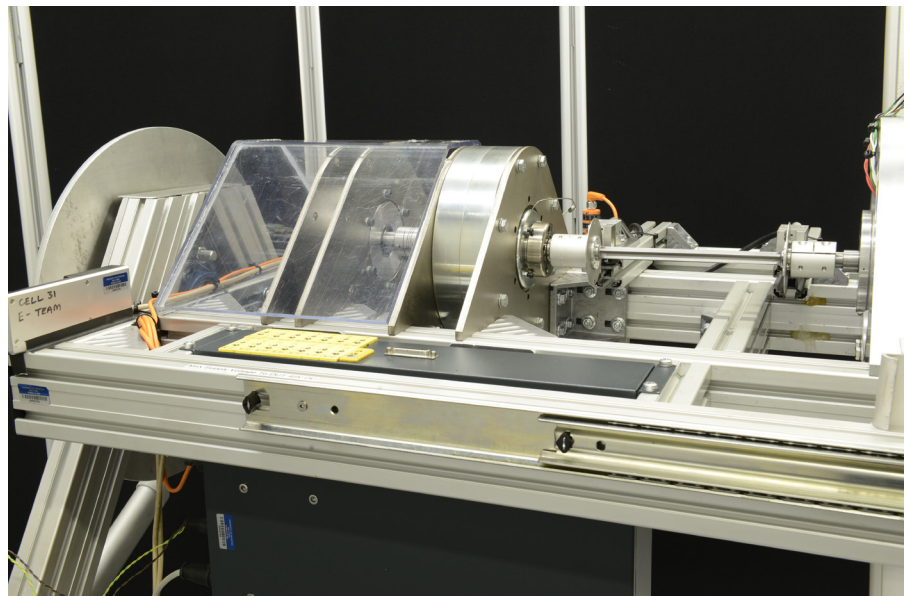


## FACT SHEET

# ELECTRIC VEHICLE MOTOR LUBRICANT TESTING RIG

Intertek delivers one of the broadest range of development services for combustion engine, hybrid and pure electric propulsion systems and their associated fuels and lubricants. Our expert engineers are constantly developing unique and bespoke testing equipment to ensure our customers products are at the forefront of the industry.



### Our background

Intertek Transportation Technologies is a global automotive engineering service company with more than 30 years' experience in powertrain testing. Our UK facility includes one of the most well-established specialist fuels, fuel additives and lubricants testing facilities in Europe. Intertek now offers a new EV fluids development capability to compliment its current range of current and future CEC fuel, additive and lubricant tests. Working with our experts, we can help you improve EV lubricants and electric motor performance, enabling you to accelerate your development programme.

### Our EV motor lubricant test rig

Designed and built in-house, this unique testing solution was created to enhance the performance and cooling of e-motors specifically designed for electric vehicles. Our EV motor lubricant rig enables development of e-motors lubrication and/or EV lubricants and can conduct your tests at a wide range of temperatures and flow velocities.

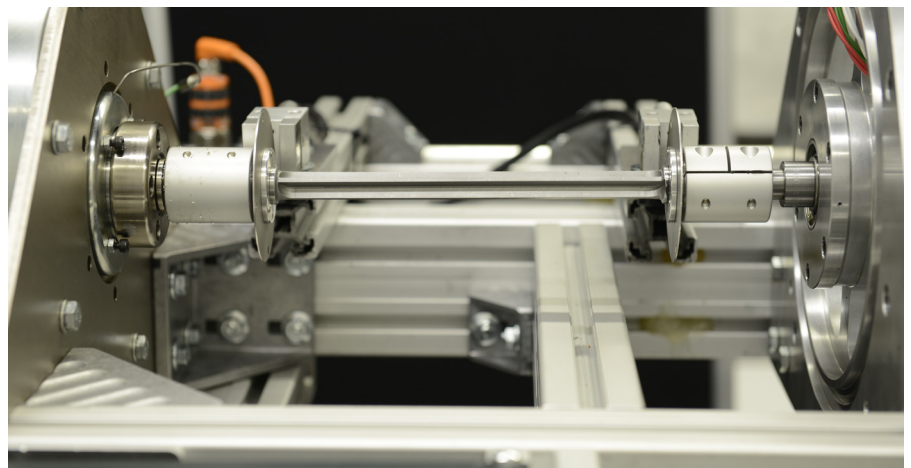
Our rig can help you:

- Reduce e-Motor losses to improve efficiency and vehicle range
- Improve e-Motor cooling to reduce the need for motor de-rating at high load
- Develop improved fluids to better meet the changing needs of the automotive industry

Upon demand, the rig is also ready to provide tilting capabilities and simulate real-world challenges. With the increasing development

of electrification technologies in the automotive market, we have designed our EV motor lubricant test rig to suit a broad range of fluid and motor types and designs.

Our equipment can be fitted with customer specific mounting plates, allowing us to accommodate a large range of customer e-motors. Additionally, all our test facilities are fully accredited to ISO 9001 and can operate 24/7, allowing us to accelerate our customers test programmes.



