



NEWSLETTER

THE INSTITUTION OF FIRE ENGINEERS (SINGAPORE BRANCH)
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SEPTEMBER-OCTOBER 2009

AUTOMATIC FIRE ALARM SYSTEMS AND DETECTORS

By David Goh, Convener of Working Group for CP 10:2005

Common Types of Fire Detectors

1 Heat Detectors

- a. Rate of Rise only
- b. Fixed Temperature only
- c. Rate of Rise/Fixed Temperature (point)
- d. Linear Heat Detector

2 Smoke Detectors

- a. Ionisation type smoke detectors (point)
- b. Optical type smoke detectors (point)
- c. Multisensor fire detectors (point)
- d. Optical Beam Smoke Detectors (linear)
- e. Aspirating Smoke Detectors (ASD)

3 Flame Detectors

- a. UV/IR Flame
- b. UV Flame
- c. IR3 Flame

- Rate-of-Rise (ROR) heat detectors react to the sudden change or rise in ambient temperature from a normal baseline condition. Any sudden temperature increase that matches the predetermined alarm criteria will cause an alarm. A typical ROR detector will activate when the rate of temperature rise exceeds 12° to 15°F per minute
- Fixed Temperature Heat Detectors react to a preset threshold and will not activate until the preset threshold is crossed, regardless of the rate of temperature increase
- Combination type heat detectors react to both the rate of temperature increase and the preset threshold. It is used widely as this is the most sensitive heat detector
- ROR ONLY heat detector shall not be used locally

How Fire Detectors Work

Heater detectors (Point Type)

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Heat Detectors (Linear Type)

- Linear Heat Detector provides early detection of fire or overheating conditions by detecting changes in temperature in localized areas or over its entire length.
- it is especially suited for confined areas or harsh environments where adverse ambient conditions cause other detection devices to be unreliable or difficult to use.

- the sensor cable is constructed with a negative temperature coefficient material, where a change in temperature results in an exponential decrease in resistance of the sensor.
- the interface module interprets this resistance change and provides an output to a control panel once the field programmable alarm set point is exceeded

Ionisation Type Smoke Detectors

- activates when smoke particles enter the ionisation chamber causing change in current flow

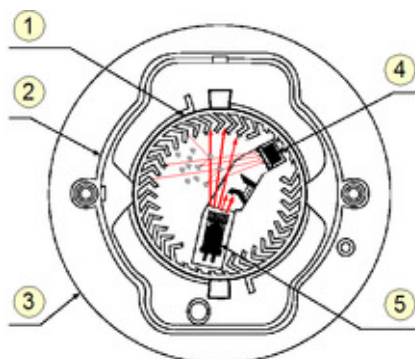


- operates by ionizing air molecules (pink and blue spheres) with alpha particles from a radioactive material, americium 241 (red lines). The ions then carry a small current between two electrodes (above). Smoke particles (brown spheres) attach to the ions thus reducing current flow and initiating an alarm

Optical type smoke detectors

- Operates on either light scattering or light obscuration principle
- Smoke particles in the smoke chamber scatters light into a photodiode (detector)

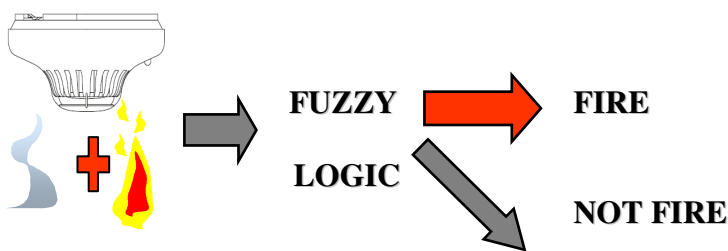
- Amount of light received is proportional to the smoke density
- Operates on either light scattering or light obscuration principle



- 1: optical chamber
- 2: cover
- 3: case moulding
- 4: photodiode (detector)
- 5: infrared LED

