Selecting a Flame Detector

Planning and installing flame detectors requires consideration of the nature of the fire, the protected area, environmental conditions, detector capabilities and limitations and user expectations. For instance, is it more important to select a detector that alarms a few seconds faster or a detector that has superior immunity to false alarms? Is it more important that the detector can detect a wide range of fuels or shall it focus on only one fuel?

Defining the application:

You need to consider the following:

- All fuels that present a fire hazard
- Location of potential fires
- Minimum fire sizes to be detected
- Maximum detection distance required
- Speed of response
- All sources of nuisance radiation
- Environment conditions

Fuel types

You will need to know the following:

- Hydrocarbon or non-organic fuel types (i.e. Methane vs. Hydrogen or Silane)
- Liquid or gases fuel source (flame detectors can detect liquid fires at a greater distance)
- Potential sources of false alarms (welding operations, reflected sunlight, extreme weather, etc depending upon type of flame detector)

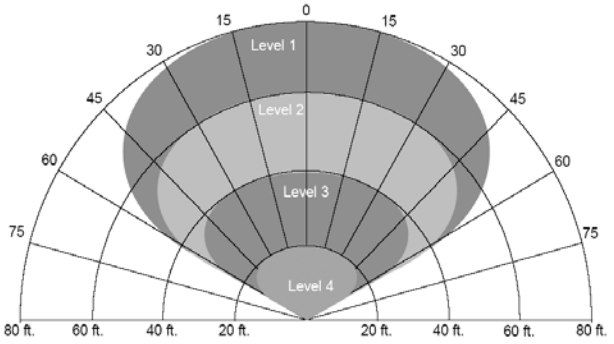
Fire Size

- Detector sensitivity and range are related to fire size. Performance is normally specified in relation to a standard 1 square foot gasoline pan fire for liquids, plume flame with 18" height and 8" width for gases, and defined by weight, size and pre-ignition configuration for solids
- Typical detection ranges based upon fire size are as follows:

Fuel	Fire Size	UV/IR	UV/IR/Vis	IR3	Multi IR
Gasoline	1 sq ft pan fire	50 ft	80 ft	215 ft	215 ft
Heptane		50 ft	80 ft	215 ft	215 ft
JP5		37 ft		150 ft	150 ft
Kerosene		37 ft	75 ft	150 ft	150 ft
Ethanol		25 ft		135 ft	135 ft
IPA		25 ft		135 ft	135 ft
Hydrogen	18" Plume	16 ft	15 ft	-	160 ft
Silane	12" plume	15 ft	50 ft	-	-

Location of Flame Detector

- A flame detector is an optical device and thus it needs to have a clear view of the area to properly detect a fire.
- Flame detectors have a 3-D cone of vision ranging from 90 degrees for the 3600 series to 120 degrees for the 3100, 3200 and 3300 Series Flame Detectors
- Sensitivity diminishes at the edges of the cone of vision so their might be some blind spots at the edges. The detector would still respond but the fire would need to be larger, perhaps up to four times that needed at the center of the cone.
- Since both sensitivity and range are related to fire size, if the detector is placed further away from (or closer to) the fire source, the detectable fire size will vary according to the inverse square law. So doubling the detection distance results in only ¼ of the radiant energy reaching the detector, or conversely, for the same response time, the surface area of the fire then needs to be 4 times larger.



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Detector	Applications	Advantages
3100 Series – UV/IR/VIS	Hydrocarbon fires, Hydrogen, Silane and other hydrogen based fuel fires Indoors or Outdoors	Widest cone of vision in the industry Low false alarm rate Unaffected by solar radiation Multiple fuel types FM and CSFM approvals
3200 Series – UV/IR	Semiconductor Wet Bench applications IPA and other semiconductor fuels Indoors	Enclosure resistant to various semiconductor materials FM and CSFM approved
3300 Series – UV/IR	Hydrocarbon fires, Hydrogen, Silane and other hydrogen based fuel fires Indoors	Widest cone of vision in the industry Low false alarm rate Unaffected by solar radiation Multiple fuel types FM and CSFM approvals
3600 L-LB Series – UV/IR	Hydrocarbon fires, Hydrogen, Silane and other hydrogen based fuel fires Indoors or Outdoors	Moderate speed Moderate sensitivity Low false alarm rate Unaffected by solar radiation
3600 L4 & L4B Series – UV/IR 4.5	Hydrocarbon fires, Indoors or Outdoors	Moderate speed Moderate sensitivity Low False Alarm Rate Unaffected by hot objects or solar radiation
3600 I Series – IR3	Hydrocarbon and Hydrogen Fires Indoors or Outdoors	Moderate speed Highest sensitivity High immunity to false alarms Longer detection range Unaffected by solar radiation
3600 M Series – Multi IR	Hydrocarbon fires Indoors	As IR3 but with hydrocarbon and hydrogen fire detection Moderate speed Moderate sensitivity Low Cost