

Cleaning of pressure pipelines using hydrodynamic cavitation generators

In many branches of industry and mining there is a very big problem of cleaning technological pipelines from deposits inside. The type of deposits and their structure is different and depends on the composition and mineral admixtures of the flowing liquid. Due to the large diameters of the pipelines and their long sections, the methods known hitherto are expensive or ineffective. Most often, the user decides to replace the pipelines with new ones or to build additional pumps.

The EKOZUB Ltd. Company. currently, implements technology of cleaning technological pipelines on the Polish market using hydrodynamic cavitation generators. Depending on the diameter of the pipelines and residual sediments, a series of generators was developed to allow quick and efficient removal of sediments. As a result of the phenomenon of cavitation, the deposited sediment is crushed and transported by the flowing liquid. Local changes in static pressure occurring during the flow of liquid through small openings cause the formation of gas bubbles, which rapidly implode, causing a shockwave. The proposed pipe cleaning system does not require additional compressor or pumps.

Technical parameters of cavitation generators.

- inside diameter of contaminated pipes from 100 mm to 1,420 mm;
- thickness of residual sludge to clean up to 90% of the pipe cross-section;
- type of contaminants from sludge and slime to hard deposits;
- water pressure from 3 bar to 12 bar ;
- designed cleaning speed of pipelines up to 5 m / min;
- the option of cleaning standard arcs up to $R = 1.5D$;
- generator weight from 25 kg to 550 kg;



Hydrodynamic cavitation generator
HGK 700 for a 700 mm pipeline diameter.



Contaminated pipe in 90% cross-section



The pipe after cleaning using a cavitation generator.

The individual stages of cleaning large diameter pipelines:

1. Technical analysis of the condition of existing pipelines.
2. Development of cleaning technology and selection of a cavitation generator.
3. Development of technology for the management of waste generated during cleaning.
4. Installation of the cavitation generator in the pump discharge line.
5. Building of waste management installations.
6. Performing the cleaning process using a cavitation generator.
7. Evaluation of cleaning efficiency.
8. Disassembly of the cleaning installation with all the equipment.



Inspection hole directly after the pump



Introduction of the generator to the pipeline



Blanking of the inspection hole and activation of pressure pumps



Making an inspection hole to remove the generator

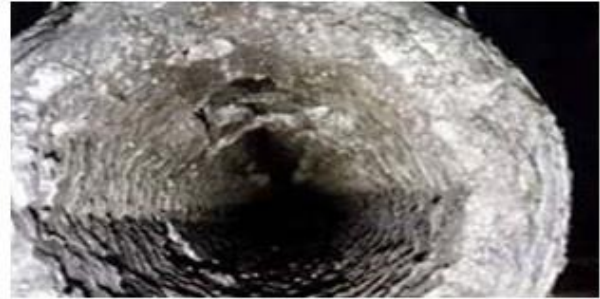
The effects obtained from the use of cavitation generators:

- no need to build new pipelines ,
- no need to build additional pumps,
- reducing the liquid flow resistance,
- reducing the consumption of electricity for pumping liquids,
- increasing the amount of flowing liquid,
- restoration of technical parameters of old pipelines,
- the possibility of scrapping or other disposal of existing pipelines.

Possibilities of cleaning various deposits in process lines:



Example of a pipe D 375 mm



Example of a pipe D 219 mm



Example of a pipe D 725 mm



Example of a pipe D 725 mm



Example of a D 830 mm pipe with a 40 mm passage



Example of a D 500 mm pipe after cleaning



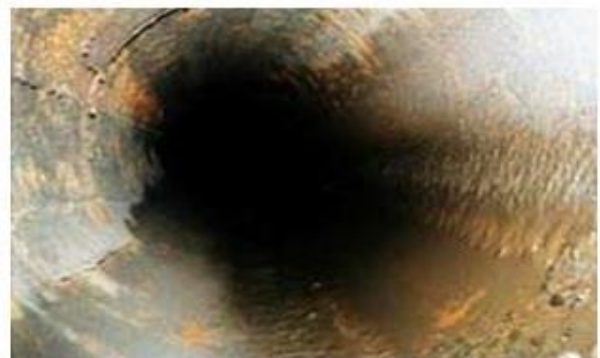
Example of a pipe D 500 mm



D 500 pipe in the cleaning phase

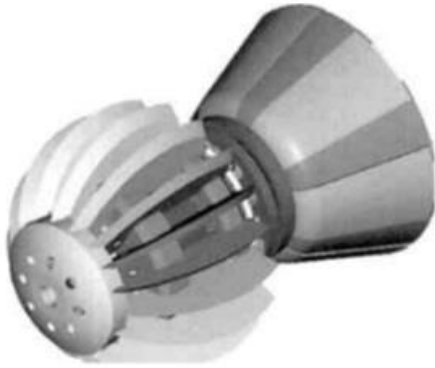


Example of a pipe D 500 mm



Example of a pipe D 500 mm

Hydroamic cavitation generators matched to specific pipe diameters and sludge types



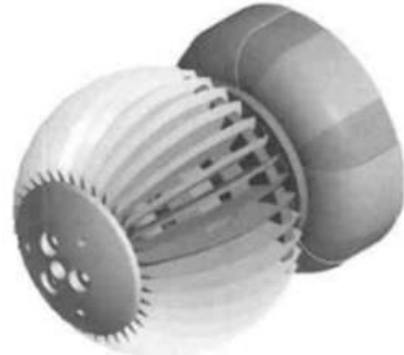
HGK 250 General view



HGK 250 General view



HGK 250 General view



HGK 300 General view



HGK 400 General view



HGK 500 General view



HGK 600 General view



HGK 250 General view