FAN ASSEMBLIES VO-21VK AND VO-21K(v) WITH MICROPROCESSOR CONTROL SYSTEMS FOR VENTILATION OF TRANSPORT TUNNELS AND UNDERGROUNDS

**Description**
Fan assemblies are designed for main ventilation systems of transport tunnels (highway and railroad) and undergrounds; the fan assembly efficiency ranges from 20 to 80 m$^3$/sec at a pressure from 10 to 70 Pa. Automated control and emergency reverse of the ventilation stream are ensured by rotation of working wheel blades from 15 to 135º without stopping within 30-50 sec. In the reverse mode, the range of change in air feed is 95% of the standard mode. Control over the efficiency from 20 to 80 m$^3$/sec is provided during 30-40 sec. The fan assembly is equipped by an automated system with a microprocessor controller. The system controls the state of ventilation-chamber equipment, protects from emergency modes, and automatically adjusts the fan assemblies. Effective control can be performed in different modes: local, remote (dispatcher), and automated (computer). The equipment is designed by the Institute of Mining, Siberian Branch, Russian Academy of Sciences jointly with the “Aeroturbomash” Institute (Novosibirsk).

**Technical appraisal and economic benefits**
The use of the proposed fan assemblies makes it possible:
- to decrease the volume and cost of underground ventilation structures by 50-65%;
- to decrease energy consumption for ventilation of transport tunnels and undergrounds by 25-27%.

**Application area**
Construction of transport tunnels and undergrounds.

**Development stage**
A pilot batch of four machines has been in operation in the Novosibirsk underground approximately for three years. Design specifications of the VO-21VK and VO-21K(v) assemblies elaborated by the results of the pilot machine batch operation has been transferred to a manufacturing plant in Novosibirsk.

**Patent situation**
The fan assembly is protected by inventor’s certificates and patents of the Russian Federation.

**Commercial offers**
Production and procurement contract.

**Estimated cost**
 Depending on power of the electrical engine used and characteristics of microprocessor control system software:
- fan assembly VO-21VK … … 45, 000-67, 000 USD
- fan assembly VO-21K(v) … … 47, 000-70, 000 USD
The cost is presented in terms of prices of the fourth quarter, 2002.

**Contacts**
Cand.Sc. Vladimir P. Boginsky, Innovation Secretary
Institute of Mining, Siberian Branch of the Russian Academy of Sciences
54, Krasny Prospekt, Novosibirsk, 630091, Russia
Phone: (383) 217-07-68
Fax: (383) 217-06-78
E-mail: innotdel@misd.nsc.ru
http://www.misd.nsc.ru/