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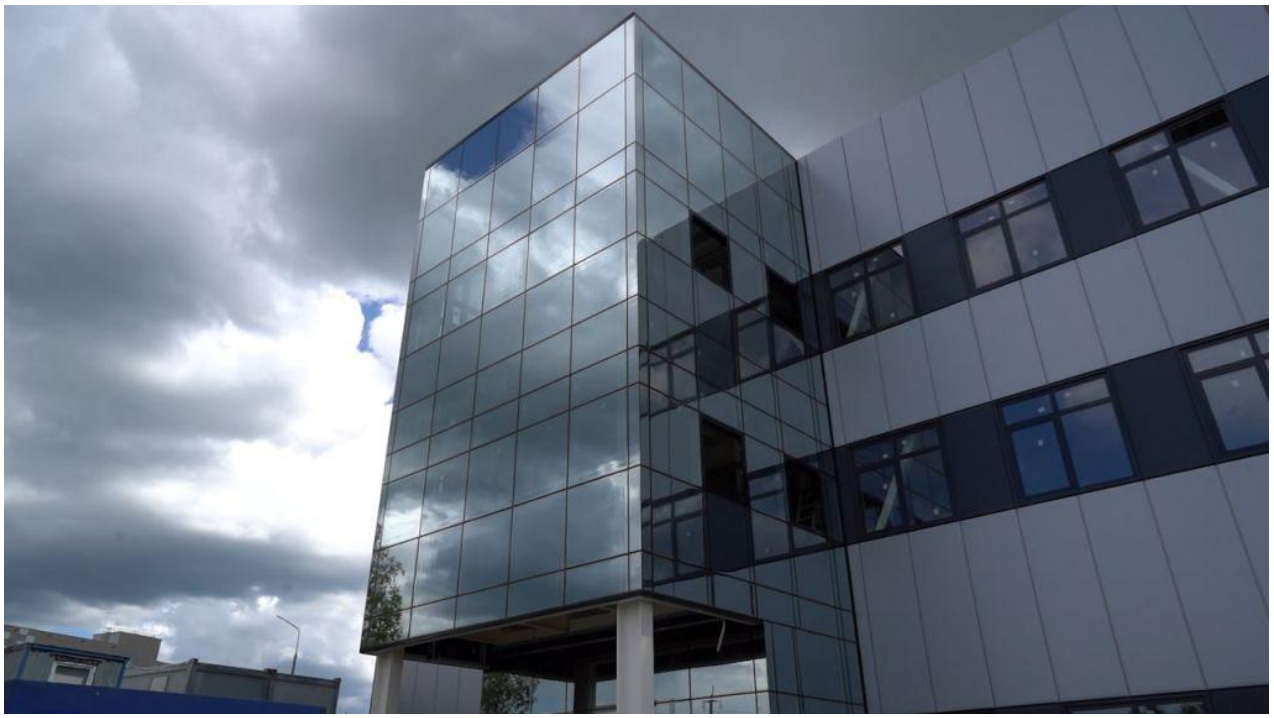
INNOVATIONS FOR INDUSTRY: "SOVELMASH" LAUNCHES A NEW TYPE OF MOTORS ON THE MARKET



At the beginning of 2023, the new "Sovelmash" engineering center in Zelenograd will begin supplying ready-made technologies for the production of innovative electric motors based on domestic development. In the near future, the new products by the Russian company "Sovelmash" will replace European and Chinese imports in the electric motor market. The "Sovelmash" team has deployed a large-scale crowdinvesting campaign to build the center. In exchange for the funds invested, the company gives anyone the opportunity to become a co-owner of a promising business developing a technology that has no analogues in the world.

"Slavyanka" rewinding

The "Sovelmash" testing laboratory in the building of the Research Institute of Precision Machine Manufacturing is quiet and cool: motor testing requires controlled conditions, so the premises are kept at a stable temperature.

Next to the testing area there is a casting shop: die-casting, laser metal cutting and engraving machines produce thin and complex shaped plates that are used to assemble the stators of future innovative electric motors. The products are based on a development that the founders of "Sovelmash" have been working on for almost 30 years.

"Sovelmash" is a Russian engineering company specializing in the development of general-purpose industrial and traction energy-efficient induction electric motors, as well as the implementation of original-design motors.

