

UNIVERSITY OF CANTABRIA
DEPARTMENT OF SCIENCE AND TECHNIQUES OF WATER AND THE ENVIRONMENT

Water treatment

EXAMPLE 1

The Water Treatment Plant of the city of Entemi, has a design flow rate of 0.5 m³/s. Source water has a high quality, and only solids, suspended solids and microorganisms need to be removed.

Determine:

1. Typical process for this WTP
2. Surface area of the settling tanks, which have an overflow rate (surface loading rate) of 40.3 m³/d·m²
3. Surface area of the rapid sand filters, knowing that their face velocity is 120 m/d

Solution:

1.

- a) Floating materials and big solids removal
- b) Sand and grit removal
- c) Coagulation-Flocculation-Decantation
- d) Filtration (rapid sand filter)
- e) Disinfection (chlorine)

2. $0.5 \text{ m}^3/\text{s} * (24*60*60) \text{ s/d} = 43,200 \text{ m}^3/\text{d}$

$$v_o = \frac{Q}{A_{s,settling}} = 40.3 \text{ m}^3/\text{d} \cdot \text{m}^2 = \frac{43200 \text{ m}^3/\text{d}}{A_s}$$

$$A_{s,settling} = 1072 \text{ m}^2$$

3. $v_a = \frac{Q}{A_{s,filtration}} = 120 \text{ m/d} = \frac{43,200 \text{ m}^3/\text{d}}{A_{s,filtration}}$

$$A_{s,filtration} = 360 \text{ m}^2$$