

External Article for Shell collaboration with Siemens Energy and TenneT:

TRANSFORMER WITH SHELL DIALA S5 BD SUCCESSFULLY TESTED BY SIEMENS ENERGY FOR TENNET PROJECT

Shell supplied Shell Diala S5 BD, a state-of-the-art, readily biodegradable transformer oil, as part of a joint sustainability project of Siemens Energy, TenneT, and Shell.

The collaboration decided to fill the power transformer for TenneT's transformer substation in Schwandorf, Germany with Shell Diala S5 BD. The unit is currently the biggest three-phase TenneT grid transformer in Germany with a rating of 650MVA / 400kV, and the power transformer is securing the high demand of energy in the southern part of Germany.

Shell Diala S5 BD is a state-of-the-art, readily biodegradable transformer oil made with Sulphur-free GTL Technology. The GTL innovation platform began in 2010, with the successful development and market introduction of Shell Diala S4 ZX-I. Based on the robust field experiences of Shell Diala S4 ZX-I and new market requests for more environmentally acceptable fluids, the further development of Shell Diala S5 BD was a logical step. Shell Diala S5 BD is a high-grade, inhibited transformer oil with a high degree of compositional consistency that meets and exceeds the IEC 60296 Ed5 (type A) specification in addition to OECD 301B. The oil is fully miscible and compatible with conventional mineral oils, which is beneficial for top-up, replacement, and standardization. Sulphur-free GTL Technology also eliminates the risk of corrosion caused by corrosive Sulphur and offers superb oxidation stability, resulting in extended transformer oil life. Shell Diala S5 BD also offers extreme cold temperature performance and is already generating demand from electrical projects that may experience arctic temperatures.

The transformer has successfully passed the factory acceptance test at the Siemens Energy factory in Nuremberg, Germany and all technical parameters were met as expected from TenneT's side. The unit is ready for dispatch to its deployment site in the substation Schwandorf some 90 kms east of Nuremberg.

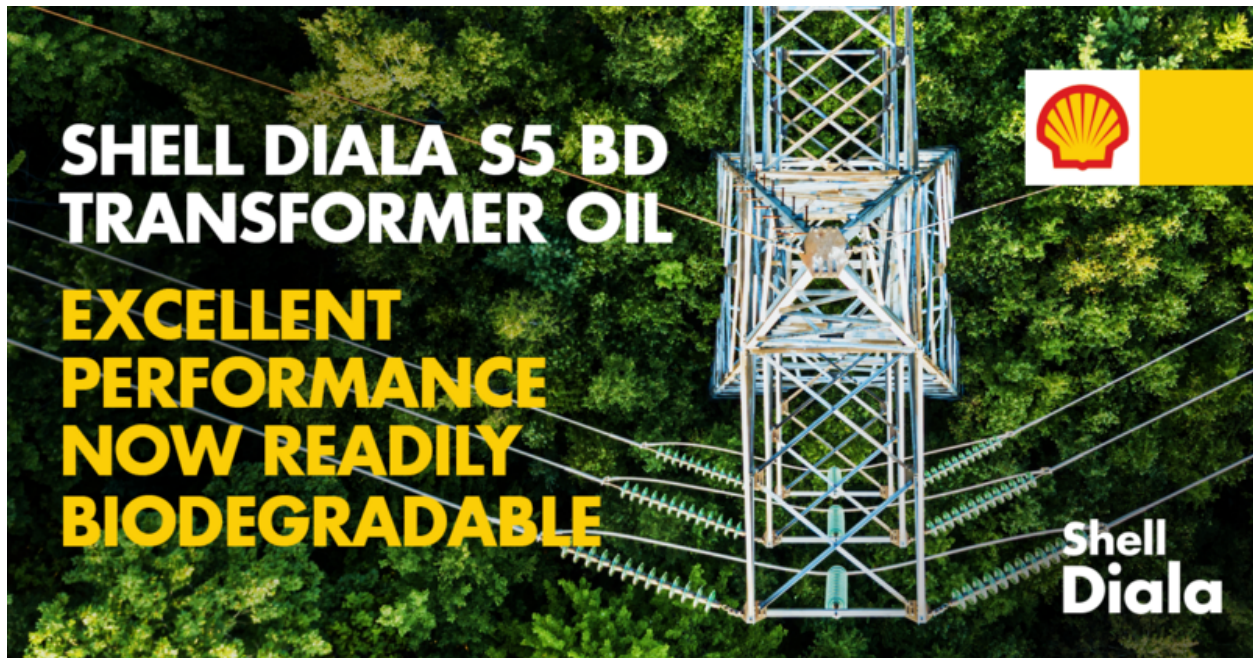
The end customer, TenneT, is a leading European grid operator and manages the high- and extra-high voltage grid in the Netherlands and large parts of Germany. As the first cross-border Transmission System Operator, TenneT designs, builds, maintains, and operates 24,500 km of high-voltage electricity grid.

After technical examination of the transformer oil's parameters, TenneT chose Shell Diala S5 BD. The performance of Shell Diala S5 BD is high-level with proven Shell Diala S4 ZX-I, combined with the big advantage of biodegradability. TenneT sees Shell Diala S5 BD transformer oil as an important step towards a more sustainable transformer.

- *“Shell believes that improving sustainability credentials does not mean sacrificing performance,” said Ed van Schaik, Product Application Specialist for Shell Diala Transformer Oils. “Shell Diala S5 BD supports transformer operators in overcoming the biggest challenges currently facing the industry, by enabling their equipment to handle harsh cold climates and new environmental needs. By diminishing downtime and extending effective transformer life, Shell Diala S5 BD helps*


businesses lower Total Cost of Ownership of equipment.”

- *“Without any compromises in terms of performance and durability, we jointly provide add value and strengthen our customer’s market appearance,”* said Mate Sicenica, Sales Director of the Siemens Energy Transformer Factory Nuremberg. *“On top, we take over responsibility towards our nature and society. A big thanks to Shell and TenneT for all their support and assistance during the whole project execution.”*



**SHELL DIALA S5 BD
TRANSFORMER OIL**

**EXCELLENT
PERFORMANCE
NOW READILY
BIODEGRADABLE**



**Shell
Diala**