It was established in 2017 by the founder of "Sovelmash", inventor, engineer and entrepreneur Dmitriy Duyunov. The company's goal is to commercialize intellectual property in the area of developing energy-efficient induction electric rotating machines or electric motors. The electric motors are developed, tested and assembled from original parts by applying a patented technology.

The essence of the technology is an innovative combined winding diagram for the conductors in one of the key elements of an electric motor - the stator. The diagram was named "Slavyanka".

"Its story began almost by accident," Dmitriy Duyunov recalls. - In the nineties I often traveled around the country between the companies that I was in charge of back then. One day in a Moscow-area commuter train near Moscow I came across a newspaper article with a catchy headline "The Righteous Fury of a True Scientist". That's how I learned about the outstanding scientist and inventor Nikolay Yalovega and his combined winding concept. Since the end of perestroika, being a professor at the Moscow State Institute of Electronic Technology (currently - MIET, National Research University of Electronic Technology), he had been working on combining the two classic stator winding diagrams, but did not succeed in patenting his innovative idea. That same day, after getting off the train in Zelenograd, I headed straight to Nikolay Yalovega."

The scientists representing different generations quickly found themselves on the same page. The first motor rewound by applying the new diagram was a pump motor for a water utility in Stakhanov. This motor has been running for 27 years now. The first successful tryout was followed by more: the stator windings were removed from the factory motors, new stator windings were put in their place, and the motors were put to use.

To confirm the efficiency of the development and to accumulate the necessary statistics, Dmitriy Duyunov made several hundred winding diagrams for different electric motors. Everyone interested - and there were quite a few already - was given paid access to the rewinding licence. This way, feedback on the performance of the rewound motors was collected over several years. "The database where the feedback was entered was no longer updated when the number of positive reviews exceeded several dozens of thousands," Dmitriy Duyunov says.

Today, rewinding a factory motor by applying "Slavyanka" is a popular service in repair shops throughout Russia and abroad. It can be ordered for a failed electric motor as well as for a functional one. It is mainly recommended for improving energy efficiency and extending the service life of electric motors. The number of machines modified using Dmitriy Duyunov's technology has exceeded 100,000.

From repair to production

Having ascertained the technology's efficiency, Duyunov and his team decided to suspend the sale of their licences. It became clear that customers were interested not only in modified, but also in original electric motors designed specifically for "Slavyanka". Two options were outlined: to establish proprietary production or a design and engineering department for developing custom-made motor production technology, from blueprints to commissioning. Both options were bet on. So, in 2017, "Sovelmash" emerged to develop and test the original electric motors. The project team set up a laboratory and started producing the prototypes. Three years later, the engineering center construction started, too.

Funds to develop the project and construct the building itself are collected through crowdinvesting. The implementation of this large-scale campaign is carried out on a specially created IT platform - with its help, private investors from anywhere in the world invest personal funds in this project. You can participate in crowdinvesting now: the amount of investment can be anything from $ 50-100 and up to $ 500,000, with the option of installment payments.

What will the investors get as a result? "After transforming our company into a public entity - in the foreseeable future - an issue of shares will take place, and each of our investors will receive a stake in the company proportional to their investment," Dmitriy Duyunov explains. - We keep a register of our investors, not a single one of them is lost."

In total, private investors will own 49% of the capital, the remaining stake will be held by the project initiators. Today "Sovelmash" already has more than 40,000 private investors from 120 world countries. More than half of the profits will be allocated to paying dividends in the future.

> **Thus, we want to change the situation in which only big capital has access to owning enterprises. This is our principled position.**

At the moment the laboratory is fully equipped, the future engineering center construction is in full swing. What will it be like and what do its founders expect?

Full lifecycle project

The testing and production part of the building will house the production of components, the assembly area, and the measurement and research laboratory - for the latter, an area with a vibration-proof foundation has already been built in a designated part of the building. Both motors and industrial equipment for their production will be designed at the production site. The company believes that now is the best time for their motors to occupy a promising niche in the market. Why?

The fact is that China, the world leader in the production of motors, is experiencing difficulties with the supply of raw materials and today can not fully meet the market needs. "This is exactly why now there is an opportunity to introduce domestically produced motors to the market," Dmitriy Duyunov believes. - We have the corresponding technology: we know how to make original-design electric motors, which are more compact and low-noise. And what is especially important in today's realities - they are energy-efficient."

