

## **Innovative methods for level measurement in pressure vessels**

### **Abstract**

Most of the level monitoring systems for pressure vessels containing saturated steam-water mixture use the hydrostatic method. Differential pressure transducers are connected by pulse tubes with nozzles at different height of the pressure vessel. A disadvantage of this method is given by measuring errors cause by evaporation and/or degassing processes in vertical parts of these pulse lines. The error is caused by the decrease of the fluid density in the reference pipe, when a two-phase mixture appears. The present work aimed at the test of a novel differential pressure measuring system that eliminates the influence of density changes in the pulse lines. It is based on two differential pressure transducers, placed accurately at the elevation of the connecting nozzles. They are connected with the pressure vessel only by horizontal pipes. The vertical distance is bridged by a standpipe, the fluid of which is completely separated from the fluid in the vessel. Degassing respectively evaporation effects can therefore completely excluded in the reference column of the new system. The method was tested at the pressurizer test facility of the University of Applied Sciences Zittau/Görlitz on three types of transients including a rapid pressure decrease similar to a loss-of-coolant transient. Traditional differential pressure systems as well as local void probes were used for comparison. The method has proven its advantages compared to the traditional hydrostatic level measurement method.

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