

Temperature Measurement in a Thermal Oxidizer

APPLICATION

Thermal oxidizers are used by ethanol manufacturers to reduce VOC (Volatile Organic Compounds) emissions on the DDG dryer exhaust. Exhaust gas flows through the thermal oxidizer and is heated to 1600°F. At this temperature the organic molecules break down to inert components.

Ethanol plants are required by state and federal environmental regulations to operate their thermal oxidizers to within $\pm 50^{\circ}\text{C}$. This ensures complete breakdown of the VOC constituents.

A temperature sensor is required to control the natural gas burners and to monitor for environmental compliance.

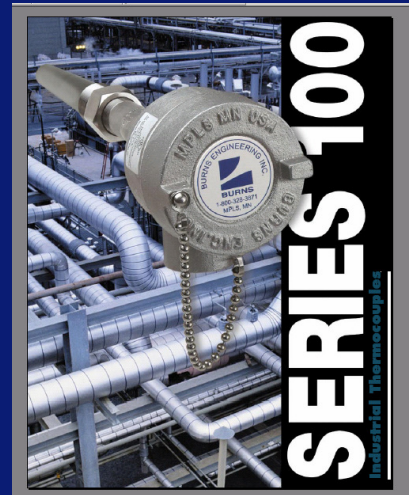
CHALLENGE

It is critical that the temperature is measured accurately and the process is controlled precisely.

If the thermometer indicates a reading that is higher than the actual temperature, then the VOCs may not be completely eliminated and the plant would be violating their environmental permit.

If the thermometer indicates a reading lower than the actual temperature, then the plant may be burning more natural gas than is needed.

100L



▶ Series 100

Thermocouple Assembly

SOLUTION

Burns recommends the Series 100 Type K thermocouple assembly for this application. The mineral insulated design can withstand temperatures up to 2156°F.

Burns recommends a duplex configuration which provides a quick backup sensor should one be required. A second thermocouple located next to the control sensor is a good check to see if any drift is occurring.

Burns recommends a heavy duty tapered thermowell of 316 stainless steel construction to avoid having the thermocouple element fused to the inside the well.

Burns recommends changing the thermocouple elements out on an annual basis. The documentation provided with a new thermocouple element can be filed with other permit documents.