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Key words: siderite, calcite, coal, magnetic field, phase transitions, chemical reactions

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STUDYING REGULARITIES OF AIR MOVEMENT THROUGH A FILTERING HALF-MASK

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Purpose. Objective is to study the available approaches to calculate pressure difference of filtering respirators, to determine theoretical dependences of its change in terms of different filtering rate according to the breathing process with the use of filtering models of interconnected channels and parallel cylinders, and to generalize the results obtained in the context of mathematical models.

Methodology. Simplified equations of Navier-Stokes in Euler form taking into consideration imaginary mass forces of Zhukovsky resistance are applied to analyze laminar movement of the air within a porous medium.

Findings. For the first time, regularities of the process of airflow passing through a porous filtering material have been theoretically substantiated in terms of breathing process; that has made it possible to determine the dependence of pressure difference on respirator filters in the context of changeable filtering rate taking into account volume and frequency of human breathing as well as in terms of filter parameters, i.e. coefficient of penetration and porosity of a filtering layer.

It has been determined that pressure difference on disposable half-masks while breathing depends not only upon resulting friction force when airflow passes through filtering layers, but also upon the level of inertial oscillations of air velocity around fibers which increases along with the growth in density of filtering layers and reduction in the radius of their fibers.

Optimal indices of filtering layer porosity have been defined to provide minimal pressure difference in terms of Lepestok dust respirator.

Key words: Dust Respirator, Pressure Difference, Breathing Resistance, Breathing Frequency, Air Loss, Filter Resistance, Coefficient of Penetration

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TO THE PROBLEM OF DEVELOPMENT OF TECHNOGENIC DEPOSITS USING THE TECHNOLOGY OF PRODUCTION OF COMPOSITE FUEL

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Purpose. The ways of obtaining composite fuel by means of the technology of development of technogenic mineral deposits are considered.

Methodology. Rational parameters of the finished energy-efficient products are substantiated as a result of research of adhesion-chemical technology of development of technogenic deposits of minerals

Findings. The problems dealing with the restoration of natural resources, the rational usage of natural resources, the resource saving, monitoring of the environmental situation, environmental protection, waste recycling are enshrined in the legislative acts of Ukraine, the decrees of the President of Ukraine, and the resolutions of the Cabinet of Ministers of Ukraine. They are also reflected in state and regional programs. Technical solutions which can help to obtain additional coal extraction are needed because of the demand for coal in Ukraine. One of the ways to solve the problems of effective power engineering is the production of composite fuel from the secondary raw materials of coal mining and heat power engineering, as well as the woodworking and agricultural industry. This research has been carried out under the budget base, the program of "Scientific substantiation of the methodological, technological, ecological and legal basis for extracting useful components from technogenic deposits in Ukraine" (GP-482) at the National Mining University, the Department of Underground Mining.

Key words: rational parameters, technogenic deposits, composite fuel