emptying schedules, inspection or site fire safety measures

> **Therefore:**
> *FirePro provides localised, automatic protection that significantly reduces fire risk, and must form part of the site's wider fire risk assessment and waste management arrangements.*

This requirement must be clearly communicated to the end user during system design, installation, and handover.

3. Important Note on Residue and Bin Contents

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

A light, dry aerosol particulate may settle on surfaces after activation, including:

- Waste contents and the waste container
- Inner bin panels and the compactor mechanism
- Sensors and electronic components inside the bin

> **Mandatory message to end users:**
> *"Following any discharge, the bin must be taken out of use, emptied, inspected and cleaned, and the FirePro unit replaced before the bin is returned to service."*

This is a mandatory operational requirement.

4. Why Sprinklers and Water-Based Systems Are Unsuitable for Smart Waste Bins

Water-based systems are not practical for individual bins.

4.1 No Water Supply

- Smart bins are free-standing, often outdoors and away from building services

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- Running pipework to each bin is impractical and costly

4.2 Building Sprinklers Do Not Reach Inside

- A fire inside a closed bin is shielded from ceiling sprinklers
- Outdoor bins have no sprinkler cover at all

4.3 Electrical and Mechanical Damage

- Water can damage the compactor, sensors and electronics
- Can lead to costly repairs and long periods out of service

4.4 Run-Off and Mess in Public Areas

- Water mixed with waste creates contaminated run-off
- Creates slip hazards and clean-up work in public spaces

4.5 Manual Firefighting Delays

- Bin fires are often not noticed until smoke or flames are visible
- Waiting for staff or fire services allows the fire to grow

5. Why FirePro Is Well Suited for Smart Waste Bin Protection

FirePro offers clear advantages for protecting smart bins.

5.1 Standalone Operation

- Thermally activated by a bulb thermal actuator (BTA)
- No power, wiring, detection panel or pipework required

5.2 Compact and Easy to Fit

- A single small unit fits in the restricted space around the compactor
- Installation typically takes under fifteen minutes per bin

5.3 Automatic Response

- Activates as soon as the actuator reaches its operating temperature
- Suppresses fire without anyone needing to be present

5.4 Robust and Tamper-Resistant

- Mounted inside the bin with the actuator facing inwards
- Reduces the risk of accidental impact, vandalism or weather damage

5.5 No Water or Moisture

- Avoids damage to the compactor and electronics
- No contaminated run-off in public areas

5.6 Low Cost per Bin

- Localised protection at a very low cost compared with other options

5.7 Long 15-Year Life

- Reduced maintenance and lifecycle costs

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6. Smart Waste Bin Protection Requirements (Mandatory)

6.1 Correct Positioning

- The unit must discharge directly into the waste storage area
- It must not obstruct or interfere with the moving compactor parts

6.2 Mounting Height and Angle

- Too low and the unit can be obstructed by waste and lose effectiveness
- Too high and the agent strikes the compactor walls and bin opening, reducing performance

6.3 Access for Inspection

- Units must be easy to reach, remove and refit during bin servicing
- Inspection should be included in the routine emptying and maintenance schedule

6.4 Bin Condition

- Bin doors, hatches and panels must close properly to contain the agent
- Damaged bins must be repaired promptly

6.5 Public Awareness

- Signage should discourage disposal of batteries, vapes and smoking materials
- Report any bin fire or discharge to the site manager

7. Environmental Conditions

Smart bins are often outdoors, so consider:

TEMPERATURE

Within the unit's rated operating range, including direct sun on outdoor bins

HUMIDITY

Outdoor exposure is acceptable when the unit is mounted inside the bin

AIRFLOW

Keep bin openings and hatches closed so the agent stays in the bin

POST-DISCHARGE VENTILATION

Allow the bin to ventilate before opening and emptying

8. Design Considerations for Smart Waste Bins

8.1 Fire Risk Assessment

- Identify likely causes such as cigarettes, batteries and arson
- Consider the bin's location and how close it is to people, buildings and exits

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8.2 Bin Volume and Openings

- Base the unit selection on the internal waste storage volume
- Allow for the deposit opening and any gaps in the enclosure

8.3 Unit Selection and Orientation

- Standalone units with bulb thermal actuators are typically used
- Orient the unit so discharge covers the full waste surface

8.4 Compactor Clearance

- Check clearances through the full compactor cycle
- Confirm that the unit cannot be struck by moving parts

8.5 Bin Manufacturer Coordination

- Agree mounting points and any changes with the bin supplier
- Confirm installation does not affect the bin's warranty or certification

9. Post-Discharge Procedure

1. Take the bin out of use and keep the public clear
2. Allow the bin to ventilate before opening
3. Check that the fire is out, including for smouldering waste
4. Empty the waste safely, treating it as potentially still hot
5. Clean:
   - Inner panels and the compactor
   - Sensors and electronics
6. Inspect the bin for damage
7. Replace the FirePro unit and return the bin to service

10. Common Myths & Factual Counterpoints

Myth 1: "Bin fires are too small to matter."

Fact: Bins are often placed in busy public areas, near entrances and buildings. A fire can spread, produce toxic smoke and cause harm before anyone notices.

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Myth 2: "Suppression must put out every fire completely to be worthwhile."

Fact: FirePro is not certificated for deep-seated fires in compacted waste, but it controls surface fires and greatly reduces the risk of a fire growing or spreading.

Myth 3: "Protecting bins needs complex wiring and detection."

Fact: FirePro standalone units are thermally activated and need no power or wiring. Each bin can typically be fitted in under fifteen minutes.

11. Transparency Statement

FirePro UK maintains full transparency:

- FirePro is designed to suppress fire, not prevent it
- FirePro cannot guarantee full extinguishment of deep-seated fires in compacted waste
- FirePro does not stop lithium-ion battery thermal runaway
- FirePro is not a zero-residue agent; a light particulate will be present
- Post-discharge emptying, cleaning and unit replacement are mandatory
- FirePro introduces no water, avoiding damage and run-off
- FirePro offers practical, low-cost protection where no other system is feasible

12. Summary

FirePro condensed aerosol provides a simple, low-cost way to reduce the fire risk from smart waste bins in public areas, where water-based and gaseous systems are not practical.

Standalone, thermally activated units fit inside the bin in minutes, need no power or wiring, and respond automatically to fires started by cigarettes, batteries or arson.

However, successful protection depends on:

- Correct positioning clear of the compactor
- The right mounting height and angle
- Regular inspection during bin servicing
- Mandatory post-discharge emptying, cleaning and unit replacement

Key operational requirement:

After any activation, the bin must be emptied, inspected and cleaned, and the FirePro unit replaced before the bin is returned to service.

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

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