INNOWEP GmbH
MEASURING & TESTING

ABREX®

Fingertip & Hand Abrasion

Soft Chemo Mechanical Abrasion

Delamination

Scratch Resistance

Dynamic Nail-scratch

Fingerprint Affinity and Cleanability

Soiling Affinity

Dynamic Shoe Sole Abrasion

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Highlights

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

Basic Functions

Abrasion is a common mechanical process on surfaces caused by scuffing, rubbing, or scratching under normal use or environmental exposure. The product with abrasion leads to the undesirable disturbance of its functionality, quality perception and value. Fingertip and hand abrasion is a specific type of abrasion due to the intensive interaction between the products and human fingertips or hands. This special abrasion leads to distinct patterns of damages on the materials and its surfaces.

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

- firstly a dynamic impact with 45° angle by a viscoelastic fingertip under a certain load and the influence of various liquid;
- then a friction rubbing or tumbling motion between the sample and a textile containing dirt, dandruff, oil, sweat or various types of creams.

ABREX® is by far the only testing machine which can simulate this complex abrasion with different standard textiles under different chemical environments. Furthermore, other tests can be also performed with the standard **ABREX®** and with a high-speed **ABREX®-E**, including:

- dynamic finger-nail scratch automotive
- dynamic industrial scratch
- dynamic shoe sole abrasion
- abrasion with soiling materials/soiling affinity
- Fingerprint affinity and cleanability
- abrasion with high-abrasive cleaning materials

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

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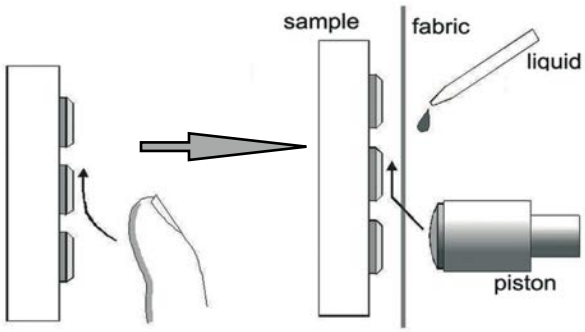
Test Principle of ABREX®-ABRASION



Fingertip Touch ABREX® Abrasion Simulation

Main features of human Fingertip:

- viscoelastic
- curved structure
- rough surface
- Inhomogeneous and nonlinear
- containing dandruff/dirt/swear/fat/lotion/ cream

- Standard silicone stamp represents the viscoelasticity of the fingertip;
- Standard fabric/textile represents the rough structure and texture of the fingertip;
- Standard liquid can be artificial sweat, hand cream and many more;
- Dynamic load is applied via the piston/stamp onto the sample surface with a fixed 45° angle

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, AA-P296
- BMW PA-P 315
- BMW TL 9 138681.6
- Daimler DBL 7384
- Ford WSS-M2P188-A1/FLTM BN155-01/ DVM-0055-MA
- GB-T 2423.53
- JIS C 60068-2-70
- PSA D24 5020
- Renault
- EWIMA
- GSO 480.1.003

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Adapters

Dynamic Fingernail Test Module-Industrial

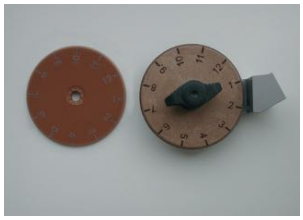
Simulation of typical scratch tests with industrial tips. Supplied with both 45° & 90° sample fixing modules.

Dynamic Fingernail Test Module - Automotive

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

Dynamic Fingernail Test Module Automotive (Shoe Sole Test)

Simulation of abrasion between shoe sole and the auto trim with high speeds acc. to BMW GS 97034-3.

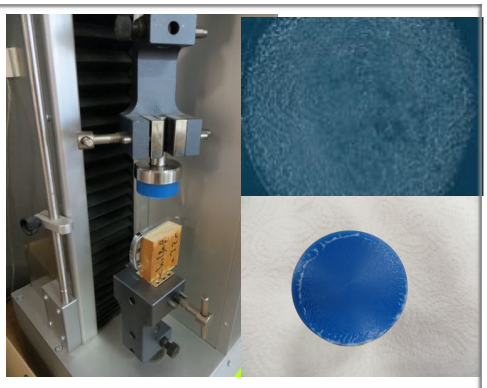


Shoe Sole Abrasion Test-General

Simulation of the general abrasion for floor, carpet, ceramics.

Fingerprint Test

Generation of a standardized fingerprint on the surface (eg. touch screen, glossy piano paint) to evaluate the soiling affinity behavior of the surface; then a cleanability test on ABREX® to test how easily the fingerprint on the surface can be removed.



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Adapters

Steering Wheel Abrasion Test

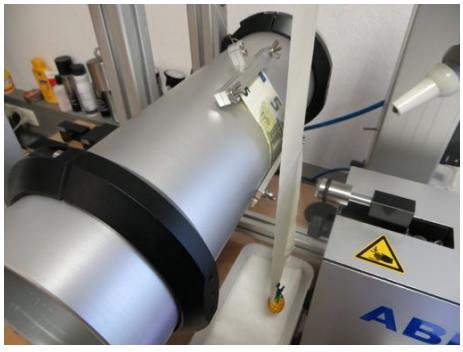
A complete car or truck steering wheel mounting on ABREX® for the simulation of ABREX®-abrasion and other scratch tests without cutting the lab samples. The steering wheel can be any size from automotive, trucks and omnibuses.

