

Using the Rule

Rectangular Weirs, V-Notches and Sharp Edged Orifices

The following are examples which have been calculated using the instruction on the back of the rule:—

Using the black scales:—

Weir 6 ft. long. 30 ins. head

Flow=74 cu. ft./sec.

V-notch 90° angle. 6 ins. head

Flow=0.446 cu. ft./sec.

Sharp-edged orifice 3 ins. dia. 20 ins. head

Flow=0.31 cu. ft./sec.

Using the red (metric) scales:—

Weir 6 m. long. 30 cm. head

Flow=6440 cu. m/hr.

V-notch 60° angle. 40 cm. head

Flow=286 cu. m/hr.

Sharp-edged orifice 6 cm. dia. 100 cm. head

Flow=27.4 cu. m/hr.

Trapezoidal Weirs

From the above examples, the calculation of flow for trapezoidal weirs is simply the addition of the flows through the notch and weir which together form the equivalent trapezoidal area. However, in the case of a Combined Notch and Weir it may be helpful to consider the following example:—

Combined Notch and Weir

Referring to the diagram on the back of the rule—let $A=8$ ft., $B=9$ ft., the angle of notch= 150° , and $H_2=20$ ins.

From the tangent of half the angle of the notch

$$H_1=14.45 \text{ ins.}$$

Using the Rule, the flow over the notch with a head

$$\text{of } 14.45 \text{ ins.} = 14.6 \text{ cu. ft./sec.}$$

Now move the slide to bring the “weir” arrow to 14.6 cu. ft./sec. and read against a weir length of 9 ft. the head $H_3=7.5$ ins.

$$\text{Then } H_2+H_3=27.5 \text{ ins.}$$

The combined flow =

$$16 \text{ ft. weir with } 20 \text{ ins. head} = 110 \text{ cu. ft./sec.}$$

$$+ 9 \text{ ft. weir with } 27.5 \text{ ins. head} = 99 \text{ cu. ft./sec.}$$

$$\text{Total flow} = 209 \text{ cu. ft./sec.}$$

The corresponding figures for metric calculation would be:

$$A=2.44 \text{ m. } B=2.75 \text{ m. } H_1=36.7 \text{ cm. } H_2=50.8 \text{ cm. } H_3=19.05 \text{ cm.}$$

Then $H_2+H_3=69.85$ cm. and the combined flow

$$= 11220 + 10098$$

$$= 21318 \text{ cu. m./hr.}$$

Note

- While all scales are clearly marked, the user of this slide rule is advised to practise the use of it, taking care to read the proper scale (by name and colour) for the calculation being performed.
- After estimation and selection of the type and size of weir or notch, accurate figures, beyond slide rule estimation, can be obtained by the use of the formulae given. For metric dimensions, these can be converted into feet and, after calculation, the cu. ft./sec. answer can be multiplied by 102 to give cubic metres per hour.
- For general proportions of weir chambers reference should be made to textbooks or to publications such as British Standard 509: 1939.

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