
TECHNICAL REVIEW

TECHNICAL REVIEW ON FIRE ALARM SYSTEM USING MIXED TYPE FIRE DETECTORS

SCOPE:

Design, Supply, Installation, Commission, Fire Detection and Alarm System

PURPOSE:

Earlier detection which leads to extinguishing / controlling the fire before it grows larger and spread to other area.

Earlier detection of fire and alarm system is one of the effective fire protection system.

APPLICABLE STANDARD:

NFPA -72	--	National Fire Alarm Code
IS2189:2008	--	Selection, Installation and Maintenance of Automatic Fire Detection and Alarm System Code of Practice

IDENTIFICATION OF FIRE:

Fire can be identified by any one or combination of following parameters,

- Smoke
- Heat
- Flame/Ember/Spark/Probe type heat detectors

It is very common, that in many places only Smoke Detectors are used to detect fire. Where smoke detectors are not suitable Heat Detectors are used. However, by selecting suitable model Flame detector fire detection system can be designed to operate efficiently to detect fire at the earliest possible stage.

The following types of detectors are used to identify the above parameters,

1. Smoke Detectors

- 1.1 Ionization smoke detector (Obsoleted)
- 1.2 Photo electric smoke detector
- 1.3 Beam detector – IR type smoke detector with emitter & receiver for high roof area.
- 1.4 Aspiration type smoke detector working on smoke suction and detection.

2. Heat Detectors

- 2.1 Rate of rise and fixed temperature heat detector (Electronic thermistor type upto 70° C)
- 2.2 Bimetal type fixed temperature heat detector
- 2.3 Probe type bimetal auto reset heat detector for special application
- 2.4 LHS Cable (Linear Heat Sensing Cable) for continuous detection of heat.
- 2.5 Quartzoid bulb type heat detector
- 2.6 Fire de tec tube

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3. Flame / Ember / Spark/Probe type heat detectors

- 3.1 UV Flame detectors
- 3.2 UV-IR Flame Detectors
- 3.3 Triple IR Flame Detectors
- 3.4 IR Ember detectors
- 3.5 IR Spark detectors
- 3.6 Probe type heat detectors

It is necessary to select suitable type of flame detector to detect the fire at very earlier stage.

For High roof area / Semi open area / Manufacturing & Process area,

Point type smoke detector is not suitable due to dilution of smoke, dust, humidity and other similar parameters.

Beam type smoke detector will have above referred limitations in addition to that over head crane movement & birds movement.

Heat detector- Though the detectors are suitable for many applications, the limitation of heat detector is that fire needs to grow to develop required heat and also heat should reach to the detector.

Flame Detectors Protect the fire by viewing the flame. By placing the detector at appropriate place fire can be detected effectively.

For High roof area / Semi open area / Manufacturing & Process area UV or UV- IR type flame detectors are strongly recommended. UV –IR detector operates based on two types of sensors UV & IR. When both the sensors detect the fire then only detector will move ON fire mode. This ensures high reliability and avoid false alarm.

The detectors can be connected to any standard fire alarm panel or addressable fire alarm panels as per requirement with necessary hooters, manual call point, response indicator and other activating devices.

FIRE DETECTION AND ALARM SYSTEM

Application

Early detection of Fire and provide audio and visual warning to evacuation. To activate automatic extinguishing system.

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Detectors

Non addressable type and addressable type:

- Smoke detectors : Photoelectric / Optical type / Ionization type
- Heat Detectors : Fixed temperature
Rate rise temperature and fixed temperature
- Special Detectors :
 1. Smoke and Heat combined detectors
 2. Linear Heat Sensing Cable (LHSC) type Detectors
 3. Laser Detectors
 4. Beam Detectors
 5. Air aspiration type smoke detector

Design Basis

- Spacing of Detectors.
 - ❖ As per IS:2189 Table (I)

Detectors	Room Height (m)				
	3.5	4.5	5.5	6.5	7.5
Smoke Detector	8	7	6	4.5	3
Heat Detector					
a. Grade 1	4.0	3.5	2.5	1.5	1

- Detector Spacing is to be multiplied by suitable Factor for air changing and slope ceiling.
- If the beams projects more than 450mm below and are more than 2.5m on centers, each bay formed by beams should be treated as a separate area.
- A detector should be placed on the protected side of the premises on the ceiling 1.5m from any door, window or any opening in the wall partitions separately the protected premises from the other premises.
- All stair wells, Lift shafts, other utility shafts, etc, should have a detector at the top. Lift machine rooms should be provided with a detector.
- The detector should also be provided in cable tunnels, ducts, false floors, AC & AHU room, long return ducts and distribution boards.
- Location of Manual call points.
 - ❖ MCP shall be located in the premises such that no person need to travel a distance of more than 30 m to reach them.
 - ❖ MCP shall be fixed at a height of 1.4 m above the surrounding floor.
- Zoning
 - ❖ Detectors or call points are less than 20 in any area / zone.
 - ❖ The floor area of a single zone shall not exceed 2000M²