



NESS PLC module for volume calculation

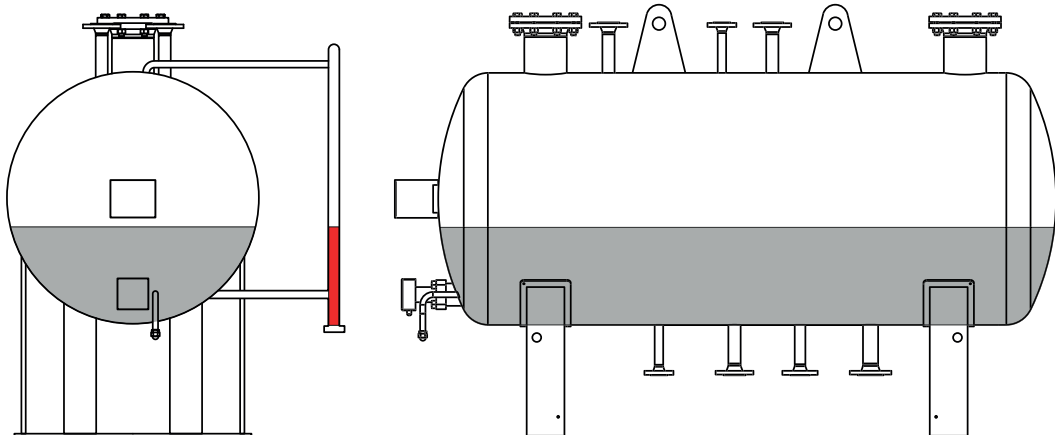
Precise volume determination in horizontal containers

In industrial plants, the level of liquids in containers is typically indicated by the level of a pipe connected to the container via a float with magnetic flaps. Signal processing is carried out via a reed chain. However, the level height is not synonymous with the volume. This is simply due to the general shape of the container. In the middle of a horizontal container, the volume

increases more with the same change in height. At the upper and lower ends, on the other hand, the increase is only slight.

A purely height-based measurement therefore does not allow a direct statement about the actual supply in the tank (as volume).

In principle, this is not a problem, but it is not optimal for some applications.



Important for leak detection

The fill level is easy to measure, but does not provide a linear representation of the actual liquid volume inside. However, volume is the decisive factor for monitoring purposes.

For example, the remaining oil volume in the expansion tank makes it easier to determine when new oil needs to be added, because light distillates are regularly removed from the system via an active light distillate removal system. The exact determination of the volume or the change in volume over time becomes

even more important if you want to be alerted to leaks based on a decreasing volume.

This requires additional measures, such as precise temperature measurement in all parts of the system, but the calculation of the volume is essential.

Functional principle of the PLC module

The developed PLC module for volume calculation uses the known container geometry and the measured fill level to determine the exact liquid volume.

The calculation is based on an approximated but very accurate integration of the container cross-sections along the fill height. The result is calculated in real time and displayed directly on the HMI.

The module can be integrated into new plants or retrofitted into existing systems, provided that a measurement signal for the fill level is available.

For particularly high accuracy, the fill level can be measured using a radar probe. These sensors achieve a resolution of ± 1 mm, enabling extremely precise volume determination. This requires a free measuring connection or a corresponding adaptation of the container.

Through the combination of intelligent calculation and precise measurement, the PLC module delivers reliable volume data that can be used for numerous applications – from operational optimization to automated leak detection.

