



Using Thermal Grease in Thermowells

Application Note

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Overview

In some applications with non-BAPI products, there are thermal transfer concerns due to a large gap between the interior wall of the thermowell and the outside of the immersion temperature sensor probe that is inserted into the thermowell. An example is when a new thin temperature probe is placed in an existing pneumatic thermowell. In these cases, the gap between the inside diameter (ID) of the thermowell and the outside diameter (OD) of the temperature probe could be as wide as .5 inch. (.75" ID -.25" OD = .5" air gap).

This air gap can cause very slow response times and even temperature reading inaccuracies. Most HVAC systems are slow reacting, but if the control variable has a short cycle time, then BAPI recommends using thermal grease or paste to fill the gap and improve stability and control. It is important that the entire space be filled so applications with large gaps may require a considerable amount of grease or paste.

Considerations

There are a few things to consider or keep in mind before installing thermal grease or paste:

- Thermal grease is messy and difficult to remove from surrounding insulation, pipes, floors and hands.
- It is challenging to inject the grease all the way to the tip of the thermowell and sensor probe but failure to do so will greatly reduce the performance of the sensor.
- If the thermal grease is installed in an upside down thermowell, such as a Hot Water (HW) pipe system, the grease could flow downward away from the tip, reducing or eliminating the effectiveness.
- Thermal grease needs to be selected to meet the specific temperature range of the application. Running or shrinking of the grease will greatly reduce its thermal transfer characteristics.

BAPI Thermowells and Immersion Probes

Thermal grease is not required when using a BAPI thermowell and immersion temperature sensor combination. This is because the gap between the inside diameter (ID) of the thermowell (.26 inches) and the outside diameter of the immersion sensor (.25 inches) is only 1/100th of an inch.

With such a minimal gap, there is direct contact along the length of the immersion sensor and the inside of the thermowell, facilitating accurate readings and quick response times. In addition, BAPI immersion sensors are allowed to move inside their fitting so that they can be extended outward until they make direct metal-to-metal contact with the bottom of the thermowell. This also helps maximize accuracy and speed.

Besides increasing accuracy and speed, using a BAPI thermowell and immersion sensor combination saves the expense of the thermal grease as well as the time required to install it. Over a million BAPI immersion sensor and thermowell combinations have been installed over the years without using thermal grease and without incident or complaints about response time or accuracy.

If you have additional questions about thermowells and immersion sensors, please call your BAPI representative.