ABREX®

Soft Chemo Mechanical Hand Abrasion

Scratch Resistance

Delamination

Nail-Scratch

Fingerprint

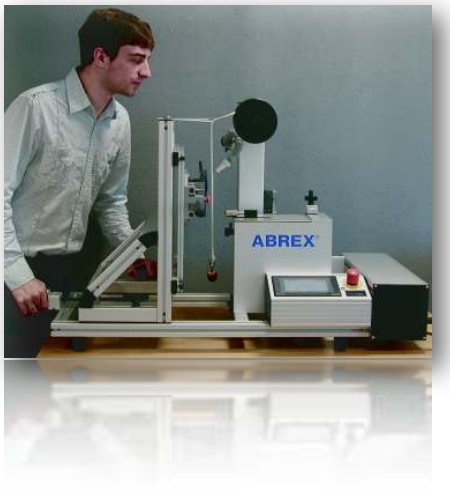
Shoe sole

Innowep GmbH Haugerring 6, Würzburg, Germany 97070 **T** 0049 931 322 980 **F** 0049 931 322 9812 info@innowep.com www.innowep.com

Basic Functions

Highlights

- Reproducible results due to standardized test procedures
- Real application simulation of chemo-mechanical abrasion
- Universal functionalities due to modular design
- Calibratible testing machine to secure reproducibility



Damage to a surface by the human hand is one of the main reasons for the disturbance of a product's perceived value. Those products that appear to have abrasion, wear or scratch will be returned or exchanged due to warranty.

ABREX®-ABRASION, namely soft-chemo-mechanical hand abrasion is a highly complex abrasion process which involves:

- firstly an impact with 45° angle by the viscoelastic finger with a certain load under various liquid environment;
- then a friction rubbing or tumbling motion between the sample and human skin containing dirt, dandruff, oil, sweat or various creams.

ABREX® is by far the only testing machine which can simulate this complex abrasion with different textiles and different chemical environments.

Furthermore, other tests can also be performed with **ABREX®** including:

- finger-nail scratch
- shoe sole abrasion
- abrasion with soiling materials
- abrasion with high-abrasive cleaning materials

In additional, all tests can be applied either on a lab sample or a finished product with the testing temperature ranging from -40°C to + 85°C.

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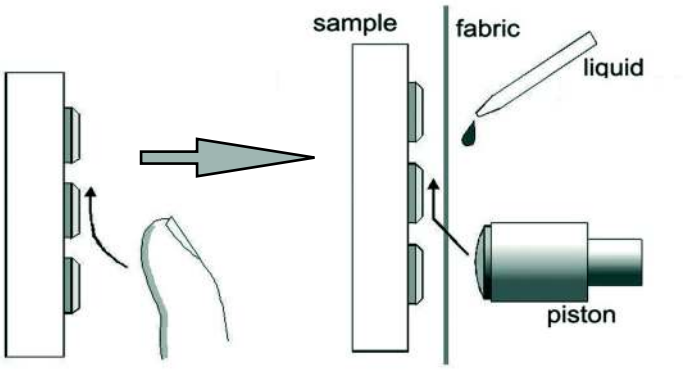
Test Principle



Fingerpad Touch ABREX® Abrasion Simulation

Human Fingerpad is:

- Viscoelastic
- Rough structure
- Inhomogeous and nonlinear
- With dandruff/dirt/swear/fat/lotion /cream

Standards & Specifications

- DIN EN 60068-2-70
- IEC 68-2-70
- BMW GS 97034 -1, -2, -3, -4, -5,-6
- BMW GS 97045-2
- BMW PR 506, 510
- BMW AA-0471, -P296
- BMW TL 9 138681.6
- Daimler DBL 7384
- Ford WSS-M2P188-A1/FLTM BN155-01
- GB-T 2423.53
- JIS C 60068-2-70
- PSA D24 5020
- Jaguar
- Renault
- EWIMA

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Adapters

Nail Scratch-Industrial

Simulation of typical scratch tests with industrial tips. Supplied with both 45° & 90° sample fixture modules

Nail Scratch & Mar Test-Automotive

Simulation of typical scratch and mar tests with human fingernail with different speeds. Supplied with 45° sample fixture. Test acc. to BMW GS97034-2

Shoe Sole Test-Automotive

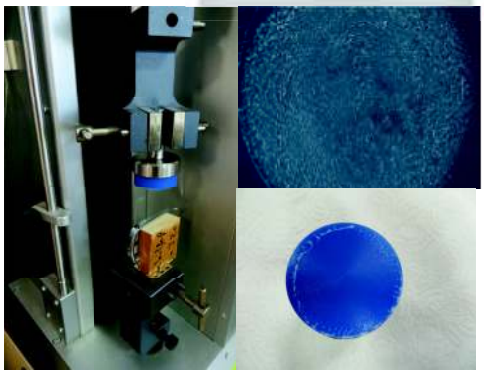
Simulation of abrasion between shoe sole and auto trim with different speeds acc. to BMW GS97034-3

Shoe Sole Abrasion Test-General

Simulation of abrasion for floor, carpet, ceramics

Fingerprint Test

Simulation of human fingerprint on surface (eg. touch screen, glossy piano paint) followed with the cleanability test to remove the fingerprint



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Adapters

Steering Wheel Abrasion Test

Ability to mount a complete steering wheel on ABREX® and simulation of ABREX®-abrasion test and other scratch tests without cutting the samples. The steering wheel can be automotive, truck and omnibus

Steering Wheel Abrasion with Wear Analysis

Ability to measure the ABREX®-abrasion rate and surface roughness, topography, structure and visual impression in a mobile fast fashion.

