

CASE STUDY



PROJECT: Locomotive transformers | Germany
ESTER TYPE: MIDEL 7131 synthetic ester
PURPOSE: Multi-network operation using differing AC/DC voltages

[OVERVIEW]

A large order to supply 400 Bombardier type BR185 electric locomotives to Deutsche Bahn had to be specifically designed with international operation in mind and as such had to be able to travel through regions with different operating voltages, namely 15kV and 25kV.

They were specified as high power units, with a maximum output of 5,600kW, and had to be capable of being used for both freight and passenger operations. These locomotives were based on the earlier design class 101, which used a MIDEL filled transformer to step down the catenary voltage to a more useful voltage for the onboard induction motors and auxiliary systems.

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[SITUATION]

Just as in a utility's power network, transformers also perform a critical role in the operation of electric drive trains. This role, however, comes with a number of challenges specific to the traction world. Such transformers must perform in severe outdoor environments where they will be exposed to extreme temperatures, near-constant vibration, and voltage fluctuations, all the while needing to deliver safe service under exacting performance requirements.

Train transformer manufacturers are on a constant quest to reduce weight and space of these units. Put simply, large, heavy train transformers equate to higher additional operating costs for the system owner. Smaller, lighter units would also deliver passenger benefits, meaning more space for extra seats. Increasingly, environmental concerns are needing to be addressed by rail operators; more rigid sustainability policies and mandates need to be addressed. MIDEL ester transformer fluid, with its high fire point, oxidation resistance and biodegradability delivers the ability for transformer OEMs to innovate, creating a new generation of traction transformers contributing to safer, greener locomotives.

[RESULT]

The BR185 series units have been used widely across Europe since successful adoption in Germany, with a total of more than 850 AC type units having been sold. If the TRAXX MS multi-system locos, which can also operate on DC networks, are added onto the total then it comes to over 1000, operating with MIDEL filled transformers.

An example of the international interest in the TRAXX AC system freight locos are those operated by Floyd zRT, used on a corridor that runs all the way through Germany and Austria, on into Hungary.

In all the years of operation of the TRAXX locomotives there have been no reported problems with the transformer fluid and the trains have an excellent reliability record, demonstrating that MIDEL gives superb long term service in the most demanding of applications.

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The use of MIDEL ester fluids in this project supports the following UN Sustainable Development Goals:

