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Application example of a stainless steel nutating disc meter RCDL DN25

Customer´s objective target

On the premises of a local company in the greater Frankfurt area, which deals with the production of hygienic and cosmetic products for human application, a part of the production needed to be expanded and renovated for economic reasons.

However, we do not always have the best conditions for such conversions. And in this case – due to reasons related to technical production processes and local conditions, the underground storage tanks for isopropanol and ethanol, with a medium temperature of about 7 °C, were about 400 m away (piping conditions!) from the planned filling stations.
The products that need to be filled must be taken to various pipelines at five separate filling stations. These pipes are situated only on a part of its total length in various temperatures, so depending on the weather, greater temperature differences may occur. The product freezing is not a concern, however, there may be larger variations in the density of the fluids.

The possibility of trace heating and/or heated pipelines is excluded completely for energy-related aspects and by the company's philosophy, which focuses on the environment and sustainable economy.
The planning and construction of the facility is to be designed so that the used materials meet safety requirements, accuracy, hygienic standards as well as the economic aspects and durability.

Planning phase

During the planning phase, it was obvious that in these sensitive areas, only stainless steel could be used to meet the hygienic requirements in production. In this case a total of 10 filling stations, which are shared with a probability of about 80%, thus 10 flow meter systems and 10 metering valves were needed.

In order not to neglect the economic factor that affects seriously with 10 filling points on the selection of equipment to be used, a RCDL nutating disc meter from Badger Meter immediately came into question.
However, there were negative votes, which raised the concern that these devices in opposite to a mass flow meter can not measure the real amount. Firstly, because the dosing of mass must be made in "kg", on the other hand, based on temperature differences the changes in density rates and quantity rates can not be captured and - it is "only" a volumetric meter.

Executing phase:

The simplest solution is not always the most economical and rational solution.
The decision was made to use the RCDL nutating disc meter from Badger Meter, as these units are very robust. Furthermore, stainless steel complies with all hygienic standards, as well as satisfying the material requirements in terms of durability and resistance.

Out of economical reasons, when comparing RCDL to a mass flow meter, the metering solution is about 80% cheaper and therefore unbeatable.
Since the total dosing was done centrally by a HMI operator unit and a connected programmable logic controller, it was the easiest and most effective way to incorporate the different temperatures of the product in the dosage by installing PT100 temperature gauges at the measuring points

The RCDL with a pulse value of 1 pulse per 100 ml determined the current flow at the measuring point. In the programmable logic controller, this volume is multiplied by the temperature compensated density and recorded. To optimize the accuracy of the flow measurement, a "calibration factor" has also been introduced into the calculation.

All dosage rates are based on the valve closing time so that the product can continue to flow, even though the selected set point is reached and the valve is already closing. This has been reflected in the programmable logic controller and corrected by using "offset".

Because all decisions were made in an effective and economical manner, the dosage accuracy was realized with a mass flow meter at a fraction of the cost. Here, the saved costs due to the 10 filling stations are significant.