Abstract

Different types of filters are used to remove iron from underground water, one of them is foam polystyrene. Depending on the chemical water composition, tasks for water supply and other working conditions of iron-removing filters, it is necessary to define an exact grain size, specific granulometric composition, the thickness of the layer and the adequate rate of filtration. This kind of problems is multifactorial and its solution is based on the mathematical modelling.

As a rule, two parallel processes considered during iron removal of underground water in filters: efficiency of water treatment and growth of head losses. Therefore, the model of water iron removal based on two main blocks, clarifying block takes into account the material balance and kinetics of the process; hydrodynamic block describes the dynamics of head loss in the granular loading. The kinetics of the detention of iron compounds in granular loading consists of two mutually opposite processes. With an increase of the amount of adsorption-catalytic precipitate, the rate of sorption of iron compounds and oxidation of ferric iron increases and the efficiency of iron-removing increases. On the other hand, with decreasing porosity of loading the true velocity of the fluid increases, that reduces the intensity of adhesion of iron compounds.

Developed mathematical model allows for determining optimal values of structural and technological parameters of iron-removing filters taking into consideration the specific filtering conditions.

Key words: foam polystyrene filter, iron removal, mathematical model, underground water, water treatment technology