

Industry Sector Building Technologies Division

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Technical paper

Innovative testing procedures increase safety

The protection of people, assets and infrastructure always ranks first with every fire detection systems operator. Operators need to rely upon optimum system operation throughout the system's entire lifecycle. Fire detection system manufacturers and providers use intelligent, state-of-the-art testing methods for the purpose of servicing and maintenance.

Reliability and safe alarming in the event of fire are crucial properties which all operators demand of their fire alarm systems. This requires, among other things, that all components of the fire alarm system are regularly serviced and maintained, including regular inspections of the fire detectors in compliance with the relevant, country-specific and regional standards and directives. New technologies and methods are increasingly used for the fast and efficient inspection of the latest detector generation. These methods enable service technicians to work efficiently and safely, at the same time providing for reliable information on the state of each individual detector. Impairments and malfunctions are detected in an early stage and can be remedied without running the risk of delayed or missing alarms.

Detectors with intelligent algorithms

False alarms may lead to operational interruptions and consequently high costs. Modern fire detectors work with highly sophisticated algorithms virtually ruling out false alarms. These algorithms evaluate ambient signals and respond according to a preselected parameter set used to adapt the alarms optimally to their respective locations. The simultaneous use of several sensors at one single detector point makes it possible to obtain additional, important evaluation information, in order to improve detection reliability. In addition, the development of the various signals over time is analyzed and used for reliable alarm decisions. The use of algorithms clearly reduces the number of false alarms and improves the response behavior and reaction to fire phenomena.

Responsibility for new alarm testing procedures

The best-known inspection method for automatic fire detectors is testing with test gas. This method generates test gas fog, which is intentionally not detected as a normal fire phenomenon by detectors of the latest generation. Fire detectors using algorithms react on test gas fog only after a considerable delay. The detection behavior largely depends on the detector type and on the selected parameter set.

With detectors of previous generations, the use of test gas is still useful and appropriate. It is important to always use the test gas specified by the detector manufacturer. Only this way can it be ensured that the use of test gas has no negative impact on the detector's sensor unit. The detector manufacturer is thus not only responsible for selecting the appropriate test gas but also for the specification and description of the detector test method with the appropriate detector testing devices. Of course the regulations pertaining to electrical safety and electromagnetic radiation are to be observed and accounted for. It is also important to note that there is no such thing as an approval and recognition of detector testing devices, as is commonly claimed and assumed.

Function and reliability of new detector testing procedures

In addition to the internal detector self-tests, special electronic detector testers monitor the light intensity of the emitted beams in the measuring chamber. This way it can also be checked whether a fire phenomenon can penetrate the detector unhindered. It should be taken into account that regional standards and regulations stipulate visual inspection of the detector.

The functionality of the receiver unit, transmitter unit and evaluation are tested by innovative detectors testers in such a way that no materials need to be sprayed into the detector's evaluation chamber, thus preventing unnecessary strain on the unit. When it comes to neural fire detectors using forward dispersive IRED for light smoke and backward dispersive IRED for dark smoke, of course both types of detection are included in testing. The communication between the detector and the detector tester is digital and wireless, supporting simultaneous testing of the digital control function. After completion of all external and internal tests, the overall, detailed result is indicated on the detector tester.

The considerably more detailed analysis and inspection achieved with the detector tester makes it possible to make concise statements regarding the current detector status as well as reliable forecasts of anticipated developments. Incorrect use by service technicians can be almost entirely ruled out, contributing significantly to reliable and efficient inspections and thus to safe fire detection systems.

Future-oriented innovation

Technologically advanced detectors will assume a larger market share in the future and will increasingly displace older technologies; a development which will force detector manufacturers to increasingly improve their detector testing procedures in order to keep up with technological progress. Innovative detector testers already allow for clearly improved and more efficient testing of modern detector generations. Testing with efficient, reliable and innovative detector testers provides for a far better coverage because both the entire detection system and the various internal processing units can be inspected and thoroughly tested. As opposed to unspecific "works / doesn't work" functional testing, impairments are detected in detail and indicated immediately on site, so that suboptimal or even unsafe detectors can be identified at an early stage and replaced by safe and reliable devices.

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(Optional Information)

Sinteso fire detectors guarantee reliable response behavior for all types of fires. Thanks to the patented ASA-Technology (Advanced Signal Analysis), Sinteso S-LINE detectors achieve unique detection accuracy, practically eliminating false alarms from deceptive phenomena (steam, dust or electromagnetic interference). The ASA parameter sets used in each detector can be adapted precisely to the expected types of fires and deceptive phenomena, and can also be programmed for day-/night-time operation or processes being performed.

Since Sinteso's introduction nearly three years ago, Siemens has integrated over a million Sinteso detectors in fire protection systems, making a substantial contribution to the protection of people, infrastructure, and assets. The Sinteso system is based on a uniform technology platform with standardized interfaces (BACnet). This is an essential requirement for the optimum interaction of individual components such as sensors, alarm devices, control panels, and connection networks, ensuring reliable protection and flawless operation.

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