

Guide to Flame Detector Selection and Placement



Selecting and properly placing flame detectors is important for effective fire detection and risk mitigation. Various technologies—such as ultraviolet (UV), infrared (IR), and multi-spectrum infrared (MSIR) detectors—offer different capabilities for detecting fires while minimizing false alarms. Proper selection and placement should be based on a thorough risk assessment, environmental conditions, and applicable industry standards and regulations. This guide provides general information on key factors to consider when choosing and positioning flame detectors. Always consult relevant codes, standards, and regulatory requirements, as well as a qualified fire safety professional, to ensure compliance with legal and safety obligations.

Factors to consider when choosing between the FL5000 MSIR and FL500 UV/IR for your application



1. Target Fuel

Selecting the right flame detector based on the expected fuel source helps ensure accurate detection, minimizes false alarms, and enhances overall fire safety by aligning the detection method with the specific risks of the environment. MSA flame detectors are FM-approved for a wide range of fuel sources (see table below), providing verified performance and reliability across diverse fire scenarios. Fuel type not listed? Contact us to request fuel-specific testing.



What type of flame do you want the detector to see?

FL5000 MSIR	FL500 UV/IR
n-Heptane	n-Heptane
methanol	methanol
methane	methane
butane	butane
propane	propane
ethane	ethane
gasoline	hydrogen
ethanol	
crude oil	
ethylene glycol	
isopropanol	
diesel	
JP4	
JP5	
JP8	
jet fuel A	
marina fuel	
kerosene	
xylene	
MEK	
Wood	
cardboard	

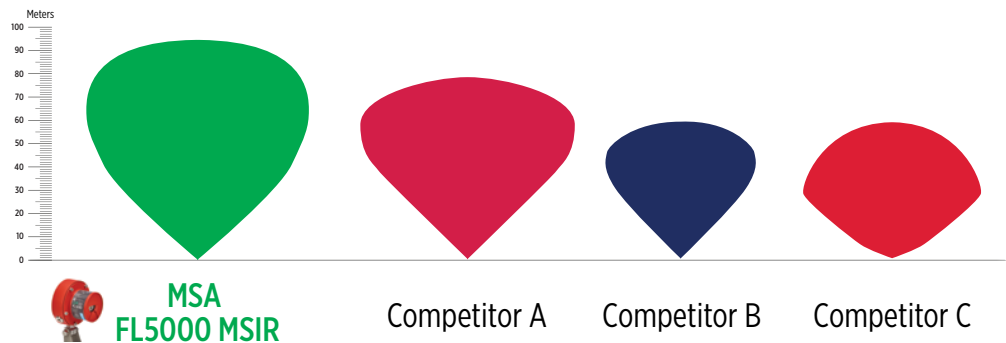


2. Field of View

The field of view (FOV) of a flame detector is important to consider because it determines the area the detector can monitor for potential fires. A larger FOV allows for greater coverage with fewer detectors, reducing overall system costs and installation complexity. However, a larger FOV may also increase the risk of detecting unwanted IR or UV sources, potentially leading to false alarms. Conversely, a smaller FOV provides more focused detection, which can be beneficial in high-risk areas where precise monitoring is needed. Properly considering FOV helps ensure that detectors are positioned to maximize coverage while minimizing blind spots, obstructions, and interference from environmental factors, ultimately improving fire detection reliability and compliance with safety standards.

*Questions
to consider*

- What coverage area do you need the detector to cover?
- Are there any high-risk points to be aware of?
- How does sensitivity affect FOV range?



Response to a 1' by 1' N-Heptane Flame Horizontal FOV



3. Speed of Response

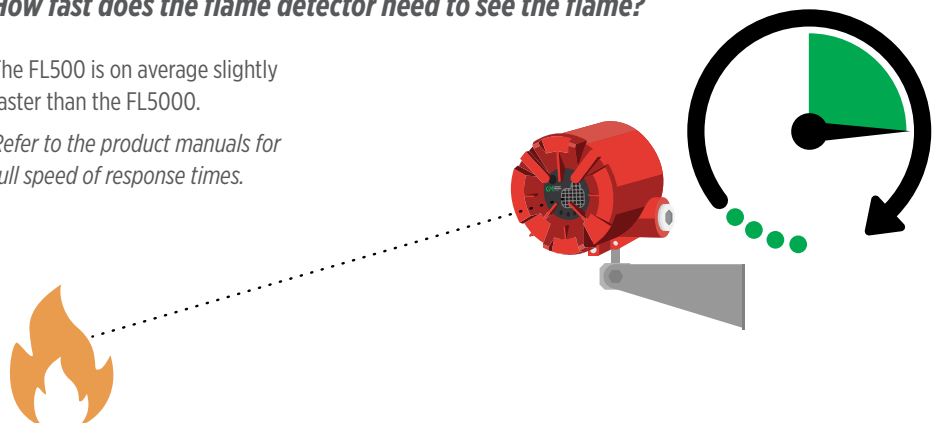
In high-risk environments—such as oil and gas facilities, chemical plants, and industrial manufacturing—a delay of even a few seconds can mean the difference between a small, manageable fire and a catastrophic event. Faster detection enables quicker activation of fire suppression systems, alerts personnel sooner, and improves overall emergency response effectiveness. Additionally, regulatory standards and safety requirements often specify response time thresholds to ensure adequate protection in hazardous environments.

