SECTION 6 - NOMENCLATURE

1) a = interfacial area of gas bubble
(ft^2 bubble surface area/ft^3 expanded liquid)

2) A = cross sectional area of reactor (ft^2)

3) c = flame-sprayed catalyst thickness (ft)

4) [ ] = concentrations (moles/ft^3)

5) [CAT] = catalyst concentration (lb cat/ft^3)

6) C_L = liquid molar concentration (moles/ft^3 liquid)

7) Cp_i = heat capacity of specie i (Btu/mole °F)

8) Cp_o = heat capacity of coolant (Btu/mole °F)

9) Cp_s = heat capacity of solids (Btu/lb°F)

10) D = tube diameter (ft)

11) ΔE = activation energy

12) h_o = coolant film resistance [Btu/(hr)(ft^2)(°F)]

13) h_s = reactant side film resistance [Btu/(hr)(ft^2)(°F)]

14) H_{Rj} = heat of reaction j (Btu/mole)

15) k_G = gas phase reaction rate constant (ft/sec)

16) k_H = hydrogenation rate constant [(ft$^3_{Rx}$)^2/lb cat-hr-mole]

17) k_L = liquid phase reaction rate constant (ft/sec)

18) $k_{L,i}$ = liquid film mass transfer coefficient for specie i (ft^3 liquid/ft^2 gas-bubble surface area - sec)

19) k_o = forward rate constant for olefin equilibrium [(ft^3_{Rx})/lb cat-hr]

20) k^o = frequency factor

21) k_p = polymerization rate constant [$(ft^3_{Rx})^2$/lb cat-hr-mole]

22) k_T = rate constant at temperature, T_a

23) k_{WG} = water-gas shift forward rate constant [$(ft^3_{Rx})^2$/lb cat-hr-mole]

24) k_c = catalyst thermal conductivity [Btu/(hr)(ft^2)(°F)(ft)]

25) K_e = olefin equilibrium constant

26) K_i = vapor-liquid equilibrium constant for specie i.

27) K_t = thermal conductivity of tube wall [Btu/(hr)(ft^2)(°F)(ft)]

28) $M(CH_2)_nH$ = active catalyst species with alkyl chain length n attached

29) M_i = molar flow rate of specie i (moles/hr)

30) M_o = molar flow rate of coolant (moles/hr)

31) N_c = number of components

32) NR = number of reactions

33) N_T = number of tubes

34) p = fraction of all monomers that have polymerized.

35) Q_L = heat removed (Btu/hr)

36) r = rate of formation (moles/hr-$ft^3{}_{Rx}$)

37) r_j = rate of reaction j (moles/hr-ft^3)

38) R = gas constant

39) S_{ij} = stoichiometric matrix

40) t = tube-wall thickness (ft)

41) T = temperature (°F)

42) T_a = absolute temperature

43) T_W = temperature at the tube wall (°F)

44) U = overall heat transfer coefficient (Btu/hr-°F-ft^2)

45) V_G = gas molar flow (moles/sec)

46) W_S = weight flow rate of solids (lbs/hr)

47) X = unit length of reactor (ft)

48) X_n = mole fraction of carbon number species n.

49) $X_{b,i}$ = mole fraction of specie i in bulk liquid

50) Y_i = mole fraction of specie i in gas phase

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