Abstracts

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FLUIDIZATION

Vol. 58, No. 38, 1962, $4.00 to members, $15.00 to nonmembers. Symposium Series books may be ordered from the Secretary's Office, the American Institute of Chemical Engineers, 345 East 47 Street, New York 17, New York.

Reaction Time Distributions in Fluidized Catalytic Reactors, J. C. Orcutt, J. F. Davidson, and R. L. Pigford. This paper describes experiments in which a mixture of ozone and air fluidized a bed of iron oxide particles. **Point Age Distributions of the Gas Phase in Fluidized Beds,** Francesco De Maria and J. E. Longfield. Experimental results from point measurements of age distribution obtained in tracer measurements in 4 in.; 2, 7, and 13 ft. diameter fluidized beds are reported in terms of the mixing parameters for an effective diffusivity model. The results are discussed in relation to the effects of scale up and bed geometry on gas flow patterns in fluidized reactors. **Factors Affecting Fluidized Bed Quality,** Jacob B. Romero and Lennart N. Johanson. Quality of fluidization is considered from the standpoint of criteria which distinguish particulate and aggregative fluidization, and by means of experimentally determined bubble size and frequency. **Effect of Reactor Internals on Quality of Fluidization,** William Volk, C. A. Johnson, and H. H. Stotler. The progress in scale up of laboratory-size fluid bed reactors is shown by successful operation of commercial units using sufficient vertical surfaces to give equivalent diameters of 4 to 8 in. **The Effect of Bubbles on Gas-Solids Contacting in Fluidized Beds,** P. N. Rowe. This paper reviews the relevant published work and offers tentative theories that describe particle and gas movement in a fluidized bed. Bubbles are discussed in some detail. **Species of Fluidization,** Arthur M. Squires. Commercial practice offers a choice between the fluid bed and the teeter bed. The decision is not simple, and perhaps these observations of physical behavior, gas-to-solid contacting efficiencies, and large-scale design will assist in the selection. **Entrainment From Fluidized Beds,** W. K. Lewis, E. R. Gilliland, and Peter M. Lang. This study was undertaken to gain increased insight into the entrainment behavior of fluidized beds. Explanations of the observed trends in terms of dense phase and disperse phase behavior are proposed, and correlations of the data are given. **Studies of Gas-Solid Heat Transfer in Fluidized Beds,** J. R. Ferron and C. C. Watson. Various heat transfer parameters from previous work are compared with those determined here. An attempt is made to resolve conflicting results that have appeared. **Heat Transfer and Solids Mixing in Beds of Fluidized Solids,** W. K. Lewis, E. R. Gilliland, and Henry Girouard. The ability of several batch fluidized beds to transfer heat internally has been determined experimentally and represented by the effective thermal conductivities of the beds. **The Fluidization of Uniform Smooth Spheres in Liquid Media,** I. L. Adler and John Happel. Experimental data have been obtained for the fluidization of uniform smooth spheres in aqueous glycerine solutions. The effect of the bed screen support design and the calming section on fluidization characteristics has been obtained. **High-Speed Flow of Fluidized Solids in Changing Area,** I. H. Stockel. A theoretical derivation of the high-speed,

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dense phase flow behavior of gas fluidized solids in changing area flow behavior of gas fluidized solids in changing area flow sections is presented. A dimensionless process diagram is described.

Computer Program Abstracts

Readers of the *A.I.Ch.E. Journal* who are interested in programming for machine computation of chemical engineering problems will find in each issue of *Chemical Engineering Progress* abstracts of programs submitted by companies in the chemical process industries. Collected by the Machine Computation Committee of the A.I.Ch.E., these programs will be published as manuals where sufficient interest is indicated. The following abstracts have appeared this year:

CEP (October, 1962) p. 84

Calibration of Inclined Tanks with Dished Heads (101)

Analytical Solution of Fourth Order Equations (102)

(Continued from page 695)

N_{Nu} = Nusselt number = $2hr_o/k$
N_{Pr} = Prandtl number = ν/α
q = local heat flux density on cylinder wall
r = radial distance
r_o = radius of the cylinder
R = r/r_o
t = time
T = temperature
T_H = temperature of hot side of cylinder
T_c = temperature of cold side of cylinder
T_i = initial temperature = $(T_H + T_c)/2$
u = velocity component in the θ direction
U = ur_o/ν
v = velocity components in the radial direction
V = vr_o/ν

Greek Letters

α = thermal diffusivity of fluid
β = coefficient in equation of state (see reference 7) = $1/T_i$
ΔT = $T_H - T_c$
ν = kinematic viscosity of fluid
ϕ = $(T - T_i)/\Delta T$
τ = $t\nu/r_o^2$
θ = angle measured from bottom of cylinder through hot wall

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Manuscript received April 25, 1961; revision received June 6, 1962; paper accepted June 8, 1962. Paper presented at A.I.Ch.E. Cleveland meeting.