

API Style Oil Water Separator Sizing Calculation

Date:
Customer:
Reference:
Proposal:
Notes:



Water / Wastewater Division

INPUTS	
100	Flow rate (gpm)
130	Water temperature (F) 65d typical
0.95	Specific Gravity of the Oil (S.G = g/cm ³)
150	Oil droplet size to be removed (in microns) 30 microns typical
0.75	Coalescing media plate spacing (0.5", 0.75", or 1.2")
2	Correction Factor (0.1 - 2.0)
75	Model Number of selected unit

RESULTS	
0.9860	Density of the Water (S.G. = g/cm ³)
0.0052	Viscosity (in Poise)
1.2568	Rise Rate of Oil Droplet (gpm/ft ²) - calculated
159.13	Horizontal Surface Area area (ft ²) of the separator needed to achieve desired oil removal performance
0.89	Cross Sectional Velocity (ft/min). MUST be < 3fpm

Formula:

$$Q_m / (A_H \cdot 7.48) = (\mu^2 * 1.072 * 10^{-6}) (S_w - S_o) / \varphi$$

Q_m = design flow, in M³/Hr

A_H = horizontal separator area, in M²

μ = oil droplet diameter in microns

S_w = specific gravity of the wastewater

S_o = specific gravity of the wastewater's oil phase

φ = wastewater's absolute (dynamic viscosity, in poise)

Note: This calculation is based on the methods proposed in API Publication 421 February 1990 using Stokes Law. The calculation first solves for total Horizontal Surface Area, which is then translated to Media Coalescing Area to determine how many cubic feet of media are needed. Cross section velocity is also determined to ensure the maximum velocity of 3 fpm is not exceeded.