

## Material pairs services

Often, the purchase of machines for solving a concrete problem in the course of a project is not worth the investment. This applies to problems prevention, the development of materials and surfaces as well as hardware that crop up when the first hardware assemblies are produced after the design freeze. In many cases, the required know-how for developing a solution to these issues does not exist. No university or college offers course for it.

Here, ZINS can be helpful by providing the required services. Our machine pool not only comprises stick-slip and drive machinery, the ZINS labs are also equipped with a number of shakers for the excitement of noise and for performing lifecycle tests. Examinations of pairs of material can be performed on the following machines.

### SSP-02

in the climate cabinet for stick-slip test at temperatures between -20° and +80°C

### SSP-03

with material temperature controller and conditioned air for stick-slip examinations between -10 and 50°C material temperature in thermal imbalance with air. These machines provide an optimal replication of the conditions in the vehicle because when the air-conditioning machine is turned on, the air approaches normal climate very quickly where as the materials still remain at the initial temperature of the vehicles. SSP-03 can also be used for abrasion measurements.

### DynaMaTe

is a movement machine for dynamic material tests along 2 axes. This resembles real movement profiles of 2 components in the vehicles. This machine is preferred for abrasion and wear simulations.

### ShearTec

is an extension of the SSP-03 which examines the shearing of materials. This is important for the development of solutions in conditions in which gaps are becoming ever smaller.

### SofTec

is a machine to measure the softness of materials. Permitted penetration depths at which the pin structure prevents relative movement can be determined with this machine.

### RoughTec

is a machine that measures the surface structure. Often, material solutions can be developed by systematically influencing surfaces. Ultrafine scales, microscopes and high-resolution camera systems can measure surface changes and abrasion. Surfaces can systematically be influenced by sand blasting machines.



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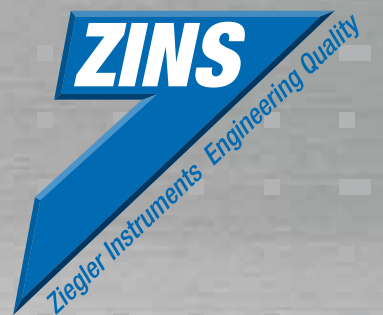


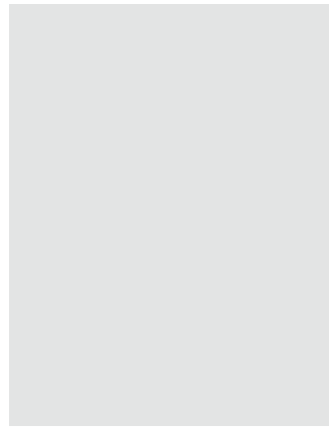
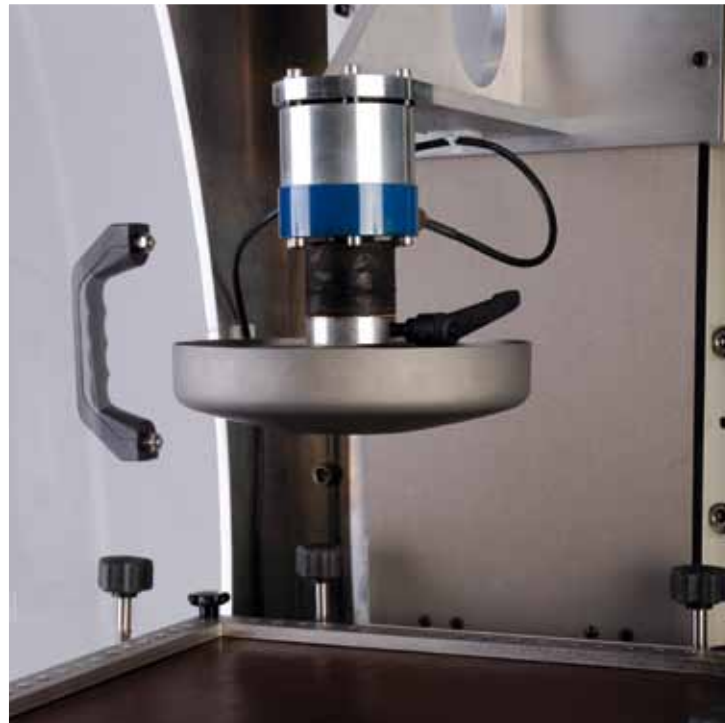
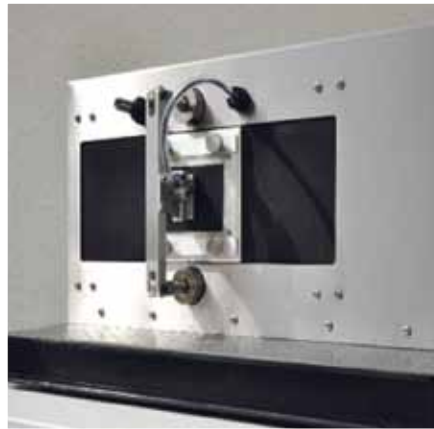
Innovative

solution oriented

quality oriented

process oriented





## Noise

Noise need not to be loud, noise is a nuisance to the human ear because it is associated with danger.

