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### Important Note - RF ValProbe

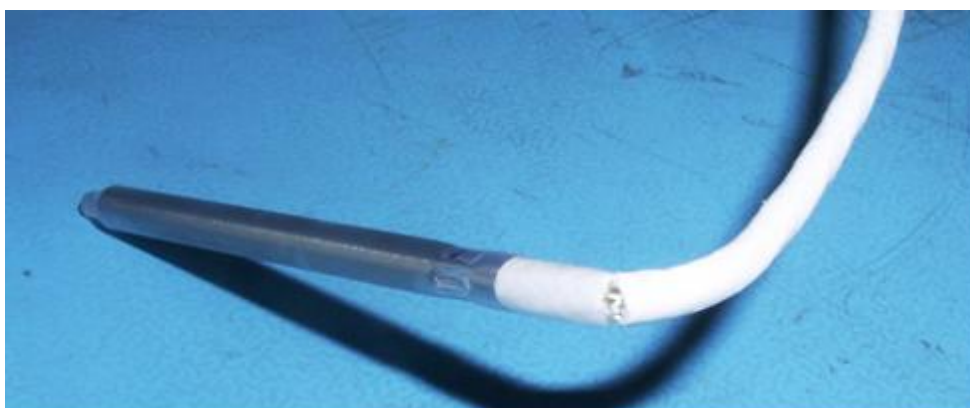
## Temperature sensor handling - How to avoid sensor probe damage

The Kaye RF ValProbe integrates breakthrough RF Mesh technology with well-established thermal validation in situ loggers from GE Measurement & Control Solutions. The Kaye RF ValProbe system is intended for the validation and monitoring of environmental chambers and storage areas (i.e. stability chambers, freezers, refrigerators, warehouses, etc.).

The RF ValProbe system utilizes a 2.4 GHz RF Mesh network and multiple redundant data storage to provide ultra-reliable and robust communications and storage of critical validation data. Additional safeguards guarantee data integrity, storage and compliance with regulatory requirements. The RF ValProbe system is comprised of RF wireless loggers, a base station and software.

The external standard temperature sensor probes of the RF ValProbe system are designed for operation from -200°C up to 200°C and can be submerged into liquids. In order to achieve a reliable and robust sealing the sensor is coated with a chemically inert Teflon jacket. This Teflon jacket is quite rigid compared to the rest of the cable insulation.

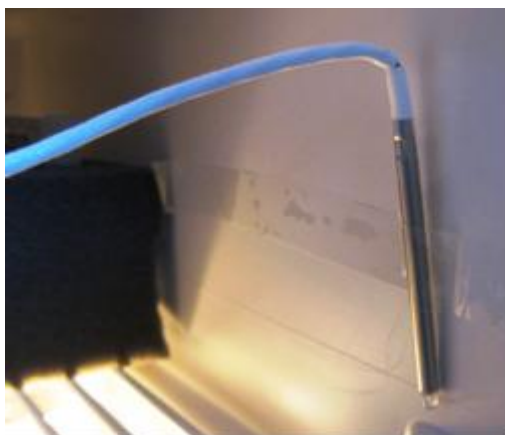
If sensor cables are put under tension and/or bend at this junction point, eminently while the sensor tip is fixed, the junction between Teflon jacket and cable insulation is the weakest point and the insulation is prone to break exactly behind the Teflon jacket. The rupture of the insulation is not caused by any material weakness but by excess tension on the sensor cable while bending the cable at this point.



**Figure 1: The sensor is damaged by a rupture of the insulation directly at the Teflon sealing jacket.**

If there is a rupture in the insulation the sensor is not sealed anymore and any liquid inside the sensor will result in incorrect or invalid measurement readings. Sensors with a ruptured insulation cannot get calibrated in a temperature reference bath anymore (see Figure 1, above).

In order to prevent any damage to the insulation we strongly recommend eliminating any bending the sensor cable directly behind the sensor and avoid tension on the cables.



**Figure 2: Bad practise – The sensor cable is strongly bend directly behind the Teflon jacket and there is strain on the cable.**



**Figure 3: Best practise – The sensor cable is not bend behind the Teflon seal and the loop acts as a strain relief for the cable.**

Bending the cable directly behind the Teflon jacket and putting strain on the cable is a bad practice that should be avoided because it will lead to ruptures in the insulation, especially in cold applications (see Figure 2, above).

Instead we recommend eliminating strain on the sensor cable by introducing a loop into the cable that can act as a strain relief and avoiding strong bending of the cable near the sensor tip.

**Table 1: Available RF ValProbe sensor types**

<i>Type</i>	<i>Logger</i>	<i>Temp. Range</i>	<i>Notes</i>	<i>Calibration points [°C]</i>
237-061 (12,18,36,100) inch	Single	-200°C to +200°C	Single Logger replacement flexible probes	-60; 0; 30; 60
237-066 (20) inch (20) inch flexible with 12 inch bendable	Single	-200°C to +200°C	Bendable probe, used e.g. for SIP and surface measurement applications.	-60; 0; 90; 130
237-068-120-12 (120) inch flexible with 12 inch bendable	Multi	-200°C to +200°C	Bendable probe for Multi loggers	-60; 0; 90; 130
237-062M (15, 30) feet	Multi	-45°C to +260°C	For LabWatch! Flexible probe with no Teflon seal jacket over the sensor.	-30; 0; 30; 60 (Labwatch calibration not automatically included!)
237-063M (15, 30) feet	Multi	-200°C to +200°C	For LabWatch! Flexible probe with Teflon seal jacket over the sensor.	-60; 0; 30; 60 (Labwatch calibration not automatically included!)
237-067V (3, 6,15, 30) feet	Multi	-200°C to +200°C	Multi loggers for validation replacement flexible probe.	-60; 0; 90; 130