ANALYSIS OF THE EFFICIENCY OF THE PROCESS OF DRYING IN THE HEAT-MASS TRANSFER MODULE AT HIGH PRESSURE

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The main methods of energy saving in the processes of convective drying are heat utilization of drying agent and forced drying of drying agent with the purpose of intensification of mass transfer. Earlier we proposed the method of drying in the heat-mass transfer module (HMTM) under increased pressure and the filtering of the drying agent through the material. According to this method, crushed wet material is placed in a hermetic heat-mass transfer module where an excessive pressure is created by external compressor. Due to compression in compressor the air is heated to the necessary temperature. Air is completely are saturating by vapour during filtration through a porous structure of the wet material then condensed under excess pressure and vapour-liquid mixture is removed from heat-mass transfer module.

The work deals with the mathematical modeling of drying agent state during processes of convective drying and drying in the heat-mass transfer module under the excessive pressure

The estimates were performed for the consumption of the drying agent and power consumption of two methods of drying with the identical evaporating power.

It is shown that the consumption of drying agent at the same evaporating power is identically for standard mode of convective drying ($t_1=60...160 \, ^{\circ}\mathrm{C}, \varphi_2=0,4$) and filtration drying in HMTM under the excessive pressure ($p_1=0,15...0,4 \, \mathrm{MPa}$). The energy consumption for convective drying in these modes is higher on 45...85% than for the filtration drying in heat-mass transfer module for the same value of evaporating power.

**Keywords:** drying of wet materials, heat-mass transfer module, the overpressure, energy efficiency.