

## High Temperature Surface Mount Sensor for Heat Exchanger Temperature Measurements

### ▶ APPLICATION

A heat exchanger manufacturer needed to measure the tubing fluid temperature in a heat recovery heat exchanger used in conjunction with a gas turbine engine.

By monitoring the fluid temperature and comparing it to the air temperature, they could prevent thermal shock events that could catastrophically damage the unit.

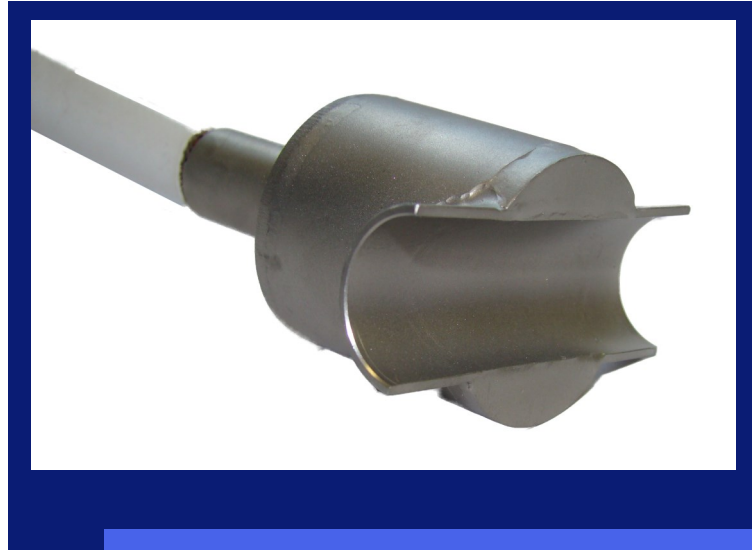
### ▶ CHALLENGE

A direct immersion style sensor seemed to be the obvious choice. However, they were restricted from penetrating the tubing wall as this may be a potential leak point. This also eliminated the option to use the Sanitary Non-Intrusive (SNI). A surface style sensor seemed the next best alternative.

The challenge was the high temperature air flow across the tubing and between the fins created a large convective thermal gradient. They needed a sensor on the surface of the tube that could measure the temperature inside without being influenced by the air flow outside.

They required three temperature measuring elements and wanted minimal impact on the heat exchanger. This meant a sensor that was small enough for minimal installation impact yet large enough to package three sensors and provide adequate isolation from the ambient air.

In addition, the whole assembly needed to withstand 450 F and be mounted in a manner such that no components could come loose and fall off over time. Any mounting nuts or bolts would need to be welded in place to ensure integrity of the mounting.



▶ **Model 21257, Tube Surface Mount RTD**

### ▶ SOLUTION

The solution evolved from a modified version of our SNI temperature sensor. The SNI has the sensing elements mounted on the exterior of the tube with a protective shell providing mechanical protection and thermal isolation.



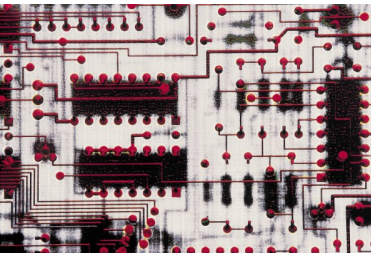
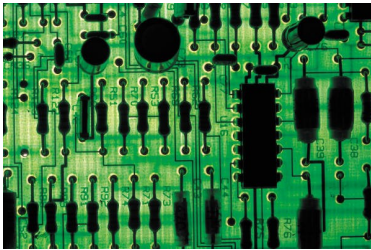
We modified the SNI design to mount on the surface of the existing tubing by creating a half-shell design. This half-shell left tabs on the sides that could be used to hose clamp the unit in place. Hose clamps created an easy way to install the sensor on the tubing while providing the component integrity required. No welding was needed for installation.

Moreover, all of the sensor hardware is on half of the tube so very little modification of the heat exchanger fins needed to be done at the time of installation.

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# ▶ Main Header

## TABLE HEADER

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TREY RESEARCH

Burns Engineering, Inc.  
10201 Bren RD E  
Minnetonka, MN 55343