

TECHNICAL UPDATE - TU-6018

SUBJECT: Checking Tube Temperature in Dekoron/Unitherm Heat Traced Tubing Bundles

At times a customer must verify the process tube temperature in a heated instrument or process line to determine if the bundle is operating properly and meeting the design requirements.

In large diameter pipes, the typical method of testing is to use a hand-held pyrometer or other device to measure the surface temperature of the pipe underneath the insulation, or to place a temperature probe against the pipe under the insulation.

In preinsulated, heat traced tube bundles, however, the small core diameter and low thermal mass of the core can result in extremely large measurement errors.

This update details two methods that allow for accurate measurements in the field.

The first method provides the most accurate measurement with the least amount of field work. It cannot be used on a line that is in service unless a spare process tube is available.

In this case, the technician slides a small diameter thermocouple wire up into the process tube, or a spare tube that is in the heated core. For easiest application, the tube should be at least 3/8" OD, and the thermocouple wire no larger than 20 AWG. Slide the thermocouple inside the tube at least 10 feet to get away from any end effect cooling. The temperature will be the static tube temperature.

Insure that at least one end of the tube is capped to prevent "chimney effect" cooling. This should agree with the tube maintenance temperature specification.

Remove the thermocouple wire on completion of the test.

The second method involves cutting into the bundle at a point convenient to measure. This method can cause damage to the bundle if care is not taken. This method can be used on a bundle in service, and is a good method to determine cooling or heating effects of the process fluid.

Open the jacket and remove the thermal insulation down to the core.

Remove the metal/mylar thermal barrier tape.

Insert the temperature probe alongside the process tube, underneath the barrier tape. The entire length of the sensing probe must be under the barrier tape to insure an accurate reading.

Replace the barrier tape and thermal insulation removed earlier.

Cover the bundle with jacket removed earlier and seal with vinyl tape to prevent spot cooling.

This should now give you an accurate reading of the tube surface temperature if there is material flowing, and the tube maintenance temperature if the flow is static.

When the test is complete, remove the probe and rebuild the insulation and jacket using a Dekoron/Unitherm Seal Patch Kit.