

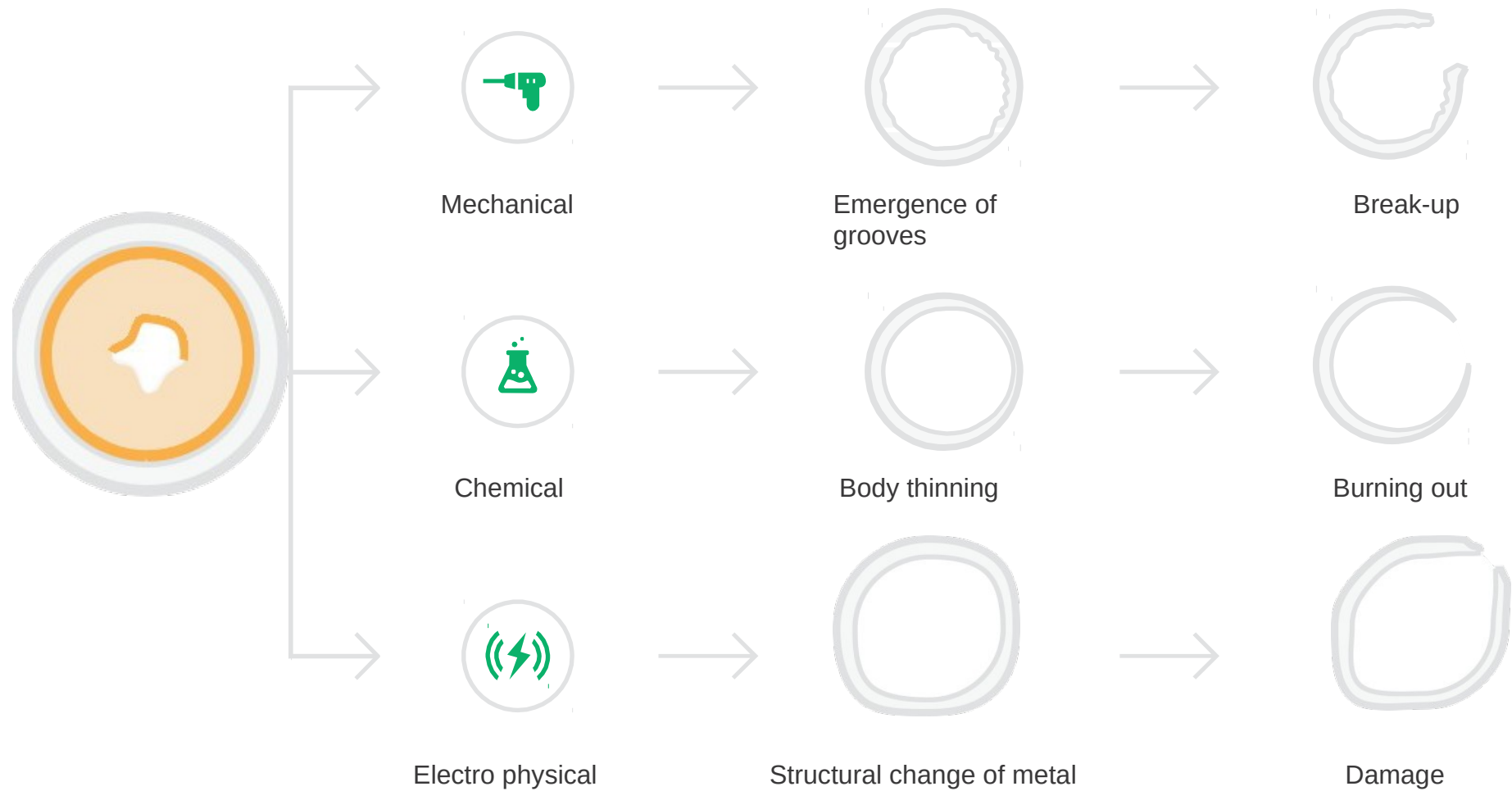


Biotechnology
for cleaning heating systems
and thermal equipment

“Bonaka” technology is a
new life to your
equipment



Existing on the market solutions



General description of the technology

The Bonaka technology using bio composition BIZ-1 (hereinafter - BIZ-1) effectively and safely allows to clean equipment and systems from these deposits practically to the factory state. The technology of sediment removal with the help of BIZ-1 was patented by Russian scientists in 2003 (patent No. 2213922 of 10.10.2003) and currently has no analogues in the world. BIZ-1 is manufactured by NanoServ Ltd, a trademark of BONAKA.

