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Calculating liquid level in a cylinder

Thomas Fried Helsør

Senior Facilities Engineer at Wintershall Norge

I have a challenge for you. Consider a horizontal flat ended cylinder filled with 30 volume % water and 70 volume % air. The internal diameter of the cylinder is 1 meter and the length is 10 meters. The liquid level (the distance from the bottom of the cylinder to the water/air interface) is 0,34 m. I have found the liquid level by using iterations (goal seek in excel). The problem is that I want to find the liquid level without having to use an iterative method. Is this possible?

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3 comments



Wilfredo

Wilfredo Garcia

Process Specialist at Ecopetrol

Hi Thomas,

To obtain the liquid level in horizontal vessels you have to consider the liquid surge time and the cross vessel area at the accumulated volume. I think I have an excel spreadsheet for these calculations. Allow me to look in the files I have saved during my projects experience and I'll submit it to you. By the way, pass on your email please.

Cheers,

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Saeid R. Mofrad

Principal Process Engineer at Petrofac (P.E.)

Top Contributor

Try following formula:

$$Y = (a + c X + e X^2 + g X^3 + i X^4) / (1.0 + b X + d X^2 + f X^3 + h X^4)$$

where:

$$Y = H/D$$

$$X = V/VT$$

H: Liquid height

D: Vessel diameter

V: Liquid volume

VT: vessel total volume

and

$$a = 0.00153$$

$$b = 26.787$$

$$c = 3.299$$

$$d = - 22.923$$

$$e = 24.353$$

$$f = - 14.845$$

$$g = - 36.999$$

h = 10.529

i = 9.892

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S M Kumar

Process Design Consultant

Top Contributor

S M

(*~*)!!

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