



Technical note
Thermal Hysteresis

What is Thermal Hysteresis?

Thermal hysteresis is the difference between two identical pressure readings taken at the same temperature point where the first is taken with an increasing temperature value and the second with a decreasing temperature value.

Why and where is it important?

Thermal hysteresis, unlike pressure hysteresis, is not commonly measured with pressure sensors and rarely appears on standard commercial product datasheets. However, thermal hysteresis, can be a large source of error in certain sensing technologies, usually a result of the mechanical construction of the sensor; in other words, how the sensing element is packaged within the pressure sensor. Errors result due to materials having different thermal properties, resulting in residual stresses on the sensing element as the sensor packaging is exercised through temperature. In some technologies, thermal hysteresis can be as large as 0.2% FS.

This means that thermal hysteresis can be a significant error contribution in applications where high accuracy is required. If a user is wishing to characterize a sensor through pressure and temperature to improve the sensor overall accuracy, then a limiting factor will be the thermal hysteresis of that sensing technology.

Examples of such applications include Gas Flow Computers, Pressure based Mass Flow Computers and electronic pressure transfer standards use in production processes or for field calibration of pressure devices.

How do Druck address these requirements?

For many years Druck has been designing and manufacturing precision pressure instruments, therefore acquiring a deep knowledge of the sensor packaging techniques to minimize thermal hysteresis as one important part of manufacturing stable, repeatable sensors for use in precision applications. Thermal hysteresis values of better than 0.02% FS are achievable with Druck pressure sensors, clearly evident from the new products that are being released to the marketplace, such as the new ADROIT 6000. If your application is in changing temperature environments requiring high accuracy and repeatability, then Druck's pedigree will give you peace of mind.

