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The final design and manufacturing process for the ESS Monolith Vessel

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The European Spallation Source is an ambitious European project with a budget of more than 1800 M€ to build a 5 MW spallation source in Lund (Sweden). For this purpose, it will use a proton beam with a total power of 5 MW which will impact on a tungsten Target cooled by helium gas.

The spallation reactions produced in the ESS target will generate a large number of radioactive isotopes. The amount of activated material generated by this process is comparable to a ~5 MW fission reactor, thus enclosing barriers are needed to avoid damage to the public and workers.

In order to confine the activated material, the target systems are enclosed in a vacuum or helium atmosphere confined by a pressure vessel which we call the Monolith Vessel. The Monolith Vessel provides a leak-tight boundary between the outer air atmosphere and the Target Moderator Reflector system atmosphere. Once installed, the Vessel will not be changed during the 45 years of planned lifetime of the facility.

The design, manufacturing and inspection plans are completed and the production process is progressing on schedule. It is expected to be completed by the end of 2019.

The aim of this paper is to summarize the mechanical design of the Monolith Vessel and the progress on manufacturing process.

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