SST

SAFETY SYSTEMS TECHNOLOGY

WHITE PAPER: Flame Detector Technologies

CONTENTS

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INTRODUCTION

The need for fire protection is of paramount importance in every industry. Due to the stress and harsh conditions that some manufacturing equipment goes through on a daily basis, such as offshore oil and gas rigs, turbines or other high-value manufacturing equipment, the stakes are higher and the threat of a fire has larger, more lasting consequences on the continuity of operations and the well-being of employees.

To address this need for greater fire protection than current smoke and heat detectors can offer, fire safety industry leaders like Safety Systems Technology have developed a number of ultraviolet (UV) and infrared radiation (IR) flame detectors that greatly increase the speed and accuracy of fire detection. The faster a fire is detected, the more response time employees have to evacuate. Early detection is key in isolating and containing a fire to ensure that an entire facility and its staff are not jeopardized by an equipment failure or a gas leak.

HOW FLAME DETECTORS OPERATE

Flame detectors are unique in that they operate within specific ranges of radiant energy, whether its sensors react to visible light, light that falls outside of the visible spectrum such as infrared or ultraviolet, or some variation thereof. No matter what range of light flame detectors respond to, the majority of detectors rely on a field of view. They have a field of view, usually in the shape of a cone, that can extend as far as 70 feet from the detector. Along with a flame detector's range, its response time can vary from sensor to sensor. Typically, a faster response time and a broad detection range make the most effective flame detectors. However, it really depends on the facility and the type of fire it is designed to detect.

Many manufacturing facilities have a great deal of particulate matter in the air, specifically dust, fibers and oil mist. Any build up of particulate matter — even pre-combustion smoke — can impact a flame detector's effectiveness. Fortunately, flame detector manufacturers have employed the latest in circuit technology to incorporate self-diagnostics. For instance, Safety Systems builds automatic self check (ASC) directly into each optical flame detector. These "self-checks" are programmed to occur periodically.

Fortunately, Safety Systems' UV/IR flame detectors are not impeded by dense smoke and are less impacted by particulate buildup than other flame detectors. In addition, each flame detector

can discriminate against arc welding, X-ray, sunlight, lightning and black body radiation — all sources that create the same wavelength as a fire's radiation. Discrimination between radiation sources is critical for any flame detector. Without such a sophisticated ability to distinguish between sources, false alarms can be disruptive to business operations.

F110 UV ONLY FLAME DETECTOR: FEATURES AND USES

Each detector is self-contained in a two-piece explosion proof copper-free aluminum housing.

The SST Model F110 Ultraviolet Flame Detector is a sophisticated, self-contained, optical flame detection system with many features not available in competitive detectors. It detects flames by sensing the UV radiation produced during a combustion process. Each detector is self-contained in a two-piece explosion proof copper-free aluminum housing. It is suitable for use in "classified" areas where ignitable concentrations of flammable gas normally exist.

The F110 can respond to a flame with varying sensitivity and time delay scenarios. In order to accommodate the exact conditions of your facility, each flame detector employs a multiposition jumper plug to select the most appropriate mode. During the initial detection of a fire, the Alarm outputs are activated instantly, and a red LED on the outside of the unit is also activated. If the flame continues for a period of time that can be customized by the customer, the fire will trigger the Delayed Alarm outputs, sending an alarm to alert the customer.

A self-contained source of UV radiation transmitted through a quartz rod to the outside surface of the viewing window is used to test the optical viewing path of the detector. If any obstructions impair the detectors ability to function properly, or any other circuit-related malfunctions are detected, a yellow LED bulb will light up to signal to inspectors that maintenance is required.

Favored for its quick response time and use in areas with explosive materials, UV flame detectors can detect fires created by JP4, methane, wood, diesel fuel, gas, N-heptane, kerosene, alcohol, ethylene glycol, butane, propane, hydrogen and liquefied natural gas. However, welding and lightning will trigger the UV detector. Before welding in the area, the detector must be turned off.

F120 TRIPLE MODE UV/IR FLAME DETECTOR: FEATURES AND USES

The SST Model F120 Triple Mode UV/IR optical flame detector utilizes the most up-to-date circuitry technology and high performing processors on the market to mitigate any problems UV/IR detectors currently on the market face. The flame detector is suitable for use in "classified"

areas where ignitable concentrations of flammable gas normally exist. In the front of the housing, a sapphire window permits both UV and IR radiation to stimulate the corresponding sensors. To ensure that this window is clean and free of obstruction, each detector automatically performs optical viewing maintenance.

There are a number of flame detectors available for various market applications.

A facility can either allow each detector to select which output combinations best suit the environment, or they can be selected manually. If they are selected manually, a customer has the choice of UV alone, IR alone, and Temperature alone. However, if a customer wants more comprehensive fire detection, they can opt for a combination of any two of the three options. The ability to pick and choose is just one of the features that sets the SST Model F120 apart from other flame detectors.

The F120 features all of the abilities of its F110 UV counterpart, except that the F120 responds to a flame with a greater variety of criteria and time delay settings. Typical applications of the F120 UV/IR Triple Mode Flame Detector include offshore platforms, industrial manufacturing facilities and assembly operations, hangars, chemical production and storage plants, pump stations, refineries, fuel stores, heating and coal-fired power plants and liquefied petroleum gas and liquefied natural gas distribution centers and storage facilities.

NFPA'S NATIONAL FIRE ALARM CODE 72

Updated and released every three years by the National Fire Protection Association, this code serves a guideline for those in the above mentioned industries to keep employees safe. The most recent edition of the NFPA code 72 was published in 2013 and serves to provide rules concerning the application, location, performance, inspection and maintenance of fire alarm systems, including any optical fire detector. It also addresses mass notification systems and their integration with fire alarm systems and radiant energy-sensing detector.

There are a number of flame detectors available for various market applications. When selecting a flame detector, be sure to take into account the needs of your facility, its detection range, sensitivity, its self diagnostics and its ability to discriminate between radiant energy sources.

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