Hopper flow analysis

Summary

Input Data

- Pipe inlet located at the bottom of the tank
- Vertical pipe, length 1 m
- Water depth measured from the tank bottom
- Evaluated water depth: 45 mm
- Conservative discharge coefficient: C_d=0.62

Flow rate calculated using the orifice flow equation:

$$Q = C_d \cdot A \cdot \sqrt{2gh}$$

where

$$A = \frac{\pi D^2}{4}$$

and

- Q= flow rate (m^3/s)
- C_d= discharge coefficient = 0.62
- D= internal pipe diameter (m)
- g= gravitational acceleration = 9.81 m/s^2
- h= water depth = 0.045 m

Internal pipe diameter ø143 mm (outer diameter 145 mm)

Flow rate at 45 mm water depth **9,4 l/s**