Measuring Weirs

Flow in a measuring flume or at a retaining mechanism (overflow, constriction) can be determined in various ways:

- Measuring of the water level in the measuring weir and mathematical calculation of the flow from the water level (overflow height) and geometry of the overflow when the discharge amounts to more than 0.05 l/s. Overflows are ideal for measuring flow rates because there is a definite relationship between every flow rate Q and overflow height $h_ü$. We prefer, therefore, to use this method.

- Measurement of differential pressure at diaphragms, nozzles or venturi tubes is particularly well suited for measuring the flow in tubes.

- Measurement of velocity with a PRANDTL tube.

For very small flow rates, e. g. seepage water readings of less than 0.05 l/s, we recommend taking container measurements with a tilting water meter.

As a measuring weir we normally offer a triangular overflow (THOMSON measuring weir) (Fig. 2 and 3), with which the flow rate Q is calculated from the equation

$$Q = \mu \cdot h_ü^{2.5} \left[m^3 / s\right]$$

where

$$\mu = 0.565 + 0.0087 / h_ü^{0.5}$$

if the measuring flume is at least 2 m long and α = 90° (see Fig. 1).

If α does not equal 90°, then

$$Q = 2.363 \mu \tan\frac{\alpha}{2} \cdot h_ü^{2.5}$$

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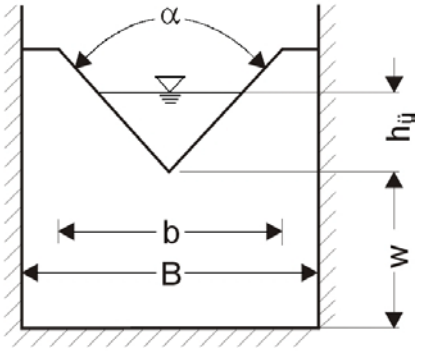

Fig. 1 Geometry of the triangular measuring weir according to STRICKLAND

For very high flow rates we offer rectangular measuring weirs in accordance with REHBOCK, with which the flow rate Q is calculated from the formula

$$Q=\frac{2}{3}\cdot\mu\cdot b\cdot h_{ü}\cdot\sqrt{2g\cdot h_{ü}}$$

with the overflow coefficient

$$\mu=0.6035+0.0813\frac{h_{ü}}{w}$$

For automatic reading of the water level $h_ü$ in the measuring weir you can use either a mechanical level logger with float (Fig. 2), or two electric differential pressure sensors (two for redundancy reasons) are fitted to a pressure borehole on the bottom of the basin (this will also permit continuous logging of the height of the water level in the basin).

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Fig. 2 Measuring weir (3 m long) with a THOMSON triangular overflow and a level logger

Fig. 3 Measuring weir in the cable terminal shaft of the Freudenstein Tunnel

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