HEAT DETECTION FOR HIGH TEMPERATURE ENVIRONMENTS

INTRODUCTION

Occasionally it is necessary to install some type of heat detection inside an oven or other piece of process equipment where the normal ambient temperature exceeds the “extra high” temperature classification corresponding to maximum ceiling temperature of 305°F (152°C) from Table 17.6.2.1. of NFPA 72.

This section provides guidance for selecting automatic fire detectors for use in high temperature environments.

POSITION

Choose detectors that are listed by a nationally recognized testing laboratory.

Use fixed temperature heat-sensing fire detectors. While an oven or other piece of equipment is being brought up to operating temperature, the temperature differential slope of rate compensation or rate-of-rise detectors can be exceeded, causing false alarms.

Fixed temperature heat-sensing fire detectors are either line-type or spot-type. Listed fixed temperature heat-sensing detectors are manufactured in the above 305ºF (152ºC) “Extra High” temperature classification and are generally line-type. Some of these line-type detectors are listed for “Very Extra High” or “Ultra High” temperature classification. There are currently some listed spot-type or line type fixed temperature heat-sensing detectors in the “Extra High”, or higher, temperature classification. Proper selection and installation of these is a key area to the operation of this type of system.

Follow the provisions of NFPA 72 for installation. Use detection system wiring suitable for the elevated ambient temperature. Follow the manufacturer’s installation instructions for line-type fixed temperature heat sensing detectors, if they are used in an application other than open area design.

DISCUSSION

There are some factors to consider when evaluating line-type fixed temperature heat-sensing fire detectors in an equipment protection design. The basic principle of this type of detection is melting of the insulation to cause electrical contact across the wires or fusing of the wires at the designated fixed temperature. The detection wires typically need to be replaced to re-activate the fire detection system for the equipment or process being protected. Two negative factors would be the cost of replacement and the extended impairment of the fire detection system.

In a case where listed fixed temperature fire detectors are not manufactured to satisfy the criteria for a high temperature equipment protection scenario, it might be necessary for the owner and/or contractor to design a properly engineered installation utilizing non-listed heat detection devices, such as thermocouples or similar devices. Negative factors anticipated with use of non-listed detection devices would be higher maintenance cost, more frequent replacement of detectors, false alarms, etc.

Submit the details of this heat detection system proposed for high temperature environments to the nearest AXA XL Risk Consulting office for review:

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