

# Stefa<sup>®</sup> HiSpin<sup>®</sup> EV40

PRECISION-ENGINEERED ELASTOMER RADIAL SHAFT SEAL DESIGNED TO MEET THE DEMANDING REQUIREMENTS OF HIGH-SPEED ELECTRIC MOTORS



**Stefa<sup>®</sup> HiSpin<sup>®</sup> EV40, equipped with our proprietary Phase-Shifted-Wave (PSW) Technology, is expertly engineered to meet the demands of electric vehicle (EV) high-speed traction motors, providing superior low-friction sealing for extended performance and durability.**

Modern EV traction motors can reach speeds of up to 20,000 rpm. Current advancements focus on enhancing efficiency and power density, driving trends toward more direct cooling methods and higher rotational speeds.

With decades of expertise in sealing challenging applications, Trelleborg Sealing Solutions is a leader in developing solutions for EV technology. Our latest innovation, the Stefa<sup>®</sup> HiSpin<sup>®</sup> EV40 is expertly engineered to protect sensitive components across a wide range of temperatures and lubrication conditions. Designed to shield against lubricants while minimizing torque losses, it ensures optimal performance and reliability.

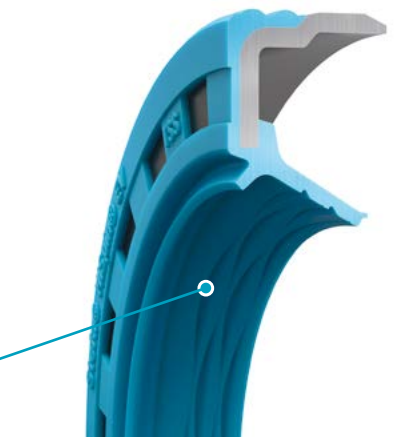
## Phase-Shifted-Wave Technology

Our patented PSW Technology provides superior sealing performance even in highly lubricated conditions, while reducing radial force and decreasing friction. Its symmetrical design ensures consistent sealing efficiency in both rotational directions.

The PSW hydrodynamic texture on the sealing lip is designed to actively pump fluid back to the oil side during shaft rotation, regardless of the direction of rotation. This unique feature prevents leakage, enabling the Stefa<sup>®</sup> HiSpin<sup>®</sup> EV40 to effectively seal at shaft surface speeds of up to 40 m/s.

## Features & Benefits

- Designed for high surface speeds of up to 40 m/s
- Symmetrical design simplifies customer validation and part management
- Delivers consistent performance in both rotational directions
- Excellent sealing efficiency under diverse lubrication conditions
- Minimizes frictional torque and heat generation
- Accommodates shaft run-out for enhanced reliability
- Specially formulated fluorocarbon (FKM) demonstrates proven compatibility with numerous electric axle fluids
- Well suited for high-volume production



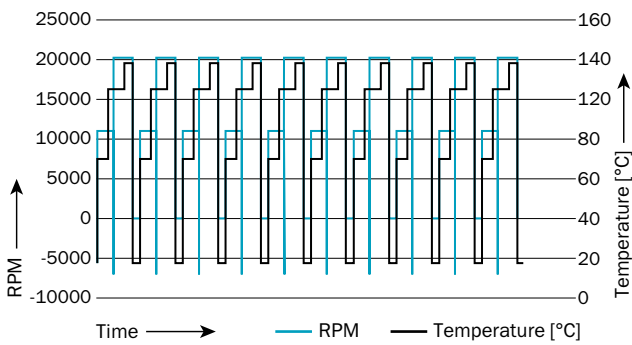
# STEFA® HISPIN® EV40

## PROVEN PERFORMANCE

Using extensive in-house facilities, Trelleborg Sealing Solutions experts conducted tests to demonstrate the performance of Stefa® HiSpin® EV40.

### High-Speed Test

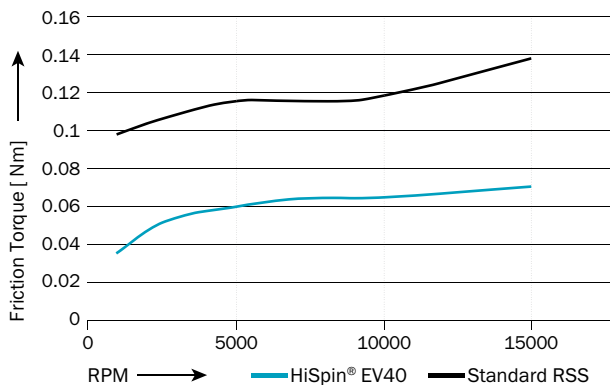
To validate the design, our R&D experts conducted a high-speed test over 240 hours, simulating severe operating conditions. This test involved a rotational speed of 20,130 rpm, equivalent to 40 m/s for the 38 mm shaft diameter samples. The setup included a 1/8 shaft fill of oil lubrication and a maximum temperature of +135 °C/+275 °F at peak speed. Stefa® HiSpin® EV40 successfully completed this test without any signs of leakage, proving its reliability under extreme conditions.



Extreme speed and temperature conditions in the high-speed test.

### Friction Torque Measurements

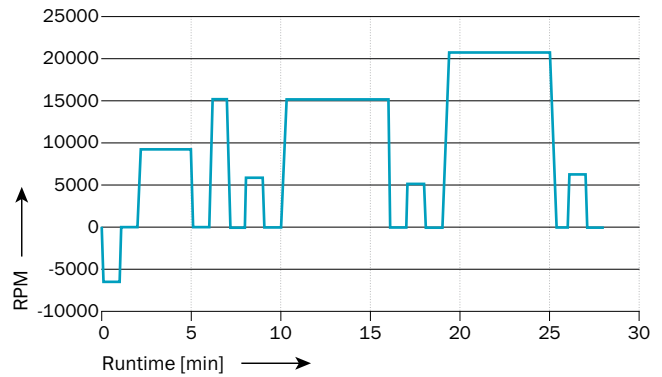
Friction torque measurements were conducted using a 1/8 shaft fill of oil lubrication to compare the Stefa® HiSpin® EV40 to a standard radial shaft seal at various rotational speeds. Thanks to its innovative PSW Technology, which features a back-pumping effect, the Stefa® HiSpin® EV40 achieves effective sealing with significantly reduced radial loads. This results in lower torque losses, ultimately improving EV traction motor efficiency.



Torque loss measurements comparing the Stefa® HiSpin® EV40 with a standard radial shaft seal.

### Endurance Test

To verify long-term durability, the seal underwent a strenuous 1,000-hour test. This included a 28-minute load profile, indicative of real vehicle demands, repeated over the entire duration. Speed cycles were carefully calibrated, with a 1/8 shaft fill of oil lubrication maintained at a consistent +100 °C /+212 °F temperature. After 1,000 hours, the test revealed no leakage and no wear visible on the seal, attesting to the outstanding durability performance of Stefa® HiSpin® EV40.



Endurance test 28-minute speed cycle repeated for the full test duration.



Inspection of seal after endurance test shows no signs of wear.

### CONTACT US

Reach out to your local Customer Solution Center for support.  
[www.trelleborg.com/seals/contact-form](http://www.trelleborg.com/seals/contact-form)



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