



## TECHNICAL NOTE

# Optical Flame Detector Family Selection Guide



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# 1 MODEL RANGE AND CHARACTERISTICS

The all-new Fike family of optical flame detectors offers superior immunity to false alarms, enhanced speed of response and are available with or without an integral high-definition (HD) video camera.

The updated Fike family looks and feels the same as previous devices, but the portfolio has been widened to tackle more challenging applications and to provide additional capabilities, like expanded reporting, system interface & diagnostics. We have also developed a new color scheme in recognition of the energy transition market for our FIK-IR3-H2 and FIK-IR3-H2-HD detectors.

The HD detector version provides high-definition (HD) video output of the monitored area with clear imaging of any fire event and personnel at distances up to 100 ft (30m). This allows the rescue team to be aware of the exact situation before entering the hazardous area.

The HD units automatically record any fire event for 1 minute before and up to 3 minutes after the alarm. These features and the built-in event logger provide additional means to study the cause and development of fire events for “lessons learned” reviews.

The following table lists the range of Fike detector models, each with its maximum detection distance and typical response times. All Fike models are suitable for use in indoor and outdoor applications.

Fike Model	Distance ft. (m)	Average Response Time	Description
IR3 IR3-HD	262 (80) 1x1 n-heptane	40 ms to fast fire burst or explosion 1.3 s @ 50 ft (15m) 4.1 s@ 230 ft (70m)	Triple IR (IR3) – targeted for all hydrocarbon and other organic fires. Offers the highest immunity to false alarms.
IR3-H2 IR3-H2 HD	100 (30) 32" (0.8m) H2 plume	40 ms to fast fire burst or explosion 1.5 s @ 66 ft (20m) 4 s@ 100 ft (30m)	Adapted IR3 detector, fast response for hydrogen (H2), methane, hydrogen blended natural gas streams, methanol, ammonia, and silane fires. Offers the highest immunity to false alarms.
UV-IR UV-IR-HD	100 (30) 1x1 n-heptane	5 ms to fast fire burst or explosion 1 s @ 50 ft (15m) <2 s@ 100 ft (30m)	Fast Response, combined UV/IR. Detects hydrocarbon and non-hydrocarbon fires like hydrogen. Additionally, it offers spark & arc detection.

## 2 COMPARISON OF FIKE DETECTOR TYPES

Each Fike detector uses Triple IR (IR3) or combined Ultraviolet and Infrared (UV- IR) detection technologies. IR3 detectors offer superior immunity to false alarms as well as high sensitivity and speed of response. The UV-IR detectors respond to a wider range of fire types.

When choosing a flame detector for a certain application, one should consider detection distance, speed of response, and the detector’s immunity to false alarms. Other factors to consider include proximity to flares, hot objects, and the presence of airborne contaminants. Care should be taken to ensure objects do not obscure the detector’s direct line of sight.

Model	Applications	Advantages	Comments
<b>Triple IR IR3 IR3-HD</b>	Hydrocarbon fires.  Suitable for use indoors and outdoors.	<ul style="list-style-type: none"> <li>✓ Fast speed of response</li> <li>✓ Highest sensitivity</li> <li>✓ Highest immunity to false alarms</li> <li>✓ Unaffected by solar radiation</li> <li>✓ Embedded camera option available</li> </ul>	<p>The number one choice for hydrocarbon fires.</p> <p>Superior sensitivity, speed of response, and false alarm immunity.</p> <p>Not suitable for non-hydrocarbon fires.</p>
<b>Triple IR – hydrogen IR3-H2 IR3-H2 HD</b>	Hydrogen, ammonia, silane, and methanol fires.  Suitable for use indoors and outdoors.	<ul style="list-style-type: none"> <li>✓ Detects invisible Hydrogen flames</li> <li>✓ Fast speed of response</li> <li>✓ Longer detection range</li> <li>✓ Highest false alarm immunity</li> <li>✓ Unaffected by solar radiation</li> <li>✓ Embedded camera option available</li> </ul>	<p>Superior sensitivity, speed of response, and false alarm immunity for non-hydrocarbon-based fires.</p>
<b>Combined UV-IR for hydrocarbon &amp; non-hydrocarbon fires UV-IR UV-IR-HD</b>	Hydrocarbon, non-hydrocarbon, and metal fires.  Suitable for use indoors and outdoors.	<ul style="list-style-type: none"> <li>✓ Fast speed of response</li> <li>✓ Moderate sensitivity</li> <li>✓ Low false alarm rate</li> <li>✓ Unaffected by solar radiation</li> <li>✓ Embedded camera option available</li> </ul>	<p>Good all-round detector responding to the widest range of fuel types.</p> <p>Ultrafast response to fireballs and explosions.</p> <p>Affected by electrical arcs, welding, and corona.</p>
<b>Combined UV-IR for hydrocarbon fires UV-IR-F UV-IR-F-HD</b>	Hydrocarbon fires.  Suitable for use indoors and outdoors.	<ul style="list-style-type: none"> <li>✓ Fast speed of response</li> <li>✓ Moderate sensitivity</li> <li>✓ Low false alarm rate</li> <li>✓ Unaffected by solar radiation</li> <li>✓ Embedded camera option available</li> </ul>	<p>Ultrafast response to fireballs and explosions.</p> <p>Affected by electrical arcs, welding, and corona.</p> <p>Not suitable for non-hydrocarbon fires.</p>

### 3 OPERATION

The following table lists maximum detection distances for the different Fike Detectors across a range of fuels when used in extreme sensitivity:

