Clamp-on temperature measurement in a dynamic regime

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The gas temperature is a key parameter for the operating of a transmission or distribution grid and more specifically: the pipeline safe (freeze effect), the integrity of the security systems (valves, vents, seals...) and the measurement quality of flowmeters and other gauges (pressure, temperature, gas composition...). At present, for the French gas grid, the only way for the temperature measurement is by thermowell and a PT100 probe. This method is precise and fast. But, it is highly expensive in terms of investment, fixed assets period and control procedures. An alternative to this method is the clamp-on temperature measurement. This method is:

* non-intrusive, then less control procedures,
* easily installed, then no fixed assets, less work time,
* less expensive, then less investment.

For all these reasons, this method is an interesting alternative for the thermowell.

This paper answers the flowing issues:

* the validation and the optimization of the clamp-on temperature measurement method for dynamic regime (high and rapid temperature variations),
* the characterization of the clamp-on temperature measurement (error, time delay...)
* the comparison with the thermowell measurements,
* the determination of the optimal operating practices for this method.

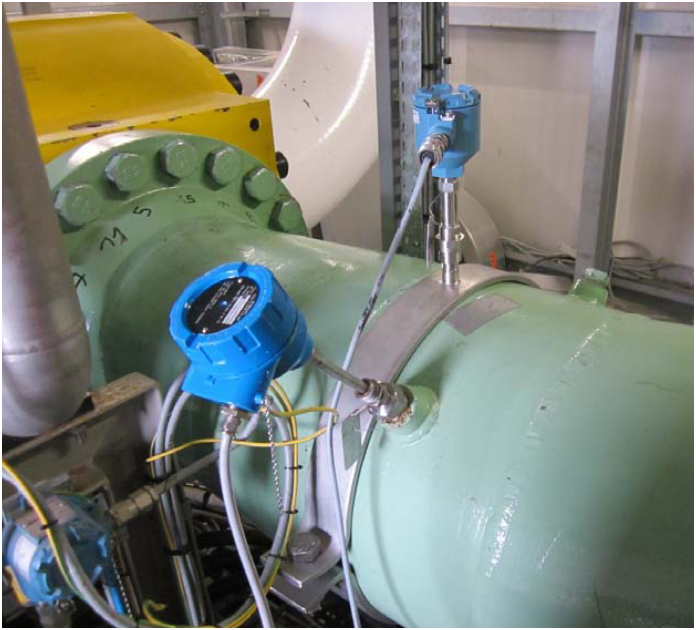
 

Figure 1 – Two clamp-on temperature probes. Left: A PT100 chip probe. Right: The EMERSON standard TE008 (PT100)