



Add value.
Inspire trust.

Servoelectric actuator (SEA) damper testing systems

Equipment and technology solutions

Your challenges

Quality and safety are paramount considerations for consumers evaluating automotive brands, hence automotive manufacturers undertake considerable efforts to ensure that their products meet or exceed consumers' expectations in those areas. In general, manufacturers require extensive testing and evaluation of product components and designs throughout the research and development process, as well as real-time quality assessment testing during assembly and manufacturing. Failure to identify quality and safety issues can expose drivers and passengers to potential safety risks, result in expensive and time-consuming recalls as well as damage to a brand's reputation in the market.

What is damper testing?

Damper testing assesses the performance, durability and service life of essential automotive components, including shock absorbers, dampers, struts and other parts. Damper testing is frequently used during the

research and development phases to evaluate different material properties for their suitability in various applications and scenarios. Thereby, repeatability and good controls are crucial as small changes can affect the test results. In addition, damper testing is also used on the manufacturing line as part of ongoing quality testing and auditing to ensure that just components which meet certain requirements are delivered to the customer.

For many years, damper testing systems have relied on hydraulically-actuated technology. While hydraulic-based systems have contributed to significant improvements in automotive safety and quality, they require extensive maintenance as they age, and leaks and ruptures of hydraulic lines can result in safety and environmental risks. Further, their operation consumes significant amounts of energy, making them energy inefficient. Finally, because of their complex design, hydraulic-based damper testing systems offer minimal configuration flexibility, thereby limiting their versatility and overall usefulness.



What are the advantages of SEA-based damper testing systems?

Designed to replace servohydraulic-based systems and exceed the performance of other electric options; servo-electric actuator (SEA)-based damper testing systems offer a clean, efficient and dynamically responsive solution for both performance and durability testing in the automotive industry.

The key benefits of SEA-based damper testing technology include:

- Energy efficiency
- Quiet operation
- Precise and full digital control with built-in diagnostics
- High continuous dynamic force capacity
- High bandwidths
- Liquid or air-cooling
- Multiple measurements, control algorithms and configurable Inputs/Outputs

How can we help you?

TÜV SÜD's series of SEA-based damper test systems bring state-of-the-art technology to automotive damper testing. Our damper testers include two standard models offering varying peak dynamic force capacities

(SEA.10.200 – 10.3kN (2,328lbf); SEA 20.200 – 20.7kN (4,652lbf)), and achieve significantly higher continuous loads, making them the only electric option for extended durability testing. Standard and custom configurations are available for various applications, including:

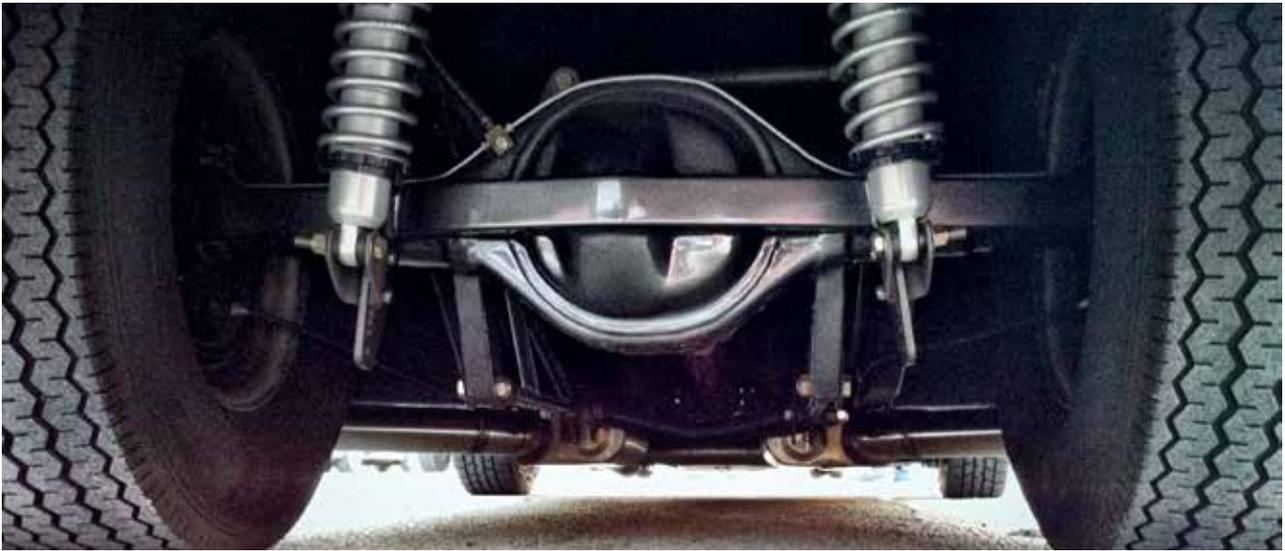
- Damper characteristics
- Strut/shock testing
- Spring testing
- NVH component testing
- Full spectrum of waveform
- Road profile/time history playback
- High velocity configuration (up to 8.7m/second)