*Questions
to consider*

- How fast does the flame detector need to see the flame?

The FL500 is on average slightly faster than the FL5000.

Refer to the product manuals for full speed of response times.





4. Radiant Energy Sources

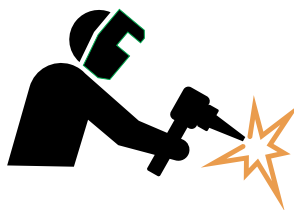
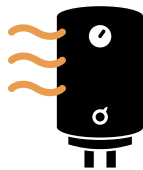
Radiant energy sources, such as sunlight, welding arcs, hot surfaces, and artificial lighting, can significantly impact flame detectors by potentially causing false alarms or reducing detection reliability. Infrared (IR)-based detectors, including UVIR and MSIR models, are particularly sensitive to radiant heat and infrared emissions. For example, direct sunlight or reflections from metal surfaces may produce IR radiation that could be mistakenly interpreted as a fire. Similarly, ultraviolet (UV) detectors can be affected by arc welding, lightning, or other high-energy UV sources.

If there are high ultraviolet (UV) radiant energy sources present, such as arc welding, plasma cutting, lightning, or intense direct sunlight, we recommend the FL5000.

If there are other high infrared (IR) radiant energy sources present such as furnaces, kilns, boilers, compressors and turbines, please consider where you are placing and aiming the detectors. Limit the amount of high IR sources within the FOV as much as reasonable allowed.

Questions to consider

- **What kind of energy sources are present in the application?**

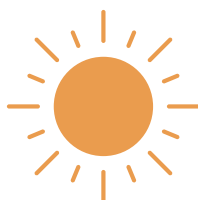


5. Detector Environment

Environmental factors such as rain, fog, snow, and high humidity can reduce the transmission of ultraviolet (UV) and infrared (IR) radiation, potentially delaying or obstructing fire detection. Strong winds can also impact flame movement, changing how a detector perceives a fire. Additionally, direct sunlight and reflections from water or metal surfaces may introduce false alarms in IR-based detectors. To ensure reliable performance, many flame detectors are designed with environmental compensation features, and proper installation techniques—such as strategic placement and protective housings—can help mitigate weather-related interference.

Questions to consider

- **Is the detector inside or outside?**
- **If outside, what are common weather conditions?**
- **Will the detector be subject to high levels of vibration?**





6. Installation

Proper installation and mounting of a flame detector are crucial to optimal performance and reliable fire detection. Placement affects the detector's field of view, minimizing obstructions and false alarms while maximizing coverage of potential fire hazards. Installing the detector at the correct height, angle, and distance from ignition sources enables faster and more accurate flame recognition. We recommend mounting them high and at least 10 degrees downward or more, depending on application requirements. Additionally, proper mounting helps the device withstand environmental factors such as vibrations, extreme temperatures, and contaminants, enhancing longevity and effectiveness in critical safety applications.

*Questions
to consider*



- *Is the detector positioned at the right height and angle for optimal coverage?*
- *Does the detector have a clear, unobstructed line of sight to potential fire hazards?*
- *Is the detector easily accessible for maintenance and inspection?*





7. Cost Considerations

UVIR detectors provide reliable fire detection by combining ultraviolet (UV) and infrared (IR) sensing, making them effective in many industrial applications where false alarm sources, such as hot surfaces or reflected sunlight, are minimal. Additionally, UVIR detectors typically offer faster response times to certain types of flames, such as hydrocarbon and non-hydrocarbon fires, making them a good choice for applications where early detection is critical. If the operating environment is relatively controlled, without excessive IR interference or high-risk factors requiring multi-spectrum analysis, a UVIR detector can provide a cost-effective and reliable fire detection solution.

A Multi-Spectrum Infrared (MSIR) flame detector typically costs more than an Ultraviolet/Infrared (UVIR) flame detector due to its advanced detection capabilities and enhanced performance in challenging environments. MSIR detectors use multiple infrared wavelengths to analyze fire signatures with greater accuracy, reducing false alarms caused by sunlight, hot surfaces, or other IR sources. This improved discrimination makes them ideal for high-risk industrial settings where reliability is critical. Additionally, MSIR technology often incorporates more sophisticated signal processing and higher-grade optical components, further increasing manufacturing costs. While UVIR detectors provide effective fire detection by combining ultraviolet and infrared sensing, their sensitivity to certain environmental factors and potential for false alarms make MSIR detectors the preferred choice in applications requiring the highest level of fire detection reliability.



• How much budget is allocated for this application?



Note: This Bulletin contains only a general description of the products shown. While product uses and performance capabilities are generally described, the products shall not, under any circumstances, be used by untrained or unqualified individuals. The products shall not be used until the product instructions/user manual, which contains detailed information concerning the proper use and care of the products, including any warnings or cautions, have been thoroughly read and understood. Specifications are subject to change without prior notice. MSA is a registered trademark of MSA Technology, LLC in the US, Europe, and other Countries. For all other trademarks visit <https://us.msasafety.com/Trademarks>.

MSA operates in over 40 countries worldwide. To find an MSA office near you, please visit **[MSAsafety.com/offices](https://us.msasafety.com/offices)**.