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Fri-Af-Po.11-03: Development of 15T DC magnet for SUPER-X test facility

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The superconducting conductor performance test facility SUPER-X, as an integral part of the superconducting magnet system for the key fusion reactor core system, is currently being developed by the Institute of Plasma Physics, Chinese Academy of Sciences. The 15T DC magnet in SUPER-X test facility serves as the core component, consisting of LF (low field) pancake coils and MF & HF (medium field & high field) layer coils. During the manufacturing of the coils, the processes of winding and forming, insulation wrapping, terminal fabrication, heat treatment, and VPI (vacuum pressure impregnation) are critical to the final quality of the coils. This paper provides a detailed description of the manufacturing processes for both the pancake and layer coils of the 15T DC magnet, and presents measurements of their dimensions and electrical insulation performance. The measurement results demonstrate that the dimensional accuracy and electrical insulation properties of the pancake and layer coils meet the technical requirements, thus providing essential support for the successful fabrication of the SUPER-X device.

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