Batch drying essay sample

The solution of the problems are to be submitted as a team report at the end of the period. Please include honor code and the individual contribution of each team member. 1. A wet solid is dried from 36% to 8% moisture in 5 hours under constant drying conditions. The critical moisture is 14% and the equilibrium moisture is 4%. Calculate the time needed: a) To dry from 8 to 5. 5% moisture b) To dry from 30% to 15% moisture c) To dry from 36% to 5. 5% moisture 2. A sheet material measuring 0. 8 m square and 5 cm thick is dried from both sides from 20% to 2% moisture under constant drying conditions. The dry density of the material is 500 kg/m3 and its equilibrium moisture is negligible. An experiment showed that the constant drying rate is 4. 5 kg/m2-hr and the falling rate begins at 25% moisture. How long is the drying time. What is the % moisture after 1 hour of drying?

3. Hot Air at 90oC and 40% relative humidity is used as heating medium in a tray drier in order to reduce the moisture content of wet sand from 30% to 5%. Weight of dry sand is 5 kg and the tray dimensions are 20 cm by 60 cm by 3 cm. Critical moisture is 15% and equilibrium moisture is 2. 5%. What is the drying time if the air flows parallel to the tray at a velocity of 1. 5 m/sec? 4. Using the same data from Problem 3 of the examples, determine the final % moisture attained if the original wet slab weighed 8 kg (same dimensions) and with 50% moisture is dried for 4 hours.