



# MATERIAL CHARACTERIZATION PRODUCT LINE

## Characterizing Acoustic, Stick-Slip and Friction Properties of Materials

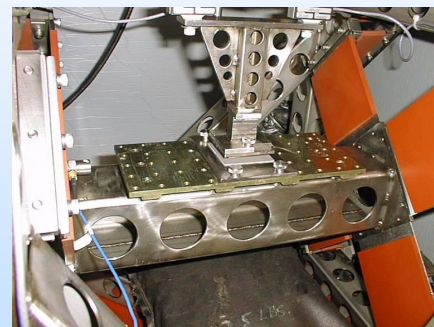
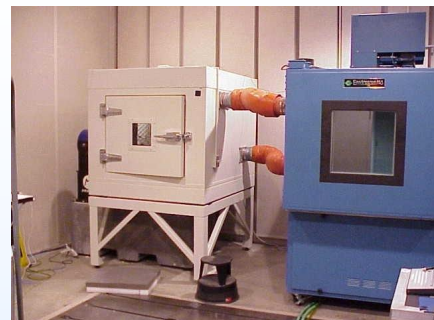
What happens when two mating materials are subjected to relative motion. The right combination of materials and coatings can mean a noise free relationship, but how do you ensure that you have the right combination? MB Dynamics offers two distinct options for quantifying material acoustic and friction properties.

### Stick-Slip Test System



The Ziegler Stick-Slip Test System measures the stick-slip effect and friction characteristics of a material pair and transforms these values into a Risk Priority Number (RPN). A high RPN means the material pair is likely to exhibit the stick slip effect and therefore emit annoying noises. A low RPN means the opposite, the material pair is less likely to exhibit the stick-slip effect. The quality of acoustical compliant material pairs can be clearly documented with this tool. Originally developed by BMW to create smooth, noiseless leather this test system has been expanded to accommodate a wide variety of materials. The effectiveness of the Ziegler SSP has resulted in it being a German Standard of VDA, the Society of German Automobile Manufacturers – VDA 230-206.

### Material Compatibility Test System for Squeak and Itch



A unique material testing environment capable of subjecting contacting pairs of materials to precisely controlled interference & motion. The Material Compatibility Test System for Squeak and Itch acquires, monitors, analyzes & reports acoustic & friction characteristics under in-vehicle environmental conditions. The ability of the Squeak and Itch System to identify material properties & system parameters that are good predictors of noise generation tendencies makes it a highly utilized tool among OEMs and their suppliers. In fact, the Material Compatibility Test System for Squeak and Itch has become the subject of a Society of Automotive Engineers (SAE) standard - J2759 - Testing Squeak and Itch Compatibility.

<b>Feature</b>	<b>Stick-Slip Prufstand</b>	<b>Squeak and Itch Tester</b>
Materials tested	Flat hard samples, soft samples, seals and rubber parts, foams, glass, paint plaques	Flat hard samples, soft samples, seals and rubber parts, foams, glass, paint plaques
Data acquired	Static and dynamic friction forces and coefficients, relative velocity, maximum acceleration, number of impulses, displacement, position, temperature, humidity	Normal force, tangential force (perpendicular to normal force), sound, relative velocity, displacement, acceleration, compression, temperature, humidity
Metrics delivered	Risk priority number from 1 to 10 (RPN) using ZINS proprietary algorithm, 1-3 no risk, 4-5 medium risk, 6-10 high risk, time-histories of acceleration and friction force, time domain plots of all acquired data	Ratio of tangential to normal force, time-histories of tangential and normal forces, average and peak values of tangential force, sound pressure level, time-varying loudness, time and frequency domain plots of all acquired data
Motions produced	Single-excursion push/pull	Single-excursion push/pull, sine dwell, sine amplitude ramp, sine sweep, PSD random, time history replication of road-measured motions
Temperature	Ambient (optional extra: -30°C to +80°C using a customer-supplied environmental chamber)	-40°C to +80°C
Humidity	Ambient (optional extra: 0 – 95 % RH using a customer-supplied environmental chamber)	10 – 98%, RH
Wet or Dry pairs	Yes	Yes
Forces between material pairs	Constant pressing force via compressed air	Constant force via Compliance Fixture
Interferences between material pairs	Constant interference from 0 up to 20 mm	Constant interference from 0 up to 20mm, accounting for actual assembled gaps and interferences in vehicles
Velocities reproduced	1 – 10 mm/s peak, velocity is constant during single excursion push/pull	0.5 – 380 mm/s peak, velocity can vary during any motion reproduced
Accelerations reproduced	0; this is a constant velocity movement	
Displacements reproduced	5 to 50mm peak amplitude	0 to 13mm peak (25mm peak-to-peak)
Pressing forces produced	1 to 80 N	0.5 to 50 N
Automatic report generation	Yes	Yes
Shape of the specimen geometry contact points	Any geometry replicating vehicle conditions	Any geometry replicating vehicle conditions
ODBC interface to database	Yes	Yes