



FIRE & GAS DETECTION  
TECHNOLOGIES INC.

Application Note  
Flame Detection  
where speed of  
response is critical

[www.fg-detection.com](http://www.fg-detection.com)

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## Introduction

A "Flame Detector" can be used to provide detection coverage for a wide range of different fire types, solid, liquid and gaseous.

The challenge is that no one flame detector can respond to every fire type and in sufficient time to limit the escalation to a point where significant damage has been caused.

This is why the FlameSpec family is available having an expanded range of FM approved optimisations for specific applications.

This note covers the whole FlameSpec range of detectors for fast evolving fires, this type fire may be caused by a pressurized paint, a solvent cloud contacting an ignition source or a host of other applications.

## Spray paint applications

NFPA 33, defines a list of requirements for Spray Application Using Flammable or Combustible Materials. The 2018 Edition, section 9.9.1, specifically requires "automated liquid electrostatic spray application equipment, both listed and unlisted, shall be further protected by listed optical flame detection, installed and supervised in accordance with NFPA 72. The optical flame detection shall, in event of ignition, react to the presence of flame within one-half (0.5) second."

All FlameSpec X5 models meet this requirement, with the response data being shared in the following pages. Please note the suffix 5 denotes this performance capability verified by Factory Mutual (FM).

Furthermore, section 15.5.10 defines the protection needs for Automated Powder Application Equipment..

In this section, it is stated that "automated powder application equipment, both listed and unlisted, shall be further protected by listed optical flame detection, installed and supervised in accordance with NFPA 72." "The optical flame detection shall, in the event of ignition, react to the presence of flame within one-half (0.5) second."

## Other applications needing fast response

Although the requirements for a sub half second speed of response are well documented by NFPA 33, speed of response is also a concern in other applications like: Aerosol filling stations



and printing presses, conveyors and tunnels.





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FM test data for the:  
FLS-IR3-AS15



Fuel	Size	Sensitivity	Range ft (m)	Response (s)
N-Heptane	1 x 1 ft	Medium	100 (30)	0.2
Methane	32-in Plume	Medium	82 (25)	0.1
Diesel	1 x 1 ft	Medium	79 (24)	0.3
Kerosene	1 x 1 ft	Medium	79 (24)	0.3
LPG	32-in Plume	Medium	100 (30)	0.4
Methanol	1 x 1 ft	Medium	59 (18)	0.3
Ethanol	1 x 1 ft	Medium	59 (18)	0.3
IPA	1 x 1 ft	Medium	79 (24)	0.3
N-Heptane	1 x 1 ft	Low	50 (15)	0.2
LPG	32-in Plume	Low	50 (15)	0.4
Methanol	1 x 1 ft	Low	30 (9)	0.3
N-Heptane	1 x 1 ft	Very Low	25 (7.5)	0.2
LPG	32-in Plume	Very Low	25 (7.5)	0.3
Methanol	1 x 1 ft	Very Low	15 (4.5)	0.4

FM test data for the:  
FLS-IR3-HD-AS15



Fuel	Size	Sensitivity	Range ft (m)	Response (s)
N-Heptane	1 x 1 ft	Medium	100 (30)	0.2
Methane	32-in Plume	Medium	82 (25)	0.1
Diesel	1 x 1 ft	Medium	79 (24)	0.3
Kerosene	1 x 1 ft	Medium	79 (24)	0.3
LPG	32-in Plume	Medium	100 (30)	0.4
Methanol	1 x 1 ft	Medium	59 (18)	0.3
Ethanol	1 x 1 ft	Medium	59 (18)	0.3
IPA	1 x 1 ft	Medium	79 (24)	0.3
N-Heptane	1 x 1 ft	Low	50 (15)	0.2
LPG	32-in Plume	Low	50 (15)	0.4
Methanol	1 x 1 ft	Low	30 (9)	0.4
N-Heptane	1 x 1 ft	Very Low	25 (7.5)	0.2
LPG	32-in Plume	Very Low	25 (7.5)	0.3
Methanol	1 x 1 ft	Very Low	15 (4.5)	0.4





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FM test data for the:  
FLS-UV-IR-AS15