Multisensor Fire Detectors

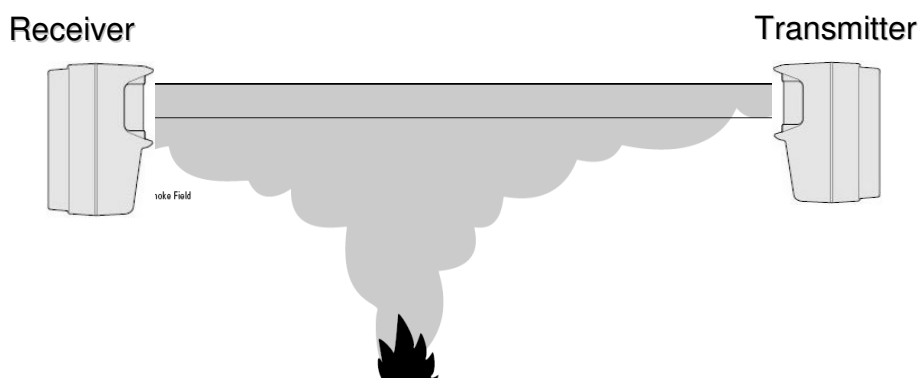
1. Multisensor Detectors represents the next generation of fire detectors that gives an earlier warning of fire or smoke, with the ability to discriminate against false alarms.
2. fuzzy logic software using multi-criteria sensing form the basis of this intelligent detector.
3. the detector consists of integrated high sensitivity smoke and thermal sensors. The system combines the dynamic results of rates of change, patterns, and absolute levels of smoke and heat to identify real fire criteria.
4. selectable software algorithms allow the response to be matched to each particular hazard.



Optical Beam Smoke Detectors

- comprising a transmitter and a receiver unit. The transmitter unit projects a linear beam of modulated infra-red light to the receiver unit. The receiver measures the

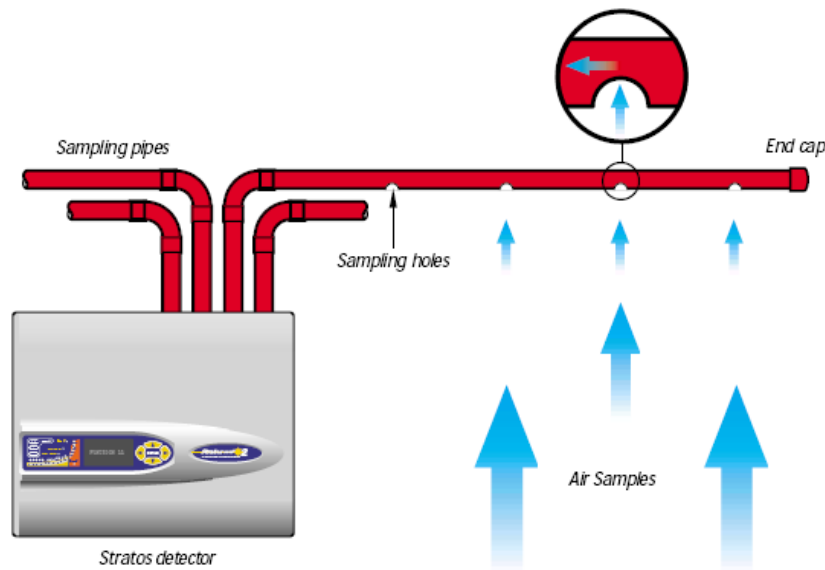
amount of light received and converts it to a signal for processing in the control electronics



Aspirating Smoke Detectors (ASD)

- a method of smoke detection, whereby a sample of air is drawn from the protected area via sampling pipe work, and

analysed at the aspirating detector for the presence of smoke.



Flame Detectors

- Flame Detectors can be divided into UV (ultraviolet), IR (infrared) and UV/IR types
- Flame radiates both UV and IR radiation depending on the types of fire. The UV or IR or combined UV/IR sensor in the Flame Detector measures the amount of radiation to determine the presence of fire

- unlikely to respond to smoldering fires
- rule of thumb: flames from fire to reach 1/3 distance to ceiling before they will operate
- in view of this lack of sensitivity, it is not suitable for the protection of areas where a small fire will cause unacceptable damage
- have the greatest immunity to false alarms
- max. recommended mounting height : 9m

How To Select A Suitable Detector

Considerations :

- the speed of detection required
- the need to minimize false alarms
- the nature of fire hazards

Other Considerations :

- cost
- suitability for the environment
- maintenance requirements

Ionisation Smoke Detectors

- sensitive to smoke containing small particulars
- less sensitive to larger particulars found in dense smoke
- less popular now as manufacture, transport and disposal for the radioactive element is tightly controlled & expensive.
- max Height recommended: 10.5m

How To Select A Suitable Detector

Heat Sensors

- generally less sensitive to most fires
- can detect very clean burning fire (eg alcohol)

Optical Smoke Detectors

- sensitive to smoke containing particles larger than 1 micron produced by most smoldering fires

- less sensitive to smaller particles typical of most flaming fires
- less responsive to black smoke than lighter colored smoke
- max Height recommended: 10.5m
- Commonly use as compare to ionization due to disposal, control etc.

