FILTERING PROPERTIES OF HIGHLY POROUS MATERIALS
PREPARED FROM IRON POWDERS WITH NONSPHERICAL PARTICLES

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Filters produced from Soviet-made iron powders are used in industry [1]. However, there is very little information on their filtering properties.

An investigation into the filtering capacity of filters made from powders with nonspherical particles, as used in industry, is of special interest, since they are the most readily obtainable and cheapest.

We present data on an investigation into the filtering capacity of filters made from reduced iron powder, prepared by reducing scale powder with natural gas [2], and fluidized powder.

The difference in the shape of the particles of these powders is shown in Fig. 1. The permeability of filters made from nonspherical powders is much lower than that of filters made from spherical powders. However, with nonspherical powders the porosity can be increased and the wall thickness of the filter can be reduced, thus making the permeability the same as for filters of spherical powders.

With this in mind, we studied the effect of the thickness of the filtering body and its porosity on the permeability. For the investigations specimens were prepared of fluidized powder, with the maximum possible porosity of about 40%, and of reduced powder, with a porosity of 30-55%. For the investigation of gas permeability, cylindrical specimens were prepared with a diameter of 10 mm and thickness varying from 0.5 to 4 mm.

The degree of filtration was determined on 50-mm-diameter specimens. Specimens were prepared from powders with a sieve composition corresponding to commercial batches of APZhM iron powder [2], and also from powders...
Fig. 1. Shape of powder particles. a) Reduced; b) fluidized. X56.

Fig. 2. Effect of method of preparing the powder and porosity of sintered material on permeability. Permeability of specimens prepared from powders: 1)-4) reduced; 5) fluidized; 6) spherical with particle size 50-70μ; 7) spherical with particle size 70-90μ.

Fig. 3. Effect of thickness of the specimen on permeability of filter with pressure drops of (kg/cm²): 1) 0.5; 2) 0.4; 3) 0.8; 4) 0.2; 5) 0.1.

Dependence of Permeability on the Method for Preparing Powder

The results of the investigation into gas-permeability show (Fig. 2) that the resistance of specimens with the

* The device was designed by B. G. Sheshenya.