# ELECTRIC VEHICLE MOTOR LUBRICANT TESTING RIG

## Development tests that can be conducted

- 1. Motor Rotational Loss (no fluid):**  
Evaluation of rotational loss without incurring on windage effect. Possibility to test different bearing types and models.
- 2. Rotor Windage Loss (no fluid):**  
Possibility to quantify losses due to windage, through comparison of results between this test and Motor Rotational Loss Measurement.
- 3. Motor Cooling Fluid Viscous Loss:**  
Comparison of drag torques using different fluids, at different temperatures, at different flow rates and at different tilt angles
- 4. Stator Heat Transfer to Cooling Fluid:**  
Fluid cooling capability can be measured at different speeds, temperatures and flow rates, providing the cooling efficiency profile for each test fluid

## Our EV motor lubricant rig capabilities

### Motor mounting and tilt specifications

- Modular design, flexible mounting options available to suit a wide range of motor units
- Test samples can be tilted in a single axis to  $\pm 45^\circ$ . Multiple axis movement available upon customer demand

### Drive system

- Drive is provided by a 7.5kW (10HP) 2 Pole AC Induction Motor

- Drive is transmitted to the precision balanced flywheel assembly through a one-way clutch drive, preventing any torsional oscillations being transmitted to the 'Phase Shift Torque Meter'
- Maximum continuous speed = 10,000 rpm (max intermittent speed = 12,000 rpm). Variable speed option available upon customer demand

### Torque measurement

- Torque is measured by an optical 'Phase Shift Torque Meter'
- Several driven torque limits available to suit all customer` needs. Current beam maximum drive torque of 10Nm and was designed for an intended operational limit of 0 to 6Nm.
- Torque measurement accuracy: 0.03Nm
- High precision speed measurement through a high speed (20Mhz) thermally stabilized counter, delivering an accuracy of 1rpm in 15,000rpm, 6 times per rev (11ppm)

### Temperature and pressure measurement

- 14 Off K Type Temperature Channels
- 10 Off high precision pressure measurement channels
- All temperature & pressure channels are synchronously recorded by the logging software at 2Hz

### Fluid conditioning

- Fluid Temperature control

- Oil Flow Rate control
- Scavenge pump to evacuate oil from motor unit under test

### Additional Specifications:

- Temperature Range = Ambient to 120°C
- Max Flow Rate = 15 l/min. Measurement resolution: 0.05 l/min

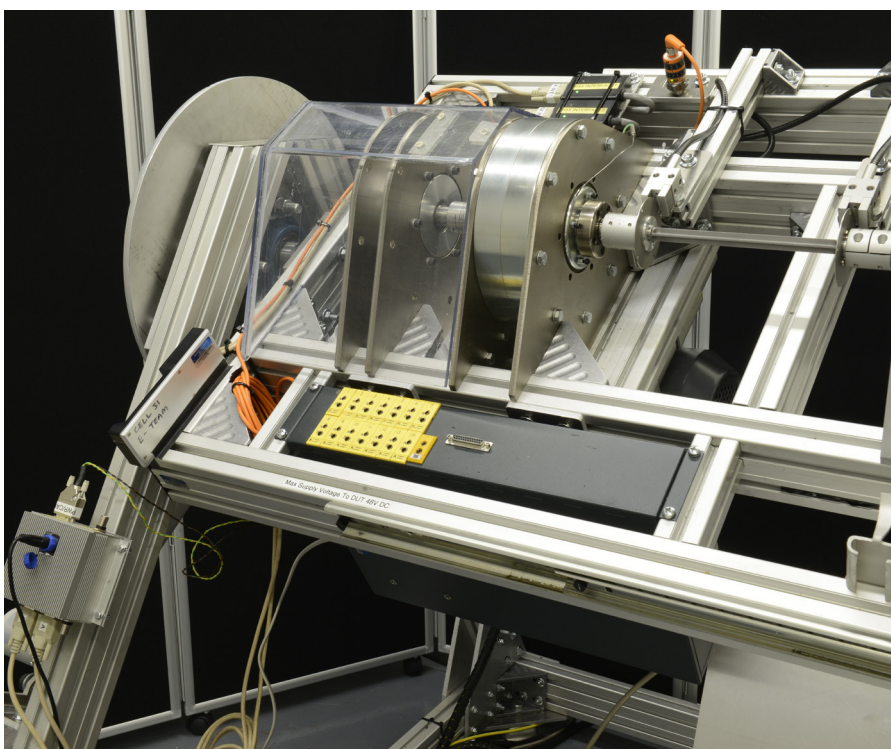
### The Intertek Advantage

Our expertise in testing supports our customers challenges on optimization and development of its products. Intertek's facilities are supported by comprehensive in-house instrumentation and maintenance, ensuring minimum down-time with maximum data quality. Our global presence means we can support your operations around the world, with state-of-the-art laboratories in America, Europe and Asia, covering all sorts of automotive testing.

### About Intertek

Intertek is a leading Total Quality Assurance provider to industries worldwide. Our network of more than 1,000 laboratories and offices in more than 100 countries, delivers innovative and bespoke Assurance, Testing, Inspection and Certification solutions for our customers' operations and supply chains. Intertek Total Quality Assurance expertise, delivered consistently with precision, pace and passion, enabling our customers to power ahead safely.

To find an office or laboratory in a particular country, please visit [intertek.com/contact](http://intertek.com/contact)



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