Optical Beam Smoke Detectors

- often used for the protection of large open plan spaces with relatively high ceilings
- used when access to point detectors for maintenance could present practical difficulties
- must be mounted on to a solid construction that is unlikely to 'flex' which causes misalignment and could result in faults signals or even fire signals

- specialist guidance required for the placement, alignment and calibration
- max. recommended installation height: 25m

Aspirating Smoke Detectors (ASD)

- incorporates a detector that of much higher sensitivity that point or optical beam
- often used in critical electronic rooms where even a very small fire can result in acceptable damage
- also used when point detectors would present difficulties on the basis of
 - aesthetics
 - height of space
 - temperature of space (cold rooms)
- specialist guidance required for the design & calibration.

.....to be continued

WORKSHOPS ON NFPA 72 AND NFPA 130

Our Institution had successfully organized two Workshops on NFPA 72 and NFPA 130 from 29 September to 2 October 2009 at Suntec Singapore. The trainer is Mr William Koffel from NFPA USA.

Workshop on NFPA 72 on National Fire Alarm Code was fully attended by 98 participants.

The topics covered are:

- Module 1 The Basics
- Module 2 Initiating Devices
- Module 3 Notification Appliances
- Module 4 Control Units and Power Supplies
- Module 5 Circuits and Pathways (2010)
- Module 6 Emergency Control Functions & Interfaces (2010)
- Module 7 Off-Premises Signaling
- Module 8 Planning & Design of Fire Detection and Alarm Systems

- Module 9 Fire Detection and Alarm System Plans Review
- Module 10 Accepting & Commissioning Fire Detection and Alarm Systems
- Module 11 Using & Living with Fire Detection and Alarm Systems

Workshop on NFPA 130 Standard on Fixed Guideway Transit and Passenger Rail Systems saw an attendance of 60 participants. The topics covered are Introduction to NFPA 130, Stations, Trainways, Venting, Vehicles and Storage and Emergency Operations and Communications.

The participants were from countries like Macau, Philippines, Vietnam, Thailand, Malaysia, Indonesia and Singapore. The feedback was generally good and there were requests to organize more of such Workshops.

IFE EXAMINATIONS 2010

Examination Time-Table

Thursday 11 March 2010	10:00-13:00	IFE Level 2 Certificate (formerly the Preliminary) Examination Paper
Thursday 11 March 2010	10:00-12:00	IFE Level 3 Certificate (formerly the Intermediate) Examination Paper 1
Thursday 11 March 2010	10:00-13:00	IFE Level 3 Diploma (formerly the Graduate) Examination Paper 1 in Fire Safety
Thursday 11 March 2010	10:00-13:00	IFE Level 4 Certificate (formerly the Membership) Paper 1 in Fire Engineering Science
Thursday 11 March 2010	14:00-16:00	IFE Level 3 Certificate (formerly the Intermediate) Examination Paper 2
Thursday 11 March 2010	14:00-17:00	IFE Level 3 Diploma (formerly the Graduate) Examination Paper 2a in Operations
Thursday 11 March 2010	14:00-17:00	IFE Level 3 Diploma (formerly the Graduate) Examination Paper 5 in UK Operations (UK candidates only)
Thursday 11 March 2010	14:00-17:00	IFE Level 3 Diploma (formerly the Graduate) Examination Paper 2c in Aero Fire Studies
Thursday 11 March 2010	14:00-17:00	IFE Level 4 Certificate (formerly the Membership) Paper 6 in Fire Service Operations
Thursday 11 March 2010	14:00-17:00	IFE Level 4 Certificate (formerly the Membership) Paper 7 in Aero Fire Studies
Thursday 11 March 2010	14:00-17:00	IFE Level 4 Certificate (formerly the Membership) Paper 11 in Civil Emergency & Disaster Management
Friday 12 March 2010	10:00-13:00	IFE Level 3 Diploma (formerly the Graduate) Examination Paper 3 in Fire Engineering Science
Friday 12 March 2010	10:00-13:00	IFE Level 4 Certificate (formerly the Membership) Paper 5 in Strategic Human Resource Management
Friday 12 March 2010	10:00-13:00	IFE Level 4 Certificate (formerly the Membership) Paper 8 in Fire Investigation
Friday 12 March 2010	14:00-17:00	IFE Level 3 Diploma (formerly the Graduate) Examination Paper 4 in Human Resource Management
Friday 12 March 2010	14:00-17:00	IFE Level 3 Diploma (formerly the Graduate) Examination Paper 6 in UK Leadership & Management (UK candidates only)
Friday 12 March 2010	14:00-17:00	IFE Level 4 Certificate (formerly the Membership) Paper 2 in Fire Safety
Monday 15 March 2010	10:00-12:00	IFE Level 3 Certificate (formerly the Intermediate) Examination Paper 1 (Version 2 for specified UK FRS candidates only.)
Monday 15 March 2010	14:00-16:00	IFE Level 3 Certificate (formerly the Intermediate) Examination Paper 2 (Version 2 for specified UK FRS candidates only.)

