



## Enhanced product safety: We test for you

When up against bracing demands, elastomer components do no better than car tires – they wear. Material wear puts limits on useful service life and thus results in less value for money. It also poses safety hazards.

These risks can be circumvented, though. Deutsches Institut für Kautschuktechnologie researches and tests the strength, elasticity, service life and functional reliability of elastomer components.

This brochure gives you an overview of our comprehensive range of services in the area of elastomer testing, -development and optimization and, in so doing, points the way to the services just right for your needs.



## Specialists in rubber technology

Experienced chemists, physicists and engineers work at DIK in state-of-the-art labs, carrying out orders received from around the world. Modern project management ensures smooth work sequences and high-quality results. The accuracy and reliability of the testing is guaranteed by application of a broad spectrum of test procedures accredited to DIN EN ISO/IEC 17025.

## Contact

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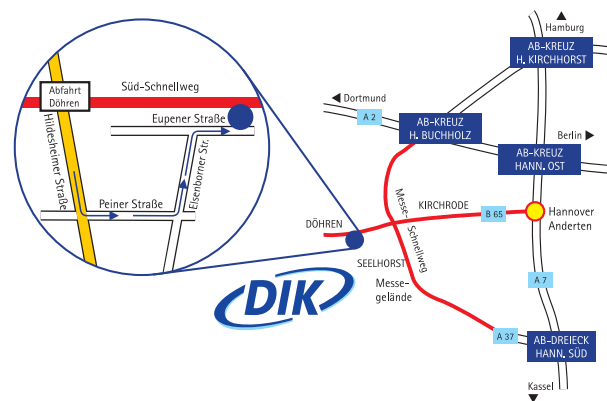
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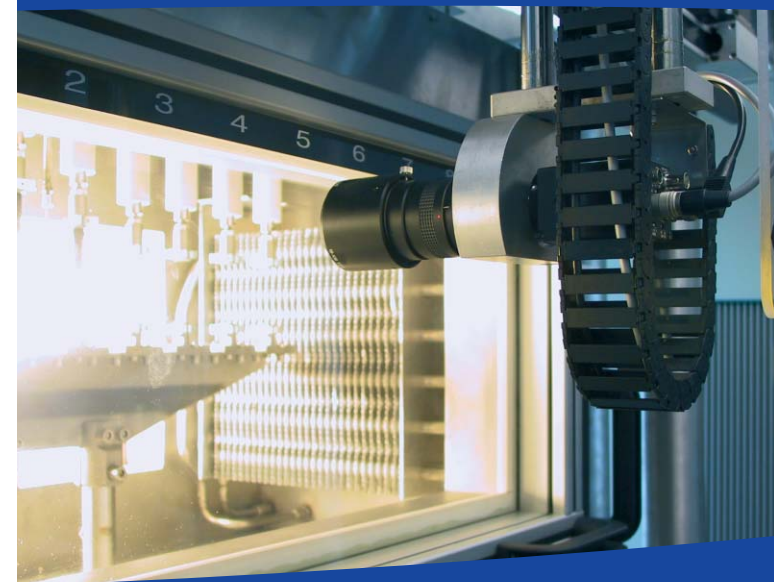
## Contact persons

Prof. Dr. R. H. Schuster (Managing director)  
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Dr. Th. Alshuth (Elastomer physics)  
PD Dr. M. Klüppel (Material concepts)  
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Prof. Dr. E. Haberstroh (Processing methodology)  
Prof. Dr. J. Ihlemann (Simulation and continuum mechanics)

## How to find DIK



Layout: www.kitazo.de



## Service offering

Edging out the field with proven quality



Deutsches Institut  
für Kautschuktechnologie e.V.



## We offer you the following services

### DIN, ISO, ASTM and industry-specific standards

- hardness: Shore A, IRHD
- rebound resilience, temperature dependent
- abrasion resistance
- stress-strain behavior, temperature dependent
- tear growth resistance, temperature dependent
- compression set, tension set
- compression strength, tensile strength, environment and temperature dependent
- density measurements
- aging and endurance behavior
- temperature, ozone, xenone environments
- filler dispersion
- electric permittivity and resistivity
- flex-fatigue testing (De Mattia)
- Flexometer test
- shrinkage behavior
- „heat build up“
- „Fogging“-measurements to DIN 75201 or VDA 278
- determination of „VOC“
- pyrolysis GC-MS

### Dynamic-mechanical testing

- storage modulus, loss modulus temperature, amplitude and frequency dependent
- elastic and shear modulus
- component testing, sinusoidal and pulsed load
- biaxial part testing
- high frequency properties (kHz-, MHz-range)
- material characterization considering rotating loading directions

### Wear behavior

- dynamic crack propagation „Tear Analyzer“, fracture mechanical characteristics
- fracture mechanical calculations, lifetime predictions
- static and dynamic friction measurements
- evaluation of hysteresis and adhesion friction
- fatigue properties, Wöhler- and Haigh-diagrams

### Surface properties

- chemical composition of surfaces
- ATR-FT-IR-spectroscopy
- surface roughness – nanometer to millimeter range
- surface tension
- contact angle measurements
- plasma treatment at atmospheric pressure
- Scanning Electron Microscopy (SEM)
- analysis of elements (EDX)

### Vulcanization

- kinetics and efficiency
- vulcameter curves
- scorch behavior of compounds (Moony-Scorch)
- crosslinking density measurements and network structure analysis

### Dielectric properties

- relaxation spectroscopy, wide temperature and frequency range
- complex conductivity and permittivity

### Rheology

- viscosity as a function of shearing velocity and temperature
- parameters for flow models
- wall slippage
- mooney viscosity
- rheometry in combination with dielectric spectroscopy
- magnetorheology

### Processing technology

- strategies for discontinuous and continuous mixing processes
- compounding of thermoplastic vulcanisates
- mixing, extrusion, calendaring and injection molding
- rheological measurements and assessment of the processability of compounds
- process analysis and process optimization
- process development

- manufacturing of samples of products under development

### Materials testing

- elastomer composition and comparison
- raw material analysis
- polymer characterization
- composition comparison
- quality control

### Failure analysis

- high resolution computer tomography
- clarification of component or material failure
- characterization of aging behavior
- exposure of elastomer parts to different chemicals
- rubber-metal bonding

### Trace analysis for pharmaceutical topics and of polymers which are in contact with food and other utensils

- migration tests according to official methods
- purity tests of polymers and elastomers
- leachable-analysis of polymer materials

### Environmental and employment protection measurements

- emissions of elastomers
- vulcanization vapors (analysis and sampling)
- nitrosamine analysis
- analysis of PAH (polycyclic aromatic hydrocarbons)

### Material development

- specifications and functional requirements
- tailor made recipes

### Finite elements calculations

- definition of problem types
- parameter identification
- component design/optimization
- shape and functional optimization
- lifetime prediction
- expert advice for in-house finite element simulations