BIZ-1 is a product of highly-productive modified lactic acid bacteria and is intended for technical purposes. Bio organic composition BIZ-1 is a fermentation product and fermenting pure culture of lactic acid bacteria strains, which as a result of biochemical processes is hydrolyzed to monosaccharides, and generates more than 30 organic acids (formic, oxalic, citric, tartaric, butyric, lactic, propionic, succinic, malic and others). The resultant organic acids react with the layers of sediments and sludge, salts converted from the insoluble to soluble, are rinsed off with water. Cleaning of surfaces from deposits is carried out under conditions of circulation of the working solution along a closed loop.

The innovative biotechnology of Bonaka makes it possible to solve the problems of efficient cleaning of equipment in oil refineries, oilfield infrastructure, raw heat exchangers, and pipelines. By applying various strains of bacteria, the BIZ-1 composition converts complex hydrocarbon chains from long to more simple, and heavy hydrocarbon fractions into light compounds. In this case, the product is obtained as a result of purification either for utilization or for further processing, depending on the task.

Advantages of using the BIZ-1 technology.

- high cleaning efficiency (plasticizes any kind of deposits, removing up to 98 - 100% of sediments);
- passivity to metals, plastics, rubber;
- the possibility of cleaning hard-to-reach areas, the ability to clean branched pipelines and small-diameter pipelines;
- a closed scheme for cleaning pipelines and boilers (without mechanical analysis of equipment);
- extends the service life of equipment and pipelines 2-3 times;
- increases heat transfer through the heat exchange surface;
- increases heat output (heat savings of 30-40% or more);
- reduces thermal stresses in metals caused by overheating;
- restores the capacity of pipelines and channels;
- reduces operating costs associated with the operation of pumps (reducing electricity costs by up to 50%);
- reduces the cost of fuel;
- Avoid overhauling the equipment;
- being environmentally friendly, does not harm the health of people and animals;
- the surface treated with bio-organic liquid is covered with a protective film that smooths out micro cracks, scratches, roughness, shells in the metal, as a result of which the process of re-formation of scale and iron oxides is noticeably slowed down;
- reduces the amount of greenhouse gas emissions into the atmosphere;
- does not need special disposal.

Our product is

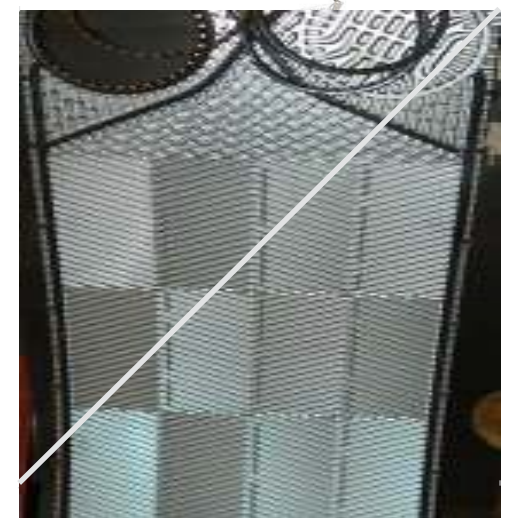
Individual engineering decision based on biotechnology and innovative approach to cleaning



