Inter-laboratory Comparison of Small Water Flow Calibration Facilities Between EHJ and NMIJ

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In this paper, results of an inter-laboratory comparison of small water flow calibration facilities with extremely low uncertainty between Endress+Hauser Japan (EHJ) and the National Metrology Institute of Japan (NMIJ) is reported. Flowrate range between 30 kg/h and 36000 kg /h is compared. Uncertainty of mass flowrate is from 0.020% to 0.025% at EHJ and from 0.021% to 0.023% at NMIJ. To achieve low uncertainty, NMIJ carries out a re-evaluation of the uncertainty budget for two weighing tank systems. With advanced control of ambient temperature and calibration, the uncertainty level can be reduced to approximately half of previous levels. Results of the inter-laboratory comparison show excellent agreement for both standards, which is less than 0.018%. *En* values are also less than 0.52 for all examined flowrate points. These results show a high level of consistency for the facilities at both labs. Since it is difficult to know substantial applicability of the facilities by general calculation, such as the difference and *En* value, comparison is performed using modified fitting curves which provide a trend curve without the reproducibility of the transfer standards. As a result, significant difference between two facilities was quite small, and is estimated to be less than 0.001%. Differences in this comparison are one or two orders lower than previous comparisons on water flow.