

# Hi-PERF EV FLUID RANGE

## Electric two wheelers

Dedicated fluids for Electric Powered Two Wheelers Drivetrain

Thermal Management fluids



- ▶ EV-DRIVE R
- ▶ EV-DRIVE MP
- ▶ EV-BATTERY
- ▶ EV-MOTOR

### Hi-PERF EV-Drive MP



Designed for reducers, electric engines and power electronics:

- Protects against short circuits and static electricity
- Provides optimal temperature control (even at fast charging)
- Ensures compatibility with copper coils and polymer materials.
- Shows excellent anti-wear properties (gears and rolling bearings)

### Hi-PERF EV-Drive R



Provides specific technology for new generation of electric drivetrain reducers:

- Ensures durability of gears and rolling bearings rotating at very high speed
- Shows optimal anti-foaming and air release properties through the entire lifetime of the vehicles
- Designed for excellent pumpability even at very low temperature

### Hi-PERF EV-Battery



High-performance fluid for battery thermal management:

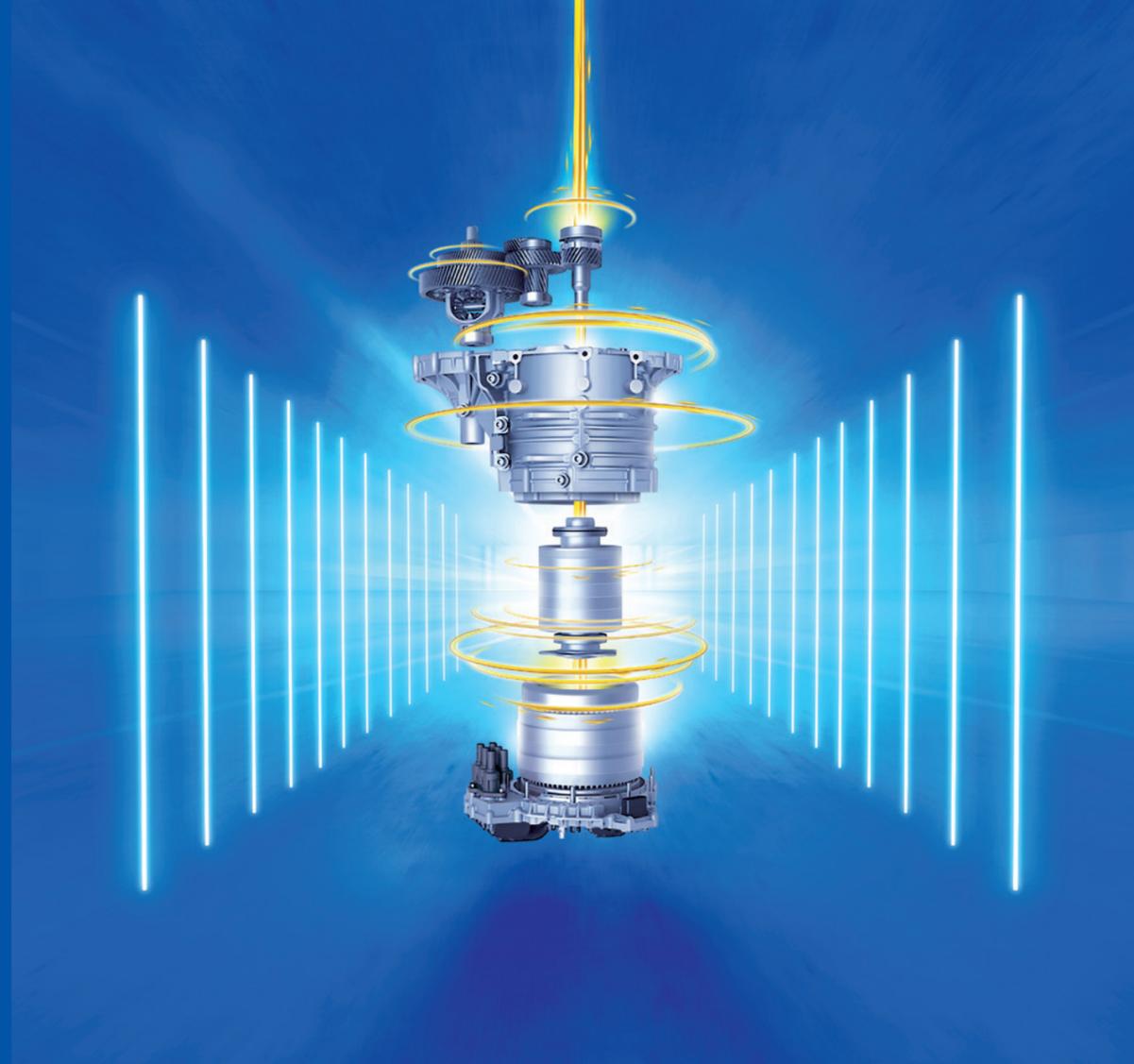
- Allows ultra-fast charging through outstanding thermal management properties
- Provides a very high resistance to ageing
- Protects against short circuits and static electricity
- Ensures high protection against fire propagation risk

