

### **Improvement of Starting Acceleration by use of Gear Oil with Improved Low-temperature Fluidity**

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This study explores effects of gear oil with improved low-temperature fluidity on improvement of starting acceleration of trains running in cold districts. In starting performance tests at  $-20^{\circ}\text{C}$ , temperature rise of gearbox in acceleration region was suppressed using the gear oil with improved low-temperature fluidity. Suppressing effects on temperature rise of gearbox using gear oil with improved low-temperature fluidity was also confirmed under condition where starting acceleration was increased up to 2.9km/h/s. Accordingly, from these results, it is found that the use of gear oil with improved low-temperature fluidity is effective in improving starting acceleration in cold environment. Moreover, it is confirmed that the use of gear oil with improved low-temperature fluidity tends to suppress gear oil temperature rise under conditions of operation at maximum speed.