MCERTS Bulletin 25

Calculation of Uncertainty of discharge coefficient for flumes

An error has been identified in the equation for calculation of uncertainty for the correction coefficients C_v and C_D presented in the measurement standard for flumes. **BS ISO 4359:2013** "*Flow measurement structures – Rectangular, trapezoidal and U-shaped flumes"*.

The following equation is presented to estimate the percentage uncertainty of the discharge coefficient u*(C) in paragraphs 10.6.7, 11.6.7 and 12.6.8 for rectangular, trapezoidal and U-shaped flumes respectively. It is repeated in paragraph 13.3 with a note stating the confidence level. (Equations 43, 58, 77, 87)

$u^*(C)=\pm[1+20(C_v-C_D)]\%$

The note in paragraph 13.3 is not correct.

This equation provides an estimate for the uncertainty at 95% confidence level, as stated in an earlier version of the standard (1983).

The error is repeated in the example calculation in paragraph 14.4 leading to incorrect results in 14.7.

The error has been confirmed by a member of the ISO committee.

Inspection companies should be aware of this error and ensure that uncertainty calculations of u*(C) use the correct equation for estimating the standard uncertainty at the 68% confidence level:

$u^*(C)=\pm[0.5+10(C_v-C_D)]\%$

before combining with other sources of uncertainty, also at the 68% confidence level, to derive the overall standard uncertainty. This is then multiplied by the coverage factor (k=2) to obtain the overall uncertainty at the 95% confidence level.

BSI committee CPI 113 have been informed of this error.