### Hi-PERF EV-Motor

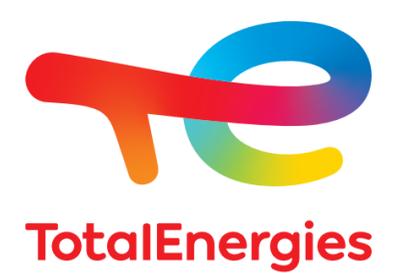


High performance fluid for electric motor cooling:

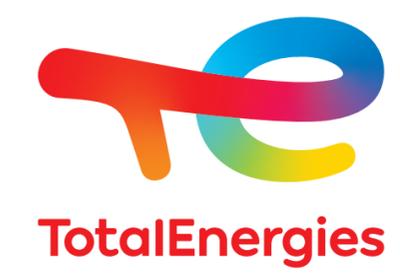
- Protects against short circuits and static electricity
- Provides optimal temperature control even at sharp acceleration
- Ensures compatibility with copper coils and polymer materials
- Ensures excellent durability for rolling bearings rotation at very high speed



## Technical guide



[lubricants.totalenergies.com](http://lubricants.totalenergies.com)



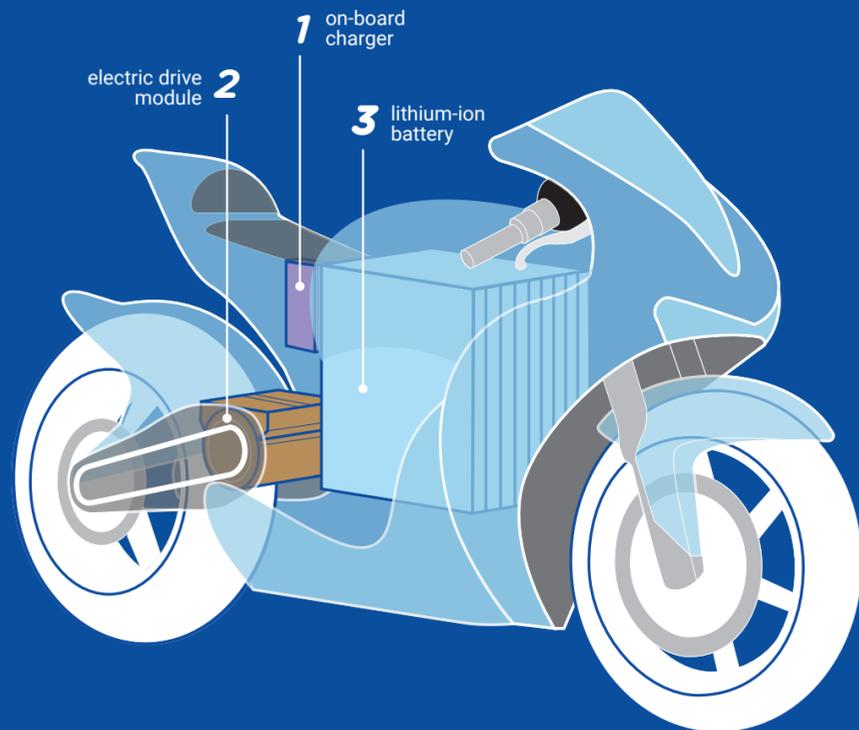
# What is an electric powered two-wheeler?

An electric Powered Two Wheeler (ePTW) uses generally a electric motor powered by electrical energy, stored in batteries. Example of electric Two Wheelers are **e-bikes, e-scooters and e-motorcycles**.

The electric motor converts electrical energy into mechanical energy with an efficiency of around 80%, while Internal Combustion Engine only achieves 35% of efficiency. Batteries are energy accumulators and are the electric two wheelers's main technological challenge. Major objectives of a battery are: high energy density, reduced charging time and lower cost. **The lithium-ion battery is the most commonly used technology.**

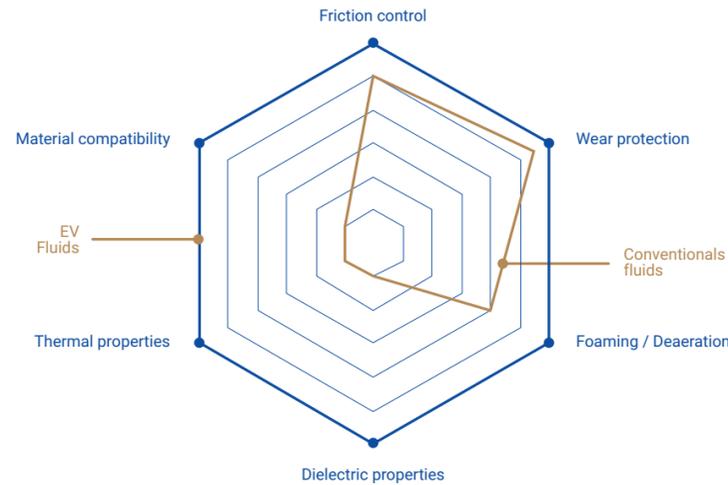
The electric engine does not require the use of standard complex gearboxes, which are otherwise necessary in today's vehicles. **A reducer is used to transfer the electric motor's mechanical power to the wheels.**