Fuel	Fire size	IR3 & -HD ft. (m)	IR3 CO2L & HD ft. (m)	IR3-H2 & -HD ft. (m)	UV-IR & -HD ft. (m)	UV-IR-F & -HD ft. (m)
n-Heptane	1 ft2 (0.1 m2) Pan fire	262 (80)	262 (80)	X	98 (30)	98 (30)
Gasoline		230 (70)	230 (70)	X	98 (30)	98 (30)
Diesel		164 (50)	164 (50)	X	75 (23)	75 (23)
JP5		164 (50)	164 (50)	X	75 (23)	75 (23)
Kerosene		164 (50)	164 (50)	X	75 (23)	75 (23)
Ethanol		125 (38)	X	X	62 (19)	72 (22)
Isopropanol		180 (55)	180 (55)	X	75 (23)	75 (23)
Methanol		131 (40)	X	59 (18)	52 (16)	59 (18)
Hexane		230 (70)	#	X	98 (30)	98 (30)
Methane		32" (0.8 m) Plume fire	148 (45)	X	66 (20)	59 (18)
LPG	180 (55)		X	X	75 (23)	75 (23)
Hydrogen	X		X	98 (30)	66 (20)	X
Syngas 70% H2/30% CH4	98 (30)		X	82 (25)	59 (18)	33 (10)
Ammonia	X		X	56 (17)2	#	X
Silane	X		X	56 (17)2	20 (6)2	X
Arsine		X	X	56 (17)2	20 (6)2	X
Phosphine		X	X	56 (17)2	20 (6)2	X
Polypropylene	1 ft2	115 (35)	115 (35)	X	49 (15)	49 (15)
Wood / Office Paper	(0.1 m2)	137 (42)	131 (40)	X	33 (10)	33 (10)
Sulfur	Pan fire	X	X	X	UV only 23 (7)	UV only 23 (7)

X – Not suitable  
 1 – FM validated  
 2 – Theoretical  
 # - Not tested

## 4 EXPANDED DETECTION CAPABILITIES BY APPLICATION

### 4.1 THE CO2L MODEL – FOR THE IR3 AND IR3 HD DETECTOR ONLY

Fike has developed a special IR3 configuration for applications where the exhaust (combustion) gases of engines and turbines are known to cause false alarms for competing devices.

This detector configuration, known as CO2L mode, is ideally suited to the detection of heavy hydrocarbon fuels in applications such as road & raid tanker loading racks, aircraft hangars, airport gate / jetty protection, as well as helidecks and helipads where helicopter engine downdraft is a potential false alarm source.

Fuel	Pan Size	Distance ft (m)	Average Response Time (Seconds)
N-Heptane	1 x 1 ft	262 (80)	4.2
Gasoline	1 x 1 ft	230 (70)	3.2
Diesel	1 x 1 ft	164 (50)	3.6
JP5	1 x 1 ft	164 (50)	3.6
JP5	2 x 2 ft	262 (80)	10.3
Kerosene	1 x 1 ft	164 (50)	3.5
Polypropylene	1 x 1 ft	115 (35)	3.3
IPA	1 x 1 ft	180 (55)	2.5
Wood	1 x 1 ft	131 (40)	5.0

## 4.2 THE X5 VARIANT – FOR ALL FIKE DETECTORS

“Flame Detection” can provide 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 in sufficient time to limit the escalation to a point where significant damage has been caused. That is why the Fike family is now available with an X5 variant. The X5 variant is FM-approved for fast-evolving or moving fires. These fires may be caused by a release from pressurized paint, a solvent cloud contacting an ignition source, a fire moving on a conveyor, etc.

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. In the event of ignition, the optical flame detection shall react to the presence of flame within one-half (0.5) second.” The X5 variant complies with NFPA 33.

## 4.3 SPARK & ARC DETECTION

In electrical installations such as high-voltage direct current (HVDC) systems, static var compensators (SVC), flexible AC transmission systems (FACTS) and their valve halls, and numerous others, the ability to detect sparks and electrical arcs, in addition to fire can be valuable in protecting assets.

The presence of sparks and electrical arcs is usually a precursor to a more serious event, such as a fire. We at Fike have enhanced the capabilities of all our Fike UV-IR(-HD) and UV-IR- F(-HD) detectors to generate an additional signal, either via the 4-20 mA signal or an auxiliary relay to indicate the presence of sparks and arcs (high UV levels) in addition to a flame detected signal.

If HD variants are used, spark and arc detection will also initiate the pre- and post-event video recording to aid incident analysis.

## 5 SUMMARY OF FIKE FAMILY FEATURES

The table below lists the standard features of the Fike detector family.

Feature	Standard Detector	“HD” Detector
Standard and selectable Ultra Fast response mode	✓	✓
3 or 4 wire 0-20 mA (HART®) Source or Sink Fire and Fault Relays & RS485 (in the same unit)	✓	✓
HART® option with optical contamination measurement	✓	✓
Operating and Certified Temperature -55C to +85C	✓	✓
Heated optics	✓	✓
Adjustable sensitivity levels	✓	✓
ATEX / IECEx / cFMus / INMETRO / EAC / CE	✓	✓
Performance per FM3260	✓	✓
Performance per EN54-10 (not IR3-H2)	✓	✓
HD video	X	✓
Analog video feed PAL or NTSC	X	✓
High-speed fire (and spark / arc) event recording	X	✓
SIL 2 capable	✓	✓
Integral but segregated termination compartment	✓	✓
Warranty 5 Years	✓	✓







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