98% Effective



Safe



Eco-friendly

Bonaka is superior to other technologies

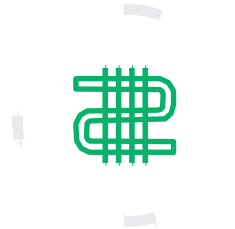
	Time	Price	Safe for materials	Doesn't require special utilization	Eco-friendly	Forms protective film	Cleaning efficiency
Capital repair	⌚⌚⌚⌚	₺₺₺₺	✓	✓	✗	✗	100%
Biotechnological cleaning	⌚⌚	₺₺	✓	✓	✓	✓	98%
Mechanical cleaning	⌚⌚⌚	₺	✗	✓	✓	✗	90%
Chemical cleaning	⌚	₺₺	✗	✗	✗	✗	80%
Electro physical cleaning	⌚⌚⌚	₺₺	✗	✓	✓	✗	75%
Water flushing	⌚	₺	✓	✓	✓	✗	1%

Cleaned equipment



Boiler

- Steam
- Water-heating
- Exhaust heat boilers
- Economizers



Heat ex-changers

- Shell-and-tube
- Section-type
- Coiled
- Spiral-type
- Plate-type



Heating systems

- Open type
- Closed type
- Fan coils



Production

- Evaporators
- Oil coolers
- Turbine condensers
- Water-cooling towers
- Reactors
- Columns

Cleaning process

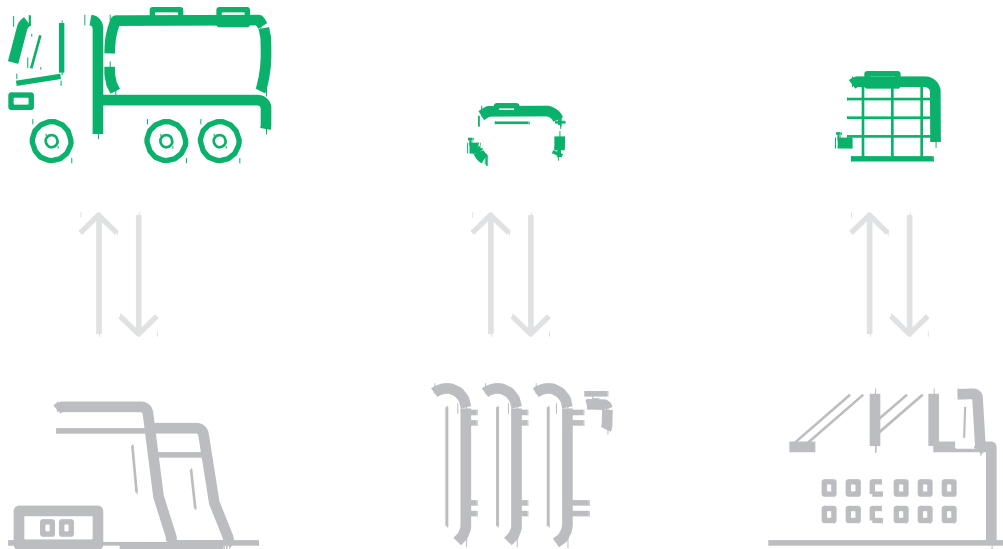
We select an optimum strain of bacteria according to type and thickness of deposits.

We issue individual regulations of work taking into account characteristics and requirements on an object.







Cleaning takes place without disassembling the equipment.

Bio solution circulates on the closed loop.

In the course of activity of bacteria cleaning from deposits takes place.



General technological effect

-  Cleaning up to 98% of deposits from equipment
 -  Restoration of equipment working parameters up to passport values
 -  Increase of operation term for 2-3 times
 -  Decrease of service and operation costs of equipment
 -  Risk of capital repairs and replacement of the equipment decrease
 -  Keeping equipment and its components integrity
-

Change of working parameters of the chemical reactor

Parameter	Before cleaning		After cleaning		Effect
Deposits thickness		1,5 – 2 mm		Not visible	99%
The amount of heat taken-away of 1 m ³ of water		58,8 MJ		72,2 MJ	+23%
Time required for cooling of the reactor from 80 °C to 40 °C		48 min		31 min	-35%
Water volume required for cooling of the reactor to 40 °C		2850 l		1900 l	-33%
Reduction of time required for technological operation of cooling					for 10-15 min (gold 24)

