

Vapor Pressure Testers – Range vs. Accuracy: Choosing the suitable instrument for your dedicated application



eralytics' vapor pressure tester **eravap** is available in two different versions: EV10 and EV20.

EV10 is equipped with a 1000 kPa pressure sensor capable of performing the most common tasks, whereas EV20 features the 2000 kPa version for applications where higher pressure values are required, such as for the measurement of LPGs. This of course raises the question of why not installing the 2000 kPa pressure sensor in all our devices to offer an “All-in-one” solution. There are two reasons for providing different instrument configurations, adapted to be suitable for different pressure ranges.

Most commonly, the vapor pressure of gasoline and other fuel type samples is measured, in the 20 – 200 kPa range. For some rare applications the vapor pressure of n-butane, condensates or n-pentane at higher temperatures (> 80°C), reaching up to 600 kPa can be of interest. Only gases like methane, ethane and propane reach pressures higher than 1000 kPa.

Reason 1: *“If the pressure range is extended by factor of 2 (1000 kPa to 2000 kPa) the resolution is decreased in the same proportion?”*

Both pressure sensors have a voltage output signal of 200mV (V_{max}), which is electronically amplified. This maps the same signal range in mV to a smaller pressure range, resulting in a resolution of 5 kPa/mV for the 1000 kPa pressure sensor in contrast to 10 kPa/mV for the 2000 kPa sensor.

- As a consequence, the result will be more precise when measured with a 1000 kPa pressure sensor!

Reason 2: *“The sensor drift in kPa depends on the pressure range. If the total pressure range is doubled, the sensor drift is doubled, too.”*

The long-term drift of the two sensors is approximately 0.75 mV. Since the same voltage range is used for different pressure ranges, a drift up to 0.75 mV resembles a drift of 3.75 kPa or 7.5 kPa for the 1000 kPa or 2000 kPa pressure sensor, respectively.

The recommended calibration interval in ASTM methods has been originally determined with 1000 kPa sensors only. Therefore, a risk remains that the 2000 kPa pressure sensor's calibration is off before the end of the 6 months recalibration interval is reached.

For example:

With an assumed sensor drift of 10% within the first year in operation, the 1000 kPa sensor exhibits a drift up to **0.38 kPa** compared to **0.75 kPa** for the 2000 kPa sensor, as shown in Figure 1.

For high pressure LPG suited vapor pressure instruments this is a condition which cannot be avoided without limiting the available pressure range, **eravap** EV10 is designed to combine both advantages, featuring a **smaller drift** of the pressure sensor together with a **wide pressure range**, resulting in the most accurate instrument available.

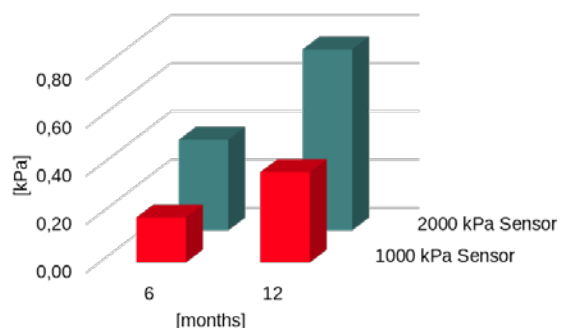


Figure 1: Long term sensor drift of 1000 kPa (red) and 2000 kPa (green) pressure sensor.