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Research temperature distribution in a cylindrical inductor downloads

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The method of calculating load inductor heating rapeseed are proposed. The experimental determination of thermal fields are conducted. The value of the temperature along the rod and rod coil located in different radial rows in the middle of the inductor are practically identical. It indicates the uniformity of distribution of magnetic induction in the channel.

Inductor, rod, induction heating, heat processing, rapeseed, heating.

Using cylindrical inductors for heating axisymmetrical products (tubes and rods of circular cross section) is the most common use of induction heating. These inductors create a magnetic field that at sufficiently large length of the inductor is uniformly distributed on the inner perimeter.

Sometimes called inducers inducers cylindrical longitudinal magnetic field due to the magnetic field direction coincides with the longitudinal axis of the coil, which is located along the heated product.

The widespread use of inductors as heat exchange agent by heating liquid media (water, milk, etc.). Thus the physical properties of liquids allow you to shoot with a significant heat transfer surface heat flux. When using induction heating for thermal treatment of bulk materials such as sand, gravel, agricultural products (grains, oilseeds) should create an extensive surface heat transfer.

Known use of single-phase cylindrical coil for heating air by passing through the last ferromagnetic pipes that are loading coil and heat exchanger [2]. Using this scheme can significantly increase the loading surface heat transfer and use induction heating for heat treatment of particulate material, increasing the heat transfer through the creation of rotational motion bahatosterzhnevoho download a cylindrical coil.

Justification of parameters and geometrical dimensions of the heat exchange unit is necessary to determine the temperature distribution based on the heat exchanger section. Literary sources describe a uniform distribution of the magnetic field and eddy currents listed in longitudinal section of the download, but specific data distribution of physical fields (electromagnetic and temperature) are still missing.

The purpose of research - to develop a method of calculating the geometrical parameters of load inductor to install heat-treating rape, studies of the distribution of the temperature field in the inductor load.

Materials and methods research. To calculate the heat treatment oil installation materials to determine the geometric parameters of the heat transfer surface. The surface consists of a dilute ferromagnetic beam rods with no electrical contact with each other by a length of the inductor. Location rods to choose from puchtsi conditions unauthorized leakage of particulate material.

Conclusions

The temperature of rods arranged in different radial rows inside the inductor is almost the same. The discrepancy between the values of temperature does not exceed 4%. In the study of temperature rods to obtain a complete picture of heat distribution sensor turns on all rods were inserted in each of the sections, but the measured temperature varied within 0.5% definitions indicates even distribution of magnetic induction of the diameter of the pipe and the heating of different rods in the upper and middle points to a temperature of 80 ° C explains the "end" effect of the electromagnetic field of the inductor.