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## OIL SLUDGE AND FILLER MIXING MATHEMATICAL SIMULATION FOR A PYROLYSIS MODULE DESIGN

### Background

Development of an ecologically clean oil sludge treatment unit which is mountable onto off-road vehicles is a highlight task nowadays.

The modular oil sludge thermal treatment unit design has been made in order to solve the above tasks; the corresponding patent has been obtained. Along with the unit design, the method of oil sludge treatment has been introduced and applied, in particular in the original design.

### Aims and Objectives

To determine by means of mathematical simulation the dependence of the total heat transfer area change, which defines oil sludge heating rate during mixing with the filler, on the grain-size composition and relative volume of the filler.

### Results

Analytical dependences of the total heat transfer area as a function of the bottom's geometry and grain-size composition of the spherical shape filler, applicable for fillers of various relative volumes, have been obtained.

It has been established that the process of heating up the treated oil sludge is speeded up in an exponential dependence during a technological cycle due to simultaneous increase of bottom's effective area, as well as of the amount and the depth of immersion of the filler particles.

**Key words:** oil sludge, thermal treatment, modular unit, mathematical simulation, filler

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