



PRESSURE SOLUTIONS

C103: Percentages and Absolutes (VL)

If you look at the training note on TUR, you will notice in the examples that all percentages were reduced to pressure units (kPa).

Percentages are very treacherous, because they have to be applied to different amounts.

Example 1:

Which is better at 600 kPa; a Jofra APC 15 bar or a 20 bar DHB PPS40 or a DHB 552?

The uncertainty on the Jofra APC is 0,01% of range + 0,04% of reading. When we use it at a reading of 600 kPa, the uncertainty is $600 \times 0,04\% + 1\,500 \times 0,01\%$ which is 0,39 kPa.

The uncertainty on the DHB 552 is 0 % of range + 0,02% of reading. When we use it at a reading of 600 kPa, the uncertainty is $700 \times 0\% + 600 \times 0,02\%$ which is 0,12 kPa.

The uncertainty on the DHB PPS40 is 0,025% of range + 0% of reading. When we use it at a reading of 600 kPa, the uncertainty is $600 \times 0\% + 2\,000 \times 0,025\%$ which is 0,50 kPa.

Percentages can only be compared when they are related to the same base.

Example 2:

If we have a master test gauge 4 000 kPa 0,25% and an industrial pressure gauge 4 000 kPa 1%, then, because both have the same range, we can say that the TUR is 4.

What is the TUR when using a 1 000 kPa master gauge with an accuracy of 0,25% FS to calibrate a 400 kPa 1% FS industrial pressure gauge? Let's work it out.

Reference uncertainty is 0,25% of 1 000 kPa = 2,5 kPa.

UUT allowable uncertainty is 1% of 400 kPa or 4 kPa.

TUR = 1,6! Not good enough!

Hands up those who were able to intuit the answer!