fusion NEUTRONS SOURCE DEMO-FNS TRITIUM FUEL CYCLE: TECHNOLOGIES, DEVELOPMENT, DESIGN, EXPERIMENTS [[1]](#footnote-1)\*)

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The fuel cycle of the DEMO-FSN facility is an important component of the reactor design. The fuel flow (tritium and deuterium) into the vacuum chamber is a function of the declared DEMO-FNS parameters, such as thermonuclear power, etc., and is comparable to the fuel flow in the JET facility. However, the stationary operating mode of the DEMO-FSN facility (pulse duration of more than 106 seconds) leads to a significantly higher total tritium content in all fuel cycle systems (20-60 g of tritium in JET and 2000 g in DEMO-FNS). It should be noted that this parameter is one of the keys to justify safety and determine the operating costs of the entire installation. The tritium amount in the fuel cycle substantially depends on the selected technologies for processing the hydrogen isotopes fuel mixture. Therefore, it is necessary to optimize the technologies planned for use, improve the FS-FNS code [1] and experimental results to justify the adopted design decisions.

The report discusses the technologies planned for use in the main fuel cycle systems: a fuel supply and storage system, an injection system, a divertor pumping system, a tokamak exhaust gas processing system, a hydrogen isotope separation system, a gas detritiation system, etc. The comparison of technologies and adopted design decisions with analogues developed for ITER, CFETR and DEMO facilities is also carried out.

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References

1. Ananyev S.S., Spitsyn A.V., Kuteev B.V. «Electronic model «FC-FNS» of the fusion neutron source DEMO-FNS fuel cycle and modeling hydrogen isotopes flows and inventories in fueling systems» — Fusion Engineering and Design 138 (2019) 289–293, <https://doi.org/10.1016/j.fusengdes.2018.12.003>
1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/XLVII/Mu/ru/BF-Ivanov.docx) [↑](#footnote-ref-1)