Cleaning biotechnology is



The bio reagent consisting of strains of bacteria grown by a selection method



Neutrality to metal, plastic, rubber laying and other materials



Effective technology for cleaning thermal equipment



Developed by the scientists group



Safe for human health and animals



Environment friendly product

Extract from results of the pilot projects

Name	Object	Qty.	Average change of temperature	Average change of pressure
Boiler station #6	Heat exchanger VVP-273-4-10	3	7,0°C	0,5 m ²
Boiler station № 3	Heat exchanger Ridan NN № 41-016	1	7,5°C	0,3 m ²
Central heat distribution station #1	Heat exchanger Ridan NN № 41-016	1	0,0°C	0,6 m ²
Central heat distribution station #2	Heat exchanger Ridan NN № 47-016	1	6,0°C	1,4 m ²
Central heat distribution station #3	Heat exchanger Ridan NN № 47-016	1	3,5°C	1,4 m ²
Boiler station UMKT 3,75	Heat exchanger Ridan NN № 47	3	2,5°C	0,8 m ²
Central heat distribution station KVTS	Heat exchanger PP 1-57-7-2	7	5,0°C	0,7 m ²
Central heat distribution station #4	Heat exchanger PP 1-9-7-2	2	12,5°C	0,8 m ²

Excessive fuel consumption for boilers and an approximate payback period

Deposit thickness	0,4 mm	0,8 mm	1,6 mm	3,2 mm	6,4 mm	12,7 mm
Excessive fuel consumption , %						
Gas	4%	7%	11%	18%	38%	60%
Coal	8%	14%	22%	36%	76%	120%
Diesel	4%	7%	11%	18%	38%	60%
Deposits amount, kg	45	91	182	383	726	1441
Payback						
Gas	~3 months	~3 months	~2 months	~1,5 months	~1,5 months	~1 months
Coal	~3 months	~3 months	~2,5 months	~2,5 months	~1 months	~1 months
Diesel	Less than 1 month					

* Calculations are made on the basis DKVR 10/13 boiler or a similar boiler



CLEANING BIOTECHNOLOGY FOR INDUSTRIAL EQUIPMENT, THERMAL DEVICES AND HEATING SYSTEMS



CLEANING BIOTECHNOLOGY

FOR INDUSTRIAL EQUIPMENT, THERMAL DEVICES AND HEATING SYSTEMS

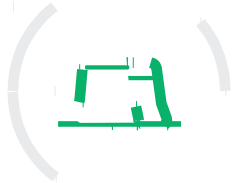
Steam and water
boilers



Heat Exchangers



Different markets effect



Heat production

- Increase in temperature of heat carrier at exit
- Decrease in thermal losses for up to 50%
- Decrease in fuel consumption for up to 30%
- Lack of costs of capital repairs and replacement of the equipment
- Decrease in payments for CO₂ emissions and emission of harmful gases to atmosphere for up to 25%.