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## New technical requirements

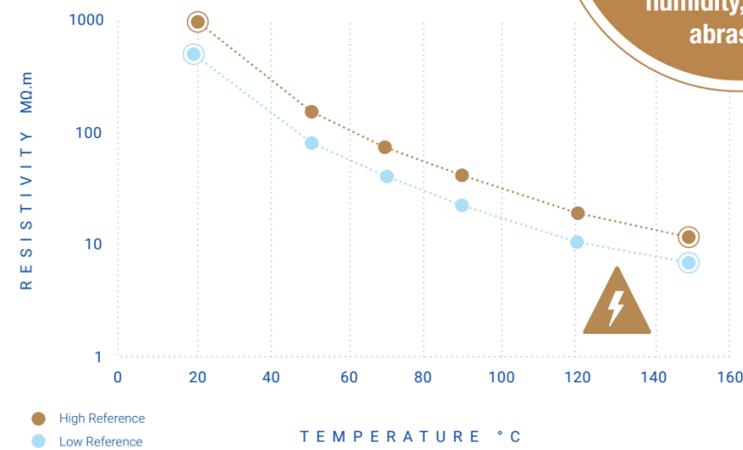
New technical constraints for the electrification of two wheelers **require the development of new fluids** that must meet the following properties.



## Dielectric properties

Fluids used in ePTWs require electrical insulation properties. The fluid must be insulating to prevent any arcing since it is going to be in close contact with the electrical and/or electronic components of the vehicle.

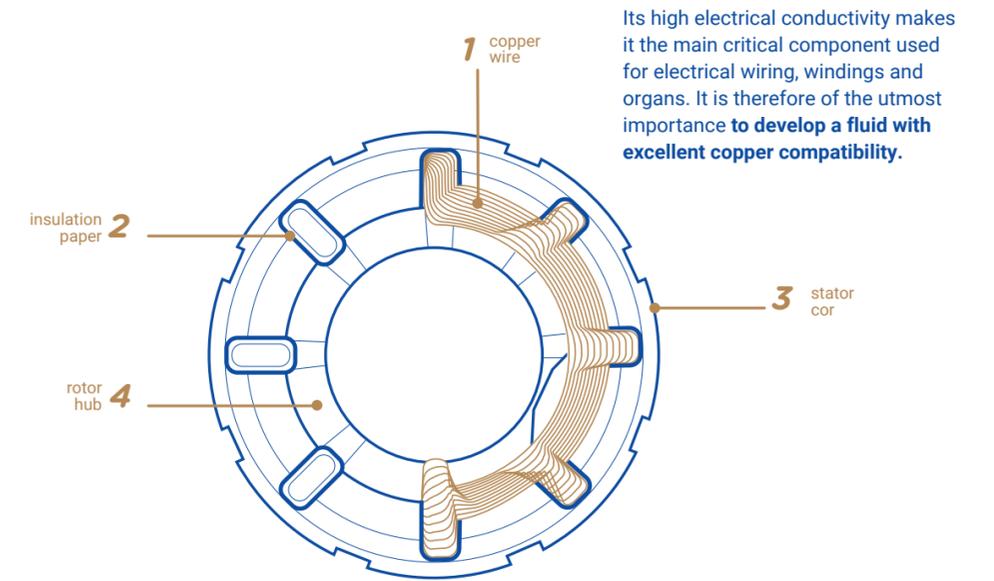
Dielectric properties must remain stable throughout the time in spite of harsh operating conditions: rising temperatures, oxidation, humidity, particle abrasion.



## Compatibility with materials

The fluid and new components of the ePTW are in direct contact. New challenges must be faced in terms of the fluid being compatible with different types of materials in order to avoid the following consequences: swelling, breakage, corrosion etc.

**Copper is a key material for these applications.**



Its high electrical conductivity makes it the main critical component used for electrical wiring, windings and organs. It is therefore of the utmost importance **to develop a fluid with excellent copper compatibility.**

## Thermal properties

Power electronics and the electric engine must operate within a defined temperature range. Operating at higher than the desired temperature range inevitably reduces the vehicles' service life, efficiency and power. The components are subject to the Joule effect, which is the heat dissipation of the electrical energy. A fluid must therefore ensure efficient heat evacuation at temperatures up to 180 °C.