Fuel	Size	Sensitivity	Distance ft (m)	Response (s)
N-Heptane	1 x 1 ft	Medium	33 (10)	0.2
Methane	32-in Plume	Medium	30 (9)	0.3
JP5	1 x 1 ft	Medium	26 (8)	0.5
Hydrogen	32-in Plume	Medium	33 (10)	0.1
IPA	1 x 1 ft	Medium	30 (9)	0.1
Syngas	32-in Plume	Medium	33 (10)	0.2
LPG	32-in Plume	Medium	33 (10)	0.2
LPG	32-in Plume	Low	13 (4)	0.2

FM test data for the:  
FLS-UV-IR-HD-AS15



Fuel	Size	Sensitivity	Distance ft (m)	Response (s)
N-Heptane	1 x 1 ft	Medium	33 (10)	0.1
Methane	32-in Plume	Medium	30 (9)	0.3
JP5	1 x 1 ft	Medium	26 (8)	0.2
Hydrogen	32-in Plume	Medium	33 (10)	0.2
IPA	1 x 1 ft	Medium	30 (9)	0.2
Syngas	32-in Plume	Medium	33 (10)	0.2
LPG	32-in Plume	Medium	33 (10)	0.2
LPG	32-in Plume	Low	13 (4)	0.2



FM test data for the:  
FLS-UV-IR-F-AS15



Fuel	Size	Sensitivity	Distance ft (m)	Response (s)
N-Heptane	1 x 1 ft	Medium	33 (10)	0.2
Methane	32-in Plume	Medium	30 (9)	0.2
JP5	1 x 1 ft	Medium	26 (8)	0.3
IPA	1 x 1 ft	Medium	30 (9)	0.1
Syngas	32-in Plume	Medium	30 (9)	0.1
LPG	32-in Plume	Medium	33 (10)	0.2
LPG	32-in Plume	Low	13 (4)	0.1

FM test data for the:  
FLS-UV-IR-F-HD-AS15



Fuel	Size	Sensitivity	Distance ft (m)	Response (s)
N-Heptane	1 x 1 ft	Medium	33 (10)	0.4
Methane	32-in Plume	Medium	30 (9)	0.2
IPA	1 x 1 ft	Medium	30 (9)	0.2
Syngas	32-in Plume	Medium	30 (9)	0.2
LPG	32-in Plume	Medium	33 (10)	0.2
LPG	32-in Plume	Low	13 (4)	0.3

FM test data for the:  
FLS-IR3-H-AS15



Fuel	Size	Sensitivity	Range ft(m)	Response (s)
Methane	32-in Plume	Medium	53(16)	0.1
Syngas	32-in Plume	Medium	50 (15)	0.3
Methanol	1 x 1 ft	Medium	26 (8)	0.2
Hydrogen	32-in Plume	Medium	59 (18)	0.2
Methane	32-in Plume	Low	26 (8)	0.2
Syngas	32-in Plume	Low	23 (7)	0.1
Methanol	1 x 1 ft	Low	16 (5)	0.4
Hydrogen	32-in Plume	Low	30 (9)	0.2
Methane	32-in Plume	Very Low	13 (4)	0.1
Syngas	32-in Plume	Very Low	13 (4)	0.1
Methanol	1 x 1 ft	Very Low	8 (2.5)	0.3
Hydrogen	32-in Plume	Very Low	16 (5)	0.2

FM test data for the:  
FLS-IR3-H-HD-AS15



Fuel	Size	Sensitivity	Range ft(m)	Response (s)
Methane	32-in Plume	Medium	53(16)	0.1
Syngas	32-in Plume	Medium	50 (15)	0.4
Methanol	1 x 1 ft	Medium	26 (8)	0.3
Hydrogen	32-in Plume	Medium	59 (18)	0.1
Methane	32-in Plume	Low	26 (8)	0.2
Syngas	32-in Plume	Low	23 (7)	0.2
Methanol	1 x 1 ft	Low	16 (5)	0.4
Hydrogen	32-in Plume	Low	30 (9)	0.1
Methane	32-in Plume	Very Low	13 (4)	0.2
Syngas	32-in Plume	Very Low	13 (4)	0.1
Methanol	1 x 1 ft	Very Low	8 (2.5)	0.3
Hydrogen	32-in Plume	Very Low	16 (5)	0.2

## References

NFPA 33 Standard for Spray Application Using Flammable or Combustible Materials, 2018 edition

All FGD FlameSpec manuals F1xxV0020 revision 06