

Trench 1200kV Transformer Bushing Approved for the Indian Market



Background

In August 2009, Narec successfully completed the type testing of a new 1200kV transformer bushing manufactured by Trench (UK) in Hebburn, South Tyneside. This was the first 1200kV bushing to be ordered from Trench by the Powergrid Corporation of India for use on transformers at its 1200kV development test station at Bina (in the state of Madhya Pradesh). 1200kV/400kV transformers allow the transmission system operating voltage to be increased from 400kV to 1150kV, this will then be connected to short (approximately 1km) overhead line circuits.

Research on ultra high voltage (UHV) transmission systems started in the 1970s, with experimental lines and test stations built in the USA, Russia, Italy, Japan and China to develop the next generation AC transmission technology. The expected requirements for mass power transfer did not materialise, consequently the technology was not commercialised or implemented on a large scale.

In order to meet India's expected power transfer requirements by 2025, Powergrid Corporation is investing heavily in the development of 1200kV AC transmission technology.

The 1200kV rating applies to the phase to phase system operating voltage which translates to a phase to ground operating voltage of 693kV.

Process

Trench and Powergrid Corporation chose Narec's UHV testing laboratories (Clothier Laboratory) to oversee the test programme. The testing proved a valuable exercise and all parties were extremely satisfied with the results.

As part of the type test programme the maximum test voltages reached in Narec's laboratory were:

- Partial discharge measurement test–1040kV
- Positive lightning impulse–2550kV
- Negative lightning impulse–2550kV
- Negative lightning impulse chopped wave–2930kV
- Switching impulse (positive and negative)–1950kV
- Power frequency withstand–1200kV for 1 minute
- Thermal stability–960kV for 1 hour

Results

The successful testing of the new 1200kV transformer at the Clothier Laboratory for Trench (UK), a member of the Siemens Power and Transmission and Distribution Group would enable Trench to win further work and build more transformer bushings at Hebburn destined for the Indian test site.

Alex Neumann, Director of Electrical Networks at Narec, said: "This was the first time that the UHV laboratory had been used to test bushings at such high levels. These tests have, however, shown that Clothier can generate the voltages required to for type testing 1200kV bushings for the world market.

"Narec's close working relationship with Trench (UK) has enabled this successful innovation and we look forward to continuing to work with them in the future."

XXXXXXX, at Trench (UK), said: "The success of this particular development programme could lead to opportunities for Trench to be selected as one of the main suppliers of 800kV and 1200kV bushings for the Indian market. The vast distances in India between electricity generation sources and the growing load centres requires such upgrades and provides new market opportunities."