TÜV SÜD SEA damper test systems come with Microsoft Windows®-based DAMPER TEST control and analysis software, which generates a full spectrum of waveforms, including sinusoidal, triangle, square, random, frequency sweeps and other custom waveforms. The software also allows road profiles and time history data to be imported and replayed. Our SEA systems take advantage of fully integrated digital processing, without introducing electrical noise inherent in analogue conversion processes, providing more precise control as well as more comprehensive troubleshooting, diagnostic and monitoring tools.

Damper testing systems specification

SPECIFICATION	UNITS	SEA.10.---	SEA.20.---	SEA.30.---	SEA.40.---
Peak Dynamic Force Motor Peak Force (not including Air support)	N lbF	10.360 2.328	20.700 4.652	31.020 6.971	41.400 9.303
Continuous Dynamic Force Motor Continuous Force (not including Air support)	N lbF	3.860 867	7.720 1.735	16.200 3.640	16.200 3.640
Maximum Static Air Support Air Support Maximum Force @ 100 psi (690 kPa)	N lbF	7.150 1.607	7.150 1.607	14.300 3.213	14.300 3.213
Continuous Force Motor Continuous Force + maximum Air support	N lbF	11.010 2.474	14.870 3.342	30.500 6.854	30.500 6.854
Combined Peak Force Motor Peak Force + maximum Air support	N lbF	17.510 3.935	27.850 6.258	45.320 10.184	55.700 12.517
Velocity max	m/sec In/sec	4,6 181	4,2 165	4,2 165	4,2 165
Stroke	mm in	200, 290 8.0, 11.4	200, 290 8.0, 11.4	170, 254, 290 6.7, 10.0, 11.4	170, 254, 290 6.7, 10.0, 11.4
Temperature Monitoring	Specimen Motor	Monitored non-contacting IR Embedded PTC thermocouple w/redundant safety KTY sensor			
Digital Encoder Accuracy	μ	1,0			
Noise Level – Typical	dBA	<55			
Waveforms Supported	Type Software	Sine, triangle, square, frequency sweep & custom DAMPER TEST Software			
Facility Electrical Requirements	V A	380-480 Vac, 3 φ, 50-60 Hz Performance requirement dependent			
Facility Air Supply Requirements	psi Bar CFM	90,0 6,0 5			

SEA.XX.YYY XX = Force (kN)
 YYY = p-p stroke (mm)



Your business benefits

- **Save time and money** – by leveraging our experience with various damper testing projects to meet safety requirements and avoid costly and time-consuming rework of requirements and specifications.
- **Build a solid brand reputation** – with your customers by working with a globally-recognised, independent third-party test specialist with a strong reputation in the automotive sector.
- **Increase profitability** – by efficiently developing quality automotive products that have been thoroughly tested and verified.



Why choose TÜV SÜD?

For more than 150 years, TÜV SÜD has been the preferred testing and certification partner for automobile and automotive component manufacturers worldwide. Our state-of-the-art testing facilities, combined with our global network of technical experts, can provide your company with a single source solution for achieving compliance with all applicable regulatory requirements, standards and voluntary industry schemes. In addition, our knowledge and in-depth technical expertise in the automotive industry supports our ongoing development of advanced technologies and test equipment for manufacturers and suppliers.

Add value. Inspire trust.

TÜV SÜD is a trusted partner of choice for safety, security and sustainability solutions. It specialises in testing, certification, auditing and advisory services. Since 1866, the company has remained committed to its purpose of enabling progress by protecting people, the environment and assets from technology-related risks. Through more than 24,000 employees across over 1,000 locations, it adds value to customers and partners by enabling market access and managing risks. By anticipating technological developments and facilitating change, TÜV SÜD inspires trust in a physical and digital world to create a safer and more sustainable future.

Related services

- Buzz, squeak and rattle (BSR) testing
- Cooling system and component testing
- Fuel tank and component testing