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SELECTING THE OPTIMAL DESIGN OF VORTEX GRANULATOR

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ВИБІР ОПТИМАЛЬНОЇ КОНСТРУКЦІЇ ВИХРОВОГО ГРАНУЛЯТОРА

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ВЫБОР ОПТИМАЛЬНОЙ КОНСТРУКЦИИ ВИХРЕВОГО ГРАНУЛЯТОРА

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The article presents the results of computer simulation of hydrodynamics of gas flow motion in the vortex granulator. The features of the gas flow motion in the nodes of the granulator is studied. The optimal design solutions are offered in the design of compact vortex granulators.
Keywords: *vortex granulator, hydrodynamics, computer simulation*

У статті представлені результати комп'ютерного моделювання гідродинаміки руху газового потоку в вихровому грануляторі. Вивчено особливості руху газового потоку в вузлах гранулятора. Запропоновані оптимальні конструктивні рішення при проектуванні малогабаритних вихрових грануляторів.
Ключові слова: *вихровий гранулятор, гідродинаміка, комп'ютерне моделювання*

В статье представлены результаты компьютерного моделирования гидродинамики движения газового потока в вихревом грануляторе. Изучены особенности движения газового потока в узлах гранулятора. Предложены оптимальные конструктивные решения при проектировании малогабаритных вихревых грануляторов.
Ключевые слова: *вихревой гранулятор, гидродинамика, компьютерное моделирование*

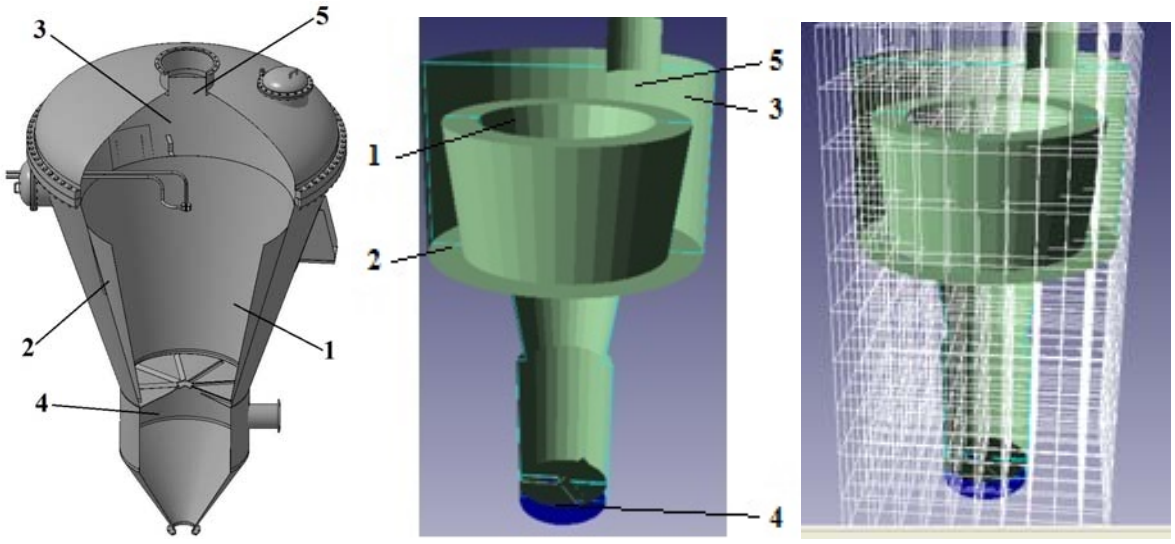
Devices with vortex motion flows are widely used in heat and mass transfer processes [1]. Vortex devices have a large specific capacity with smaller size. [2] Multiple processes can also combine simultaneously in them (e.g. granulation, drying and cooling) [3].

Vortex weighted layer granulators (fig. 1, a) are characterized by high efficiency in the processes of producing fertilizer granules and porous structure granules [4]. The main advantages of the vortex granulators - the ability to control the movement of the drops (granules) in the workspace unit (trajectory and arrival time) [5].

Objectives - to study the hydrodynamic characteristics of the gas flow beyond the vortex granulator workspace (fig. 1a, b):

- Stability zone of gas flow motion;
- Separation zone;

- Drainage zone of small granules;
- Exit zone of the gas flow from the granulator.



a b

Fig. 1. Vortex granulator: a - a schematic diagram; b - calculation model; 1 - workspace; 2 - drainage area of small granules; 3 - separation zone; 4 - stability zone of gas flow motion; 5 - exit zone of the gas flow from the granulator

Using a computer simulation in the hydrodynamics research of the vortex flows allows making the selection of the optimal configuration of workspace and swirling design for the vortex apparatus. This provides the required quality of the finished product depending on the requirements of strength and thermal treatment. The computer simulation results based on engineering calculation techniques of vortex granulator.

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