Noise (**squeak or rattle**) is very impulsive, with steep rising and falling signal flanks.

Noise is not tonal (not a melody) and does not have an expected rhythm.

Noise is perceived in relation with background and noise.

The signal character of noise causes physiological/psychological amplification in man.

**Elimination of noise** in running products is very expensive and costly, so we have developed methods to eliminate potential noise sources as early as on the drawing board.

We train designers in **noise free design**.

In addition, we have developed methods to test pairs of material for incompatibility to forecast **squeak risk** and enable the selection of **compatible pairs** at an early stage in development.

## What make us special

Optimization of perceived quality is our score business. This includes:

- **Prevention**
- **Material test for stick-slip, friction and abrasion**
- **Noise simulation with real driving profile**
- **Evaluation of noise quality**
- **Preventive contact points analysis and development of solutions for a noise-free CAD model**

**Stick-Slip** is a topic in connection with **squeal and squeak**. Within few years the **Stick-Slip-test rig SSP-01,02 and 03** have made a rapid advances in the automotive industry and today are internationally accepted testing tools enjoying **VDA-Status**.

The simulation of genuine road conditions and relative movements between parts have resulted in a **distinct reduction of noise**. The sound measuring System **ZoundLab** and the analytical software **OCIAN** record all sound events and make them available for objective or subjective evaluation.

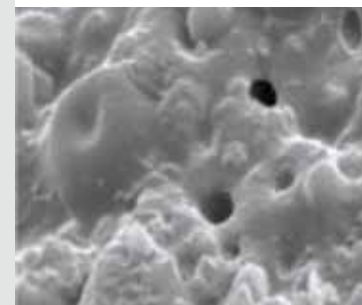
## We offer:

Systems and services for noise elimination (squeak & rattle), prevention in planning and design, hardware confirmation tests, selection of suitable material combinations, quality control, functional noise checks and management support.

Our test engineers are involved in your project. With a complete understanding of the tasks, they not only examine the specification but also locate functional inadquacies and eliminate inaccuracies in the specification. We not only test the application you require, we also perform further tests. We assure quality by tests and inspections on all levels. Test according to Technical Terms of Delivery (TL) and norms are available everywhere.

## Design

Elimination of noise on the basis of CAD data



## Material

Selection of suitable material combinations/ suggestions for unsuitable material combinations

## Testing

Confirmation of virtually noise-free CAD and solutions to unexpected hardware problems, lifetime tests

## Quality Control

Checks of the noise quality in production In-line or Off-line



## Functional noise

Checks of functional noise in production In-line or Off-line

## Management

Suppliers and workshops, process description and test specification

## Services

ZINS own a fully equipped shaker lab with low-noise shakers for excitation of noise and of durability shakers for lifecycle simulations. These system can analyses small parts such as, e.g. radios, ash trays, cup holders, or large parts such as center consoles, instrument panels, doors, sliding roofs for noise-generating contact sources. It is exciting to follow the noise development when the systems are subject to a lifecycle test because no relevant data is available yet. This new test method can now be performed by ZINS.

An important aspect is that the increase in the number of noise sources can be mapped by objective acoustic test methods in OCIAN. The scatter of data finally obtained is reduced distinctly by this approach. ZINS also owns technologies for simultaneous excitation in several spatial directions, which comes significantly nearer the real-life situation.

These services are not only suitable for analysing the causes of hardware noise but serial quality tests can also be performed. For example, ZINS already has rendered support in the series start of several hundred systems by objective analysis of the quality of noise.

**Our primary target: Satisfied customers – training courses and workshops for know-how transfer.**

**As a global leader in products and solutions in respect of**

- **Squeak and Rattle**
- **Functional noise**
- **Psychoacoustics**
- **Haptics**
- **Material pairs**



Ziegler-Instruments knows exactly what is important in practice. Being a mastermind is our claim and the motivation of our employees. We are glad to share our know-how with others in workshops and training courses.

**WETHER noise prevention, tribology and stick-slip, noise examination, acoustic quality checks – our team of coaches and technicians will show.**