Heat consumption

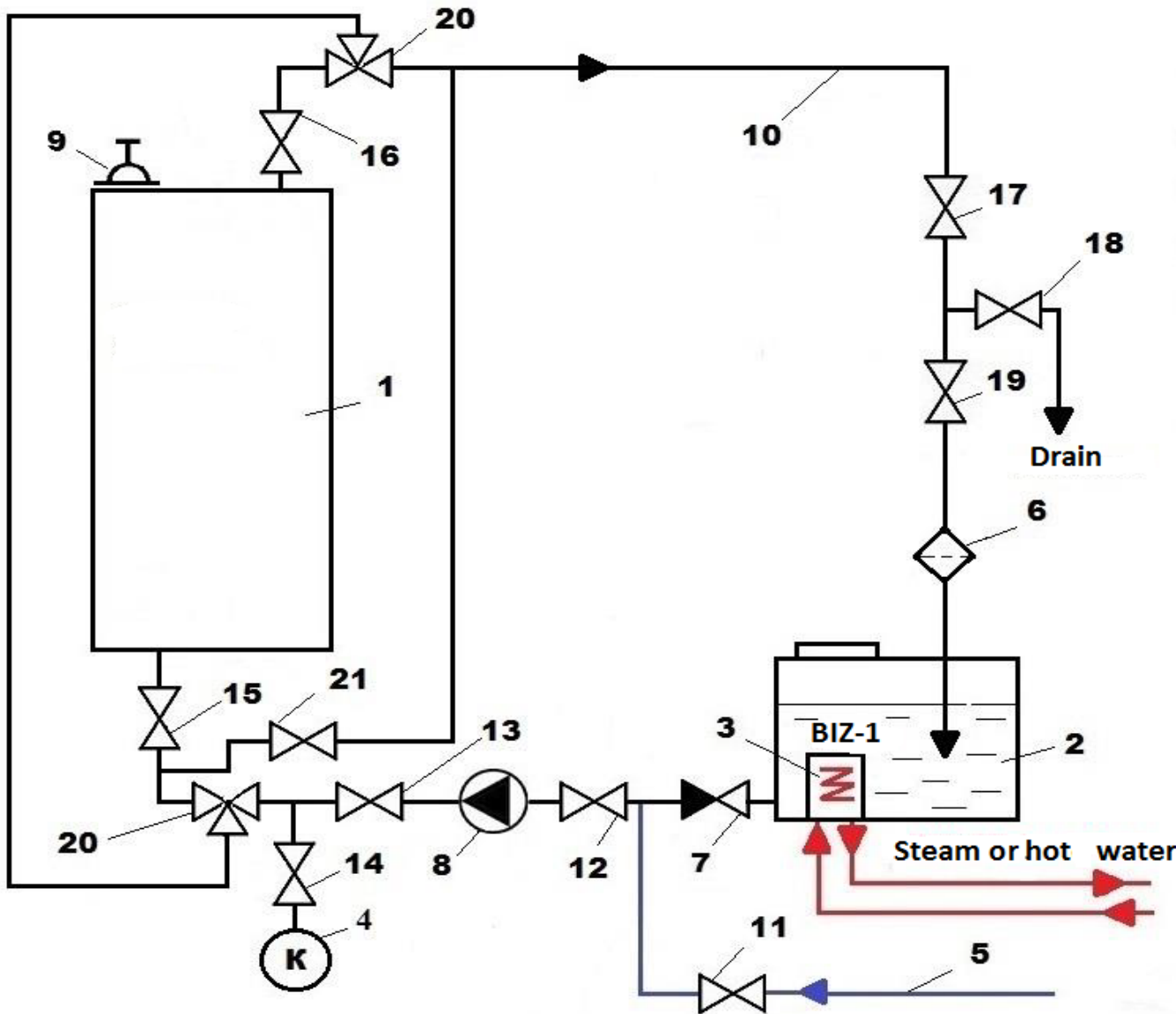
- Increase in temperature of heating devices for up to 20 °C
- Increase in thermal efficiency for up to 30%
- Reduction of client's expenses for heating



Industry

- Increase in production volume
- Reduction of prime cost of the made production
- Increase in thermal efficiency for up to 40%

Schematic diagram.



- 1. Cleaning object
- 2. BIZ-1 Solution
- 3. Heater
- 4. Air Compressor
- 5. Make-up Solution
- 6. Filtration Unit
- 7. Return valve
- 8. Pump
- 9. Air valve
- 10. Connecting hoses
- 11-19. Shutdown valves
- 20. Three way valve
- 21. Return line valve

Operating Temperature: 50-70 degree C. Ratio: solution BIZ-1 to water: 5-15%.

North America contacts:



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For any questions

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We have created high quality competitive on the world market product.

Increasing efficiency with progressive methods –we make the world cleaner and warmer.

Message from President.



Elena Levina set up NanoServ, an innovative system for cleaning heating systems and industrial equipment. The technology invented by a team of people had been in use for 20 years, but its developers were unable to commercialize it as a business before Elena stepped in.