

## Rosatom made fuel for Yakutia universal nuclear icebreaker

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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. 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.