The fees for 2010 examinations are as follows: -

Preliminary	\$ 90.00
Intermediate (one paper)	\$120.00
Intermediate (both papers)	\$150.00
Graduate (per paper)	\$150.00

Graduate (4 papers)	\$360.00
Member (per paper)	\$180.00
Member (4 papers)	\$420.00

For those who have not signed up, please do hurry as the closing date is **Friday, 23 Oct 2009.**

FSSD CIRCULARS

Our Ref: CD/FSSD/01/04/04/02

DID: 68481407
FAX: 68481493

18 Sep 2009

Dear Sir/Mdm

ACTIVATION MEANS FOR MECHANICAL VENTILATION SYSTEM IN SMOKE STOP LOBBY/FIRE FIGHTING LOBBY AND EXIT STAIRCASE FOR PURPOSE GROUP II BUILDINGS

Currently, Fire Code does not address how the mechanical ventilation system for smoke stop/fire fighting lobby and pressurization system for internal exit staircase for Purpose group II buildings are to be activated in the event of fire emergency.

2. The issue was deliberated at the FSSD Standing Committee meeting on 14 Sep 09. The Committee has decided that for Purpose Group II buildings requiring mechanical ventilation system for its smoke stop/fire fighting lobby and/or pressurization system for its exit staircase, a manual fire alarm system complying with CP 10 shall be installed. A manual call point shall be located at the entrance of each exit staircase at every storey, including the non-residential floors. Activation of any manual call point shall initiate the mechanical ventilation system and/or the pressurization system simultaneously.

3. This circular shall take effect from 1 January 2010. For projects that are currently being constructed, the Qualified Person may adopt this practice. Otherwise, he/she may counter-propose other means of activating the mechanical ventilation or pressurization system for FSSD's consideration.

4. Please convey the contents of this circular to members of your Institution/Association/Board. The circular is also available in CORENET-e-Info: <http://www.corenet.gov.sg/einfo>.

5. For any inquiry or clarification, please contact Maj Choh Choon Jin at tel. no. 68481454 or email address Choh_Choon_Jin@scdf.gov.sg.

Yours faithfully
(Transmitted thru' e-mail)
Poon Keng Soon
Secretary, FSSD Standing Committee
for Commissioner, Singapore Civil Defence Force

Our Ref: CD/FSSD/01/03/04

DID: 68481407
FAX: 68481493

13 Oct 2009

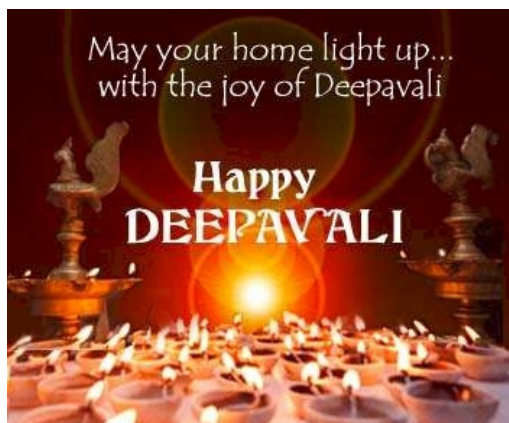
Dear Sir/Madam

IMPLEMENTATION OF SS 546:2009 – CODE OF PRACTICE FOR EMERGENCY VOICE COMMUNICATION (EVC) SYSTEMS IN BUILDINGS

The SS 546: 2009 – Code of Practice for Emergency Voice Communication (EVC) Systems in Buildings was officially launched on 26 Aug 2009. This standard specifies technical and operational requirements for basic EVC systems and also covers planning, design, installation, maintenance and testing of EVC systems in buildings.

2. SCDF has briefed the FSSD Standing Committee on 14 Sep 2009 on the changes in SS 546:2009. In order not to unduly affect on-going projects, the Committee agreed that SS 546:2009 shall be applicable to all building plans that are submitted to SCDF for approval on or after 01 Jan 2010.
3. On Clause 2.4.2.2 (f) of SS 546:2009, please refer to Clause 8.21 (b) (vii) of Fire Code for the latest requirements.
4. Please convey the contents of this circular to members of your Institution/Association/Board. The circular is also available in CORENET-e-Info: <http://www.corenet.gov.sg/einfo>.
5. For any inquiry or clarification, please contact Cpt Lau Heng Hui at tel. no. 68481413 or email address Lau_Heng_Hui@scdf.gov.sg.

Yours faithfully
(Transmitted thru' e-mail)
Poon Keng Soon
Secretary, FSSD Standing Committee
for Commissioner, Singapore Civil Defence Force



The President and Council Members

wish

all Hindu Members

Happy Deepavali