$$Q_1 = m.q,$$

where: q *is the specific heat of the corresponding phase transition (evaporation, condensation, dissolution, crystallization),* t *is the mass of the substance.*

Supply and removal of heat into the system is calculated by the heat loss by the coolant according to the formula:

$$Q_3 = \boldsymbol{m \cdot c\,(t_i - t_f)}$$

where: *t* is the mass of the coolant, *c* is the heat capacity of the coolant, t_i and t_f are the initial and final temperature of the heat carrier, and according to the formula of heat transfer through the wall:

$$Q_3 = C_T \cdot F\ (t_\tau - t_{hp}),$$

where: C_T is the heat transfer coefficient, *F* is the heat exchange surface, t_{hc} is the heat carrier temperature, t_{hp} is the temperature of the heated product, τ is the time.

The heat balance is compiled based on the results of the material balance per unit of product produced or on the cycle of operation of the apparatus. The heat balance data is used to determine the flow rate of the coolant and refrigerant, calculate the surface of the heating and cooling elements, and select the optimal thermal mode of the process.

TEST TASKS