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**Rosatom made fuel for Yakutia universal nuclear icebreaker**

*The universal nuclear icebreaker Yakutia will become the fourth Russian icebreaker of the 22220 Project with RITM-200 reactors*

MSZ Machinery Manufacturing Plant, Joint-Stock Company (MSZ JSC, belongs to Rosatom TVEL Fuel Company, based in Elektrostal, Moscow Region) manufactured and shipped nuclear fuel for the second reactor of the universal nuclear icebreaker Yakutia being built at the Baltic Shipyard in St. Petersburg.

The core for the first of the two reactors of the power unit was delivered in December 2023. Thus, the future vessel of the Russian nuclear fleet has the full supply of nuclear fuel. Having been accepted, the fuel assemblies will be loaded into the reactor.

Project 22220 universal nuclear icebreakers are equipped with RITM-200 units, which belong to the fourth generation of civil marine reactors. They are designed and manufactured at the facilities of Rosatom Mechanical Engineering Division. The integrated RITM-200 unit consists of two reactors with a thermal power of 175 MW each. Its main advantages are compactness and efficiency ensuring the vessel double draft and improved performance in terms of speed and icebreaking capability. Such units also feature a large energy resource (2.25 times exceeding the energy resource of the cores onboard the nuclear icebreakers of the 50 Let Pobedy type).

The Russian nuclear fleet already includes three universal nuclear icebreakers – Arktika, Sibir and Ural. However, the core for the universal nuclear icebreaker Yakutia features an important innovation: thermometer sleeves of a new design (having undergone the acceptance test, the equipment has gone into production with “O1” symbol). This modernization makes the heat removal recording more accurate during operation. The serial universal nuclear icebreaker Yakutia is scheduled to be commissioned at the end of 2024.

*“The core for universal nuclear icebreakers is mass produced, but the last fuel batch for the Ural icebreaker was produced four years ago. Considering that, the decision was made to put its new components to qualification tests which were successful. The next universal icebreaker for which MSZ JSC is to produce cores is the universal nuclear icebreaker Chukotka that is under construction,”* commented Alexander Shein, Project Manager, Special Equipment Production, MSZ JSC.

Unlike NPP reactors with partial fuel unloading once every 12–18 months (just some part of the irradiated fuel is replaced with fresh fuel, the a.k.a. make-up fuel assemblies), the core fuel of the units onboard icebreakers is unloaded in whole with the end of the reactor fuel campaign (in this case lasting up to 12 years). That is why fresh fuel for nuclear icebreakers and the floating nuclear power plant Akademik Lomonosov is referred to as the core in the nuclear industry (by analogy with the first core of NPP reactors).

Russian nuclear icebreaker fleet now includes seven vessels: the universal nuclear icebreakers Arktika, Sibir, Ural, as well as nuclear-powered ships Yamal, 50 Let Pobedy, Taimyr and Vaigach. MSZ JSC is the only Russian producer of fuel for nuclear icebreakers.

**For reference:**

The development of the Northern Sea Route as a major logistics corridor is a national strategic priority. To increase the NSR cargo shipping is of paramount importance for fulfilling the tasks set for the comprehensive development of the Russian Arctic. This corridor development is being ensured through cargo shipping on a regular basis, construction of new nuclear icebreakers and modernization of the relevant infrastructure. Rosatom is actively involved in these activities.

MSZ Machinery Manufacturing Plant, Joint-Stock Company (JSC MSZ, Elektrostal) is a major world's producer of fuel for nuclear power plants. The facility produces fuel assemblies for VVER-440, VVER-1000, RBMK-1000, BN-600, 800, VK-50, EGP-6, powders and fuel pellets for supply to foreign customers. The company also produces nuclear fuel for research reactors. JSC MSZ belongs to Rosatom TVEL Fuel Company. [www.elemash.ru](http://www.elemash.ru).

Rosatom TVEL Fuel Company (Rosatom’s fuel division) includes nuclear fuel manufacturers, uranium conversion and enrichment facilities, gas centrifuge producers, as well as research and design companies. As the only supplier of nuclear fuel for Russian NPPs, TVEL supplies fuel for a total of more than 70 power reactors in 15 countries, research reactors in nine countries, as well as propulsion reactors for the Russian nuclear fleet. Every sixth power reactor in the world runs on TVEL fuel.

Rosatom's fuel division is the world's largest producer of enriched uranium, while also leading on the global market for stable isotopes. The fuel division is actively developing its new businesses in chemistry, metallurgy, energy storage technologies, 3D printing, digital products, as well as nuclear facility decommissioning. TVEL Fuel Company also includes Rosatom’s integrators for additive technologies and electricity storage systems. <http://www.tvel.ru>.