The Effect of Abrasive Wear on the Operational Properties of the Flowmeters Venturi Nozzles

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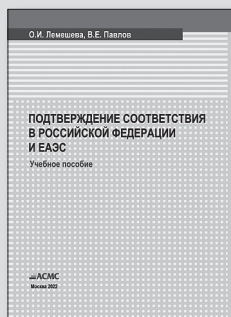[3] Professor of Department, Moscow, Russia

We have presented the results of a study of the influence of abrasive wear of the Venturi nozzle working surfaces on the operation of a variable differential pressure flow sensor. The study was carried out by numerical simulation of the operation of the Venturi nozzle with zero wear of the working surfaces and with an increase in the tolerances of the considered geometric parameters. Based on the simulation results, we have analyzed the dependence of the flow rate on wear. We have developed a method for assessing the effect on the change in the hydrodynamic properties of the Venturi nozzle of the shape of the two-radius interface of the end face at the inlet with the inner cylindrical surface of the throat and the blunting of the annular rib from the intersection of this surface with the conical surface of the diffuser. It has been established that a change in the indicated geometrical parameters, even within the tolerance limits, increases the outflow coefficient by a quarter. To reduce the effect of abrasive wear on measurement accuracy, we suggest that the section of the two-radius interface and the annular rib of the working surface of the Venturi nozzle be subjected to chemical-thermal hardening.

References

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