

## ITER NBTF 1MV電源の製作と試験 Manufacturing and test of 1 MV power supply for ITER NBTF

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The deuterium negative ion beams of 1 MeV, 40 A for 3600 s are required for the neutral beam (NB) system of ITER. To achieve such high power beams, the prototype of the ITER NB system is under construction in the NB test facility (NBTF), Padova/Italy. Japan Atomic Energy Agency (JAEA) procures the high voltage power supply components (1 MV, 60 A for 3600 s) of this system. The manufacturing of these components for the NBTF is now in progress.

The overview of the power supply components are shown in Fig.1. 1 MV is generated by connecting five DC generators of 0.2 MV each in series. Conductors from each DC generator are transmitted to the beam source through the transmission lines, where the SF<sub>6</sub> insulation gas of 0.6 MPa is filled.

Three DC generators of 0.2 MV, 0.4 MV and 0.6 MV have been manufactured by May, 2015. The output voltage test and the voltage holding test including the margin of 20 % were successfully demonstrated. These fulfill the ITER requirements. The transmission line (TL) has conductors with

five different potentials as shown in Fig.1. TL of 80% has been completed to be manufactured. The manufactured TL demonstrated the stable voltage holding at 1.2 MV for 3600 s. This satisfies the ITER requirements. These components to be manufactured have been shipped to NBTF site. The installation in the NBTF site will be started since Dec., 2015 as scheduled. In parallel to the installation work, all other components are delivered to the NBTF site by Aug, 2016.

The recent R&Ds are also reported. The feasibility of water tubes made of reinforced plastic (FRP) has been experimentally examined. The water permeation and the degradation of the voltage holding in the FRP tubes were measured to be within the acceptable level. This shows that the FRP tube is feasible as a water cooling tube in ITER. The replacement of ceramic tubes designed originally with the FRP tubes is accepted by the ITER organization. The cost reduction and the easy handling are expected.

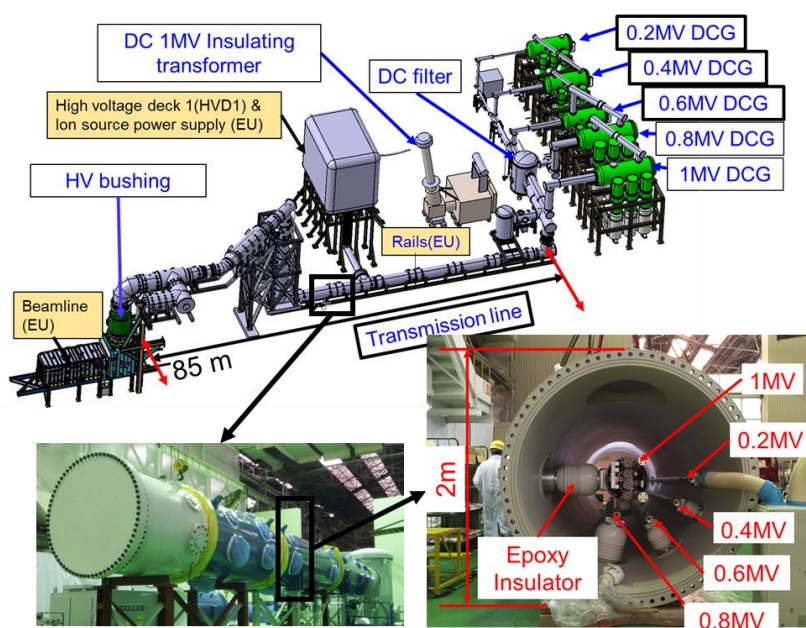


Fig.1: Overall of NB power supply and details of transmission line