Floating Floc Annotated Bibliography

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Annotated Bibliography

Fundamentals of Bubble Formation during Coagulation and Sedimentation Processes

Gas bubbles can form in solution whenever the total dissolved gas pressure (TDG) is greater than the local solution pressure (supersaturation). Rapid mixers can also cause floating floc even in undersaturated water. This article outlines the experiments conducted to investigate the initial formation and then stability of floating floc during conventional coagulation-sedimentation processes. The volume of the bubbles formed and the equilibrium dissolved gas concentration in the water was estimated using a gas bubble equilibrium model based on the assumption of a closed system. This article also looks into the mass transfer rate of the dissolved gas into the gas bubbles. Factors such as water temperature and coagulant type are also discussed.

Scardina, P., and Edwards, M. (2006). "Fundamentals of bubble formation during coagulation and sedimentation processes." *Journal of Environmental Engineering*. 132(6):575-585. Available from <http://cedb.asce.org>. Accessed 2009 February 21.

An Improved Gas-Stripping Column for Deoxygenating Water

The article discusses gas-stripping columns and an experiment using a gas-stripping column. In the introduction, the article mentions the advantages of using such columns to deoxygenate water due to their simplicity and low cost. These columns generally involve a porous substrate in the column through which water flows downward and nitrogen gas flows upward. The methods section describes the setup of the experiment and how nitrogen gas was introduced into the compresses gas cylinder. They found that the amount of dissolved oxygen in the output water was inversely related to the rate of nitrogen gas flow.

Barnhart, M. (1995). "An improved gas-stripping column for deoxygenating water." *Journal of the North American Benthological Society.* 14(2):347-350. Available from <http://jstor.org/stable/1467786>. Accessed 2009 February 26.

Water Treatment Unit Processes: Physical and Chemical

This is a book describing water treatment processes, and in certain sections it mentions the stripping of dissolved oxygen from solution. The book briefly discusses gas transfer and the transport of gas from aqueous phase to gas phase, which is controlled by rate of interface area created. On page 956, there is the mention of using gas transfer to strip air in order to remove volatile compounds from the solution. On page 979, the book refers to an experiment in which nitrogen was used to strip oxygen from solution.

Hendricks, D.(2006). *Water treatment unit processes: physical and chemical.* Boca Raton, Florida: CRC Press. Available from <http://books.google.com/books>. Accessed 2009 February 25.

Expansion of Granular Water Filters During Backwash

Granular media filtration is a crucial unit operation in water treatment plants because of its high effluent quality standards. This paper studied the mathematical models for graded filter media with uniform and irregular sieve diameters. It points out that an increase in flow rate causes the bed to expand and accommodate the increased flow while maintaining the same pressure drop. It has been found that the log-log plot of the backwash velocity against bed porosity is linear for a fluidized bed of uniform grain size. Once the porosity of the media is known, the expanded bed height can be calculated with the formula given in the paper. From the paper, it reconfirmed that sand media with a size of 0.52 mm and uniformity coefficient of 1.43 results an effective backwashing at an expansion of 50% at 2.75 cm/s backwash velocity.

Akkoyunlu, A. (2003). "Expansion of Granular Water Filters During Backwash."*Environmental Engineering Science.* 20(6): 655-665, 2003. Available from <http://www.liebertonline.com/doi/pdf/10.1089/109287503770736168>. Accessed 2009 February 27.