According to the comparative test protocols of Russian-made factory motors that have been published on the "Sovelmash" website, the "Slavyanka" rewinding gives from 5% to 40% increase in efficiency compared to the same motors with a standard winding.

"The increase is observed not only in the optimal mode of operation for the motor, but also in a wide range of load," Dmitriy Duyunov notes. - You can use less power to do the same job or do more work while maintaining the same power consumption."

The protocols note that combined winding diagrams improve the energy efficiency class of electric motors. When replacing the standard factory winding with combined windings, the energy efficiency class of the motors tested changes from IE1, IE2 to IE3, IE4. In most cases with the same weight and dimensions.

"The energy efficiency of electric motors can be improved further," Dmitriy Duyunov states. - Already now some companies in the world are working on the new energy efficiency class IE5. But it is achieved, among other things, by increasing the dimensions of a motor. So far we have been able to keep the IE3 class motors in the IE1 class dimensions, but we are working to enhance the technology."

Another advantage of "Slavyanka" is a less power-consuming and smoother start. Combined windings reduce the amount of current required to start an electric motor. High starting currents are a major factor in wear and tear, so reducing the inrush current will potentially increase the service life of electric motors. "Sovelmash" will produce not only motors, but also controllers for them and encoders - electronic devices for precise measurement of rotation parameters for the electric motor shaft.

Assembling inhouse-developed encoders is an important step towards import substitution of components for the "Sovelmash" products. The percentage of import substitution is already quite high: of all the motor components, only the bearings are purchased from China, while everything else (including materials) is made in Russia. For example, electric motor rotors are made of domestic metal on a vacuum die casting unit.

The project also includes a specialized "clean room" that meets a certain cleanliness class according to the international ISO classification, where the filtration system will maintain an acceptable concentration of particles, allowing the assembly of microelectronics.

In general, the engineering center is designed for a full development cycle: the "Sovelmash" specialists will help the customer to draw up the terms of reference, calculate the future unit, make prototypes, test them, make the necessary changes in the design and develop equipment for mass production. Specialists of the customer company will be able to get the necessary training.

"We will be the first"

The engineering center today is not only an 80% completed building, purchased equipment, ready utilities, but also agreements with the first customer, one of the leading manufacturers of elevators in the Customs Union (the name of the company has not yet been disclosed). The center's first products will be elevator winches.

Energy-efficient domestic motors are now more relevant than ever for the Russian market of elevator manufacturers, the company believes. According to a study of the marketing company BusinesStat, in Moscow alone about 50,000 elevator winches are to be replaced, and in Russia at least 500,000 units are needed. "Sovelmash" seeks to occupy this niche.

The electric elevator winch motor by "Sovelmash" weighs 60 kilograms and gives a torque of 400 N/m, while in other domestic developments, the unit weight is three times greater and the torque is just 170 N/m, so the company is confident that their products will take the vacant niche in the market.

Construction of the future engineering center building is scheduled for completion this autumn, and the commissioning is scheduled for the second quarter of next year. The plan is not only to develop the elevator winch production technology, but also to establish a small-scale inhouse production. More than 20 "Sovelmash" developments were in the focus of attention among the participants of the "Army-2022" exhibition.

Who else might be interested in using the innovative developments by "Sovelmash"? Combined windings for induction motors are used not only in industry, but in virtually all areas - from medicine, trade, agriculture and food industry to military equipment, aviation and science.

> **In other words, the world today cannot exist without electric motors. 80% of their total number are induction motors. These are the ones "Sovelmash" develops.**

Also it is planned to produce power tools with original electric motors and controllers in Zelenograd: angle grinders and mitre saws. Due to the design features of "Slavyanka", the product will not only be low-noise (like a professional tool with magnetic motors), but also cheap (like a low-cost tool with brushed motors).

"It is worth noting that investors who are joining us now are in a better position than those who entered the project five years ago, when there were much more uncertainties and risks," Dmitriy Duyunov assures. - The risks are minimal - the construction is almost completed, we are ready for production. Moreover, there are no such enterprises in Russia that depend neither on imported technology nor on imported materials and components. And we will be the first."

You can join the project by following this link.

* Information support