

EPR/NP3629SD/A001 / B6 - Calculations

Application for an Environmental Permit – Part B6, Water Discharge from the Installation

3- How Much Do You Want to Discharge

3c – Calculation for maximum rate of discharge of blowdown :-

$$\text{Blowdown rate} = \frac{\text{steam consumption} \times \text{total dissolved solids in feedwater}}{(\text{Max allowable dissolved solids} - \text{total dissolved solids in feedwater})}$$

The steam consumption is 4000kg/h, and a maximum allowable dissolved solids of 2500 ppm. The feedwater ppm from the clients existing treated feedwater supply based on the monthly sampling analysis is 523 ppm

$$\begin{aligned} \text{Therefore blowdown rate} &= \\ & \frac{4000 \times 523}{(2500 - 523)} \\ &= \underline{1058 \text{ kg/h (0.296 l/s)}} \end{aligned}$$

Clearly dependant on flow rate and the quality of the feedwater. The blowdown is intermittent at intervals of about 1 hour.

3b - Calculation for maximum volume of effluent which will be discharged in a day from the steam boiler blowdown :-

$$\begin{aligned} \text{Blowdown rate} &= 0.296 \text{ l/s} \times 24\text{hours} \times 60\text{mins/hr} \times 60\text{secs/min} = 25,574 \text{ litres/day} \\ &= \underline{25.50 \text{ m}^3} \end{aligned}$$

3d - Maximum volume of non-rainfall dependent effluent to be discharged in a day
= 25.50 m³