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- Technical Diagnostics & Nondestructive Testing (<https://patonpublishinghouse.com/eng/journals/tdnk>);
- Electrometallurgy Today (<https://patonpublishinghouse.com/eng/journals/sem>).

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*Translated Article(s) from «Automatic Welding», No. 9, 2022.

**Translated Article(s) from «Electrometallurgy Today», No. 3, 2022.

NVO «Chervona Hvilya» is 25!

In September Kyiv PJSC “NVO Chervona Hvilya” celebrates its 25th anniversary.

From the moment of its foundation in the distant 1997, the Company’s history is inseparably connected with titanium production, as well as development and introduction of electron beam technologies.

Creation of the first in Ukraine full cycle of titanium ingot production became the initial goal of the young company’s activity. A shop section on quality preparation of titanium scrap for remelting was set up at the enterprise. A procedure for production of high-quality titanium ingots by electron beam remelting from the charge, completely consisting from scrap and wastes, was developed together with “Titan” Science-Production Center of the E.O. Paton Electric Welding Institute. As a result, inexpensive and high-quality ingots and slabs appeared in the world titanium market already one year after, which were purchased by titanium industry major players in the USA, Europe and China. NVO “Chervona Hvilya” quickly transformed from raw material exporter into titanium scrap importer and Ukraine’s largest exporter of titanium semi-finished products.

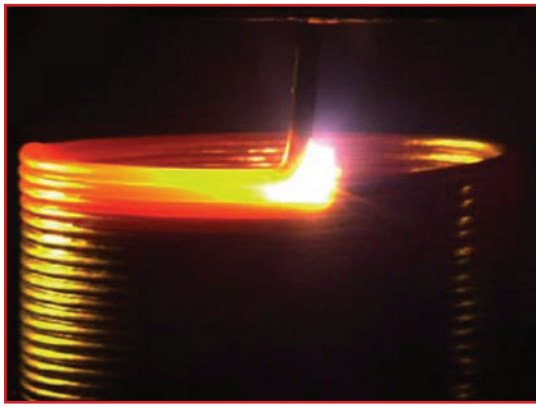
With time, most of the companies, which generated a lot of titanium wastes, decided to add electron beam melting furnaces to their traditional fleet of melting systems — and a real boom of such equipment began in the titanium world. Therefore, the owners of NVO “Chervona Hvilya” decided to refocus their activity from metal production to development of the most modern electron beam melting equipment: they had grounds to believe that no one else had such a combination of knowledge of the features of melting technology with their own real production practice.

With this purpose, a Design Bureau of Vacuum Metallurgy Equipment was established in 2005 with a team of high-class designers, engineers and technologists. The first large electron beam melting furnace for production of 10 t titanium ingots was designed and built already three years later. Then there were other projects, related not only to titanium, but also to other costly metals.

It should be noted that gas-discharge electron guns always were the base of all the company developments, both in terms of technology and design. A unique combination of exceptional technological capabilities, wide range of technical operating conditions and ease of maintenance made these guns an indispensable tool for many vacuum metallurgy processes. Gas-discharge electron beam guns of up to 600 kW power, developed by Company engineers are used all over the world for melting and refining titanium, niobium, tantalum, molybdenum, vanadium, zirconium, silicon and platinum in modern EB-PVD systems and for special welding applications.



Exceptional ability of gas-discharge electron guns to directly generate profiled electron beams, including hollow ones, became a precondition for development in 2014 of the technology of 3D printing, known as xBeam 3D Metal Printing. This development became the start of a new stage in Company development in adaptive manufacturing sector. Technical characteristics of the special electron gun and features of



the technological process of deposition ensure significant competitive advantages of this technology. The first orders for 3D xBeam printing systems began coming already at the development stage. By that time independent investigations had already proved the possibility of 3D printing of titanium products, which by their properties are not inferior to the quality of the traditional forged metal that is critical for the aerospace industry.

Scientific investigations always had a special place in NVO “Chervona Hvilya” activity, as the Company’s main business is development of high-tech equipment that requires both fundamental theoretical substantiation of the technological and engineering solutions and confirmation of the

obtained results by profound studies of the structure and properties of metal products, manufactured by the developed procedures. A combination of extensive experience of Company engineers in design of vacuum systems with profound knowledge of the technologists on physical metallurgy allows not only competing with the best foreign technologies, but often surpassing them due to unconventional engineering solutions. Innovations developed by NVO “Chervona Hvilya” team are protected by patents and applications for inventions in Ukraine, USA, Germany, China, etc. Company’s scientists and technologists are regular members and presenters at international conferences in the sectors of titanium production, electron beam and additive technologies.



Recently, the main direction of scientific-engineering research and development of NVO “Chervona Hvilya” is studying the technological capabilities of profiled electron beams, which can be generated by gas-discharge electron guns with different configuration of electrode systems. Successful scientific research activity of NVO “Chervona Hvilya” would be impossible without the procedural and practical cooperation with partners from academic and university environment, among which we can note G.V. Kurdyumov Institute of Metal Physics of the NAS of Ukraine, NTUU “Igor Sikorskyi KPI”, TWI and University of Manchester (Great Britain), Shanghai University of Science and Technology (China), and, certainly, the E.O. Paton Electric Welding Institute of the NAS of

Ukraine, with which the history of Company’s development is closely connected from foundation and up to now.

At present NVO “Chervona Hvilya” continues developing and improving the technological and engineering base. The Company team consists of about twenty scientists, including one doctor and two candidates of science, engineers and designers, who have realized dozens of research and industrial projects.

During the entire 25 years of its history, the Company has relied on three main principles, namely proprietary technologies, proprietary equipment design and proprietary operation experience. It has always helped effectively covering the entire path from development to introduction and gain-



ing recognition of leading companies all over the world.

We believe that our best developments are still ahead.

We invite you to cooperation.

Director of NVO “Chervona Hvilya”
Dmytro Kovalchuk


CHERVONA HVILYA
<https://xbeam3d.com/>