Oil Water Separator Sizing Calculation

Date:
Customer:
Reference:
Proposal:
Notes:

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Water / Wastewater Division

INPUTS	
200	Flow rate (gpm)
65	Water temperature (F) 65d typical
0.9	Specific Gravity of the Oil (S.G = g/cm^3)
60	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)
45	Amount of Media Installed in OWS (ft^3)

RESULTS	
0.9984	Density of the Water (S.G.= g/cm3)
0.0105	Viscosity (in Poise)
0.2711	Rise Rate of Oil Droplet (gpm/ft^2) - calculated
1475.20	Horizontal Surface Area area (ft2) of the separator needed to achieve desired oil removal performance
42	Media Coalescing Area (ft2/ft3.)
35.12	Cubic feet (ft3) of media volume - calculated MINIMUM
2.97	Cross Sectional Velocity (ft/min). MUST be < 3fpm

Formula:

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

Q_m = design flow, in M^3/Hr

A_H = horizontal separator area, in M^2

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.