Banknote Durability Test

Specially designed sample mounting fixture enables the simulation of ABREX®-abrasion and other tests directly on a banknote with certain curvature

Teeth Abrasion Test

Simulation of tooth abrasion

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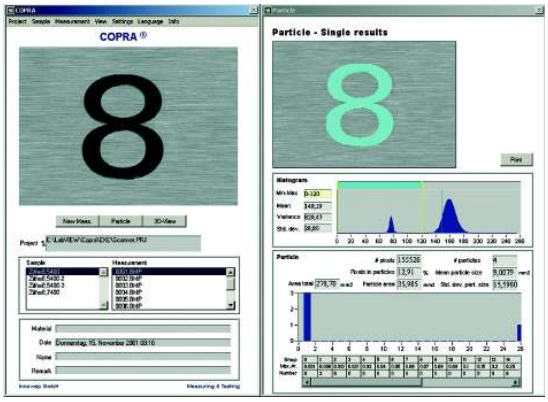
Hardware Options

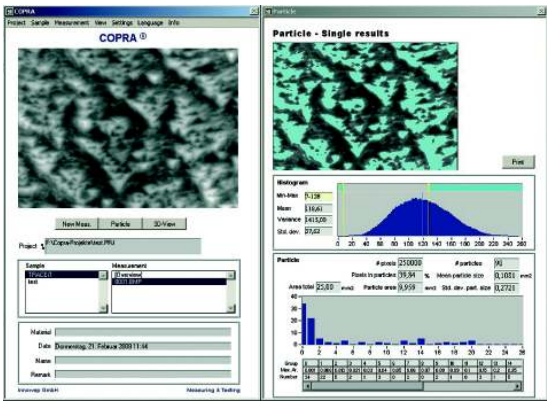
X-Y Sample Mounting Counter

for easy and accurate positioning the sample

Abrasion & Wear Analysis

Supplied with a high resolution scanner and software for evaluation of abrasion and wear rate, ratio of contact area, particle distribution, porosity distribution, height distribution





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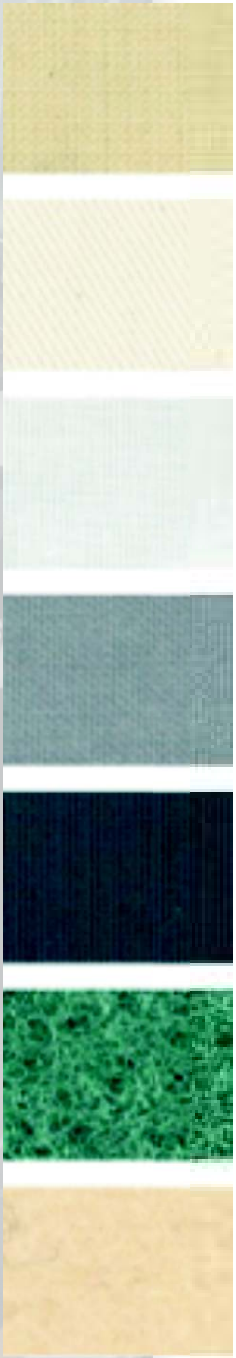
Textile Options



Standard Fabric
Simulates human hand-abrasion according to DIN EN 60068-2-70 / IEC 68-2-70

Cotton-Batist Fabric (Denim)
Simulates abrasion by clothing materials (e.g. Jeans) according to ISO 105 D01

Cotton-Lawn Fabric
Simulates abrasion with fine-structured clothing materials (e.g. trouser pockets) acc. to ISO 405 F09

Soiling Behaviour
Simulates soiliing behavior with standard materials (by fats, soot) acc. to BMW GS 97034 and various standards

Abrasion-Pad S-1000
Simulates mechanical abrasion with high-abrasive rubbing pad

Abrasion-Pad „Scrub-Test“
Simulates the mechanical wear by kitchen and cleaning sponges (M44)

Wool Felt H1
Abrasion test according to various standards, hardness H1

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Media Options

<u>Artificial Sweat</u> Acc.to:
DIN 53160-2:2001
BMW GS 97045 (2 types)
BMW PR506
DBL 7384
VW TL 226 (2 types)
Jaguar DVM-00870MA

<u>Additional Fluids</u>
Cleaning paste
Skin lotion
Soil/dirt
Plastic maintainence emulsion
Sun cream/hand cream
Cleaner/Spray

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Model Options

Model	ABREX® Standard	ABREX® -E	ABREX®-C	ABREX®-CE
Load	1-20 N			
Friction	4-40 mm			
Speed	60±5 mm/s	Scratch test acc. to GS 97034-2: 20±2 cm/s Shoe sole test acc. to GS 97034-3:70±5 cm/s	60±5 mm/s	Scratch test acc. to GS 97034-2:20±2 cm/s Shoe sole test acc. to GS 97034-3:70±5 cm/s
Cycles	1-10,000,000			
Piston	20mm Standard 10mm Standard	20mm Standard 10mm Standard	20mm (-40°C) 20mm (+85°C)	20mm (-40°C) 20mm (+85°C)
Fluid feed	Automatic			
Fabric feed	Automatic			
Power supply	230V / 50 Hz ; 110V / 60 Hz			
Compressed air	4 bar, external, oil free, water free			

Maintenance and Services

ABREX® inspection with maintenance and calibration should be performed minimum once a year.

Some of the spareparts including piston, textile and artificial sweat are required to be exchanged frequently.