



HEAT DETECTION THEORY

HEAT DETECTORS

Detect-a-Fire units are the “heart” of many Fire Protection Systems. These highly reliable devices have been a standard of the industry for over 45 year. Many thousands of these units are now in use controlling the release of extinguishants such as clean agents, CO₂, water or dry chemicals. In some systems the device is used as an ALARM device, to sense overheat or fire, and alert personnel. In other systems, it is used as a RELEASE device, to sense fire and actuate fire attack systems.

Detect-a-Fire units have met with wide acceptance because they are designed with RATE COMPENSATION. This provides a unique advantage over both fixed temperature and rate-of-rise types of detectors because only the Detect-a-Fire unit accurately senses the surrounding air temperature regardless of the fire growth rate. At precisely the predetermined danger point, the system is activated.

Fixed temperature detectors must be **completely** heated to alarm temperature and therefore a disastrous lag in time may occur with a fast rate fire. Rate-of-rise devices, on the other hand, are triggered by the rate of increase in ambient temperature and are subject to false alarms caused by harmless, transient thermal gradients such as the rush of warm air from process ovens.

The secret of the unit’s sensitivity is in the design. (Figure 1) The outer shell is made of a rapidly expanding alloy, which closely follows changes in surrounding air temperature. The inner struts are made of a lower expanding allow. Designed to resist thermal energy absorption and sealed inside the shell, the struts follow temperature changes more slowly.

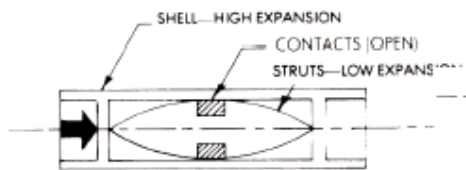


FIGURE 1 READY

A slow rate fire (Figure 2) will heat the shell and struts together. At the “set point”, the unit will trigger, actuating the alarm or releasing the extinguishant.

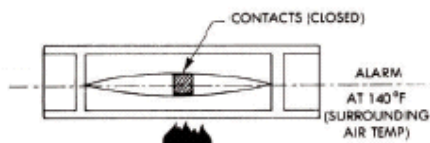


FIGURE 2 SLOW FIRE



A transient rush of warm air up to 40°F/min may expand the shell but not enough to trigger the unit. By ignoring transient warm air exclusion, the Detect-a-Fire unit virtually eliminates false alarms prevalent with rate-of-rise devices.

If a fast fire starts, (Figure 3) the shell will expand rapidly. The struts will close, actuating the alarm or releasing the agent. The faster the fire rate of growth, the sooner the Detect-a-Fire unit will react.

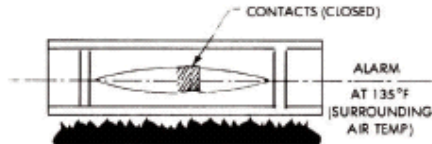


FIGURE 3 FAST FIRE

MOUNTING

Detect-a-Fire units are not position sensitive. Horizontal and vertical detectors refer to the most common mounting configuration for that unit. However, each type can be mounted either horizontally or vertically depending on the application and installation requirements.

THE VITAL ELEMENT

The distinct advantages of the Fenwal Detect-a-Fire lie in its rate-compensated principle – which eliminates false alarms, and in its unique sealed construction. Thus long life and total reliability are assured in arduous atmospheric conditions. The electrical parts are hermetically sealed against damp, oxidation, etc. No electrical power is required to operate the alarm contact, which closes immediately the air temperature reaches the selected detector set point. This automatic operation by differential expansion of the metals of construction is powered solely by the warmth of the fire. Precision construction of the element ensures extreme sensitivity and accuracy. The element is self-resetting and is compatible with all standard fire panels. The stainless steel outer shell ensures optimum corrosion resistance.

SELECTION GUIDE

1. Choose a detector temperature setting 56°C (100°F) above maximum ambient temperature.
2. As a general rule, space detectors 7.6m (25ft) apart



3. Please note: all modern fire detection systems require a detector with a normally open electrical contact, which **closes** on fire.

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