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Endogenous Fire Extinguishing with the Help of АВМП Compressor Plants

Underground fires are developed in such hard-to-reach places as worked-out areas, cribbed up areas, pillars, coal deposits behind isolation partitions, and guiding beds. Ukrainian scientists and researchers have developed techniques to fight underground fires in underground mines using АМВП nitrogen compressor plants. Nitrogen membranous screw plants of АМВП series which nitrogenous efficiency is 0.1 to 26.5 cubic meters per minute have been designed to obtain nitrogen (with 90 to 95% concentration) from open air using a method of molecular air separation within membranes. The plants can be used for various branches including underground fire fighting in mines and safety control of mining operations; completion and location construction of oil wells and gas wells; pressurization of inert atmosphere; and prevention of fires and explosive situations. The stations of АМВП series are mobile as they are mounted on the basis of standard trailers and semitrailers - container trucks. Advantages of the invention are as follows: simplicity, cheapness, and low energy consumption of membranous technique. The technique of gas separation is sensible alternative to expensive, complicated, and energy-consuming techniques of cryogenic and adsorption gas separation. Moreover, the technique is highly reliable as membranous modules use minimum quantities of fillers, and intricate moving components are excluded; automatic equipment is meant for operations within wide range of environmental temperature; possibility to control nitrogen purity by means of compressed air pressure within membrane modules is provided; cost-effective service is available; only oil, oil filters and air filters are consumables materials; high stability against vibration and impacts; membrane modules are mounted within rigid framework and container protect them against external negative effect; containers are noise-stop and heat-insulating; the equipment is simple and low-cost in operation. Operating term of blocks separating air is 10 to 12 years; in this context, stability of performance capabilities is provided during the whole period. Operating principle of the membranous gas-separating plant is based upon different velocities of gases penetrating through polymeric membrane under the action of difference in partial pressures on a membrane. The membrane is a thin pipe which thickness is several micrometer fractions. The pipe provides gas separation. By means of licensed membrane components, hundreds meters of membranes are placed into normalized membrane modules assembled into a compact system. Both compressed and dried out gas mixture is delivered to membrane cartridges mounted within membrane module. It is possible to prepare ore up to 99.5% with the help of heavy-penetrating component. However, in such a case, concentration is reciprocally proportional to the efficiency.