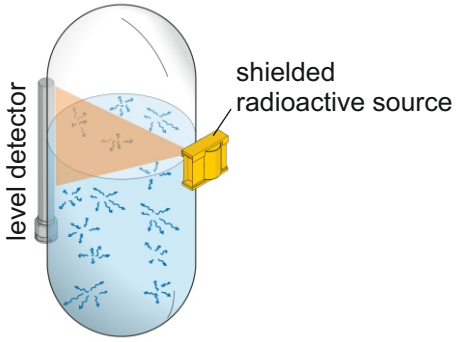
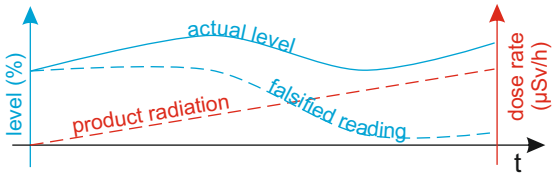
Level Measurement of Products with Natural Radioactivity

PRC (**P**roduct **R**adiation **C**ompensation)

Measurement of products with natural radioactivity



Special applications require special solutions. So it is not rare that products where the level is to be measured already contain natural radioactivity. In practically all known cases, this portion of the radioactivity is not constant. Depending on the strength of radioactivity, a radiometric measurement will be affected to a greater or less extent.



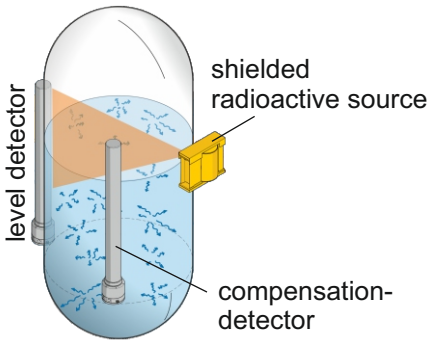
actual level = actual level in the vessel

product radiation = dose rate of the product

falsified reading = falsified reading due to product radiation

The trend illustrates how the measured value of a level measurement is falsified if the radiation in the product continuously increases over time.

The Answer



In this case, wouldn't it be good to know how strong the product radiation is at any given moment?

This is possible with a second detector! It only has to be shifted around the vessel so that the radiation from the source does not reach the "compensation detector".

The information from this "compensation detector" must then be simply transferred to the level detector and will be processed there. This option provides our level measurement system LB 480 SENSseries.

Thus, a level gauge is realized, that is independent of any product radiation.

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PRC Design

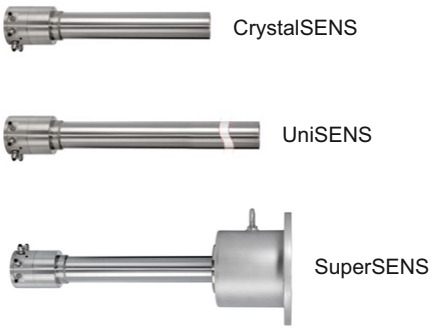
When designing a PRC-measurement the following should be considered:

1) The compensation detector

- must have the same crystal size, or detector length
- must be placed at the same height.
- must not be mounted in the beam path of the radiation source.

2) The radioactivity in the product must be homogeneously distributed.

Detector Versions with PRC



The PRC-measurement is available as a level gauge in the following SENSseries detector versions:

- CrystalSENS (point detector)
- UniSENS (rod detector)
- SuperSENS (point detector with highest sensitivity)

In PRC measurements, a point detector is preferably used, because it is easier and better to shield. Moreover the point detector is located at a significantly larger distance to the radioactive product, as it is mounted at the 100% level position.

Successes with PRC

The PRC measurement has already been applied successfully several times.

For example, in an uranium processing plant in which the level of uranium-suspension is measured in several vessels. The dose rate coming from the product radiation is roughly around 80 µSv/h.

Similarly, in the production of polypropylene, the PRC measurement could provide a solution. The product radiation at a dose rate of 0.5 µSv/h can be up to 3 µSv/h, which is approximately in the range of the usual designed source radiation at the detector. The experience which the customer could gather was so convincing that he wants to install further PRC measurements.

Please contact us, we will find the solution for your measurement problem!

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