Steering Wheel Abrasion Test with Wear Analysis

ABREX®-abrasion tests on steering wheels followed by the measurement of the abrasion rate and surface roughness, topography, structure and visual impression in a mobile fast fashion.

Banknote Durability Test

A specially designed sample mounting adapter with a certain curvature enables the simulation of ABREX®-abrasion and other tests directly on a banknote.



Teeth Abrasion Test

A specially designed adapter to simulate the tooth abrasion for testing the durability of tooth replacement materials. The materials of abrasion counterpart can be customized.

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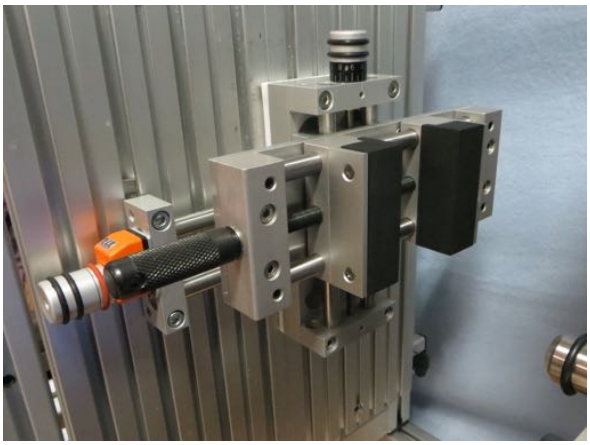
Hardware Options

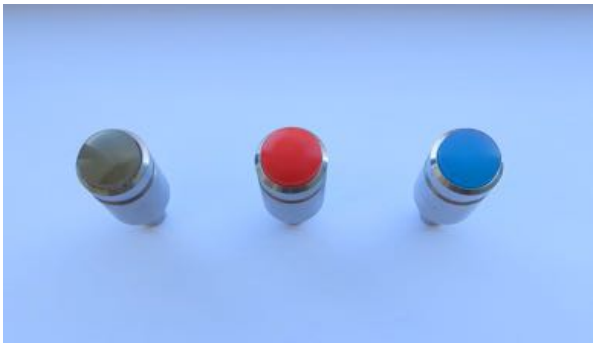
X-Y Sample Moving Frame
For easy and accurate moving and positioning of the sample.



Piston/Stamp Options

Supply of standard piston/stamp with the diameter of 10mm, 20mm and 30mm. Additionally, different piston/stamp will be especially made for different temperature ranges depending on the model of ABREX®:

- -40°C-0°C (blue)
- 0°C-30°C (transparent)
- 30°C-85°C (red)



Weight Options

Supply of standard weight to run acc. to various standards and specifications:

- 1N
- 1.5N
- 2N
- 3N
- 4N
- 5N
- 6N
- 8N
- 10N
- 15N
- 20N
- 30N

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Textile Options

Standard Fabric
Simulates ABREX®-abrasion according to DIN EN 60068-2-70 / IEC 68-2-70/ BMW GS 97034/GS 94011

Cotton-Batist Fabric (Denim)
Simulates abrasion with 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 Fabric
Simulates soiliing behaviour with standard materials (by fats, soot) acc. to BMW GS 97034 and various standards. Two versions are available.

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

Abrasion-Pad „Scrub-Test“
Simulates 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

Artificial Sweat acc.to:

DIN 53160-2:2001
BMW GS 97034/GS94011 (two types)
BMW PR506
DBL 7384
VW TL 226 (2 types)
FORD DVM-00870MA
PSA

Additional Fluids

Cleaning paste
Skin lotion
Soil/dirt
Plastic maintainence emulsion
Sun cream/hand cream
Cleaner/Spray
Seasoning
Cooking oil

For additional textile or liquid supply, please contact info@innowep.com for detailed information.

Model Options

Model	ABREX® Standard	ABREX® -E	ABREX®-C	ABREX®-CE
Load	1-20 N			
Friction Path	4-40 mm			
Abrasion Speed	6 ± 0.5 cm/s			
Scratch Speed	6 ± 0.5 cm/s	20 ± 2 cm/s & 70 ± 5 cm/s acc. to GS 97034-2 for fingernail test 70 ± 5 cm/s acc. to GS 97034-3 for shoe sole test	6 ± 0.5 cm/s	20 ± 2 cm/s & 70 ± 5 cm/s acc. to GS 97034-2 for fingernail test 70 ± 5 cm/s acc. to GS 97034-3 for shoe sole test
Cycles	1-10,000,000			
Piston	20mm Standard 10mm Standard	20mm Standard 10mm Standard	both 10mm & 20mm for three temperature range: -40-0°C , 0-30°C , 30 -85°C	both 10mm & 20mm for three temperature range: -40-0°C , 0-30°C , 30 -85°C
Liquid	automatic, manual			
Fabric	automatic, feed adjustable			
Electricity	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 at least once a year. Some of the spare parts including piston/stamp, textile and artificial sweat are required to be exchanged frequently. Certain test liquids, piston/stamp, textile and pneumatic cylinder and sensors have limited shelf life. Please consult info@innowep.com for detailed information.