

# ABREX®

Fingertip & Hand Abrasion  
Soft Chemo Mechanical Abrasion  
Delamination  
Scratch Resistance  
Dynamic Nail-scratch  
Fingerprint Affinity and Cleanability  
Soiling Affinity  
Dynamic Shoe Sole Abrasion

## 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 completely special type of abrasion due to the intensive interaction between the products and human fingertips or hands. This special abrasion, namely **ABREX®-ABRASION** leads to distinct patterns of damages on the materials and its surfaces.

**ABREX®-ABRASION**, the 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 **ABREX®** and with a high-speed **ABREX®-E & other models**, 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

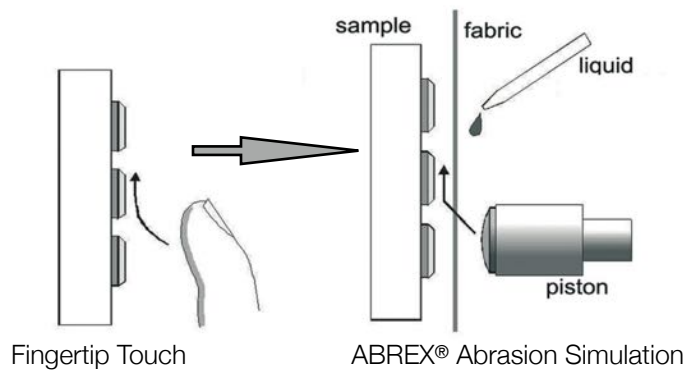
In addition, all tests can be applied either on a lab sample or on a finished product with the testing temperature ranging from -40°C to 85°C.

## Highlights

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



## Test Principle of ABREX®-ABRASION



Main features of human Fingertip:

- viscoelastic
- curved structure
- rough surface
- Inhomogeneous and nonlinear
- containing dandruff/dirt/sweat/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 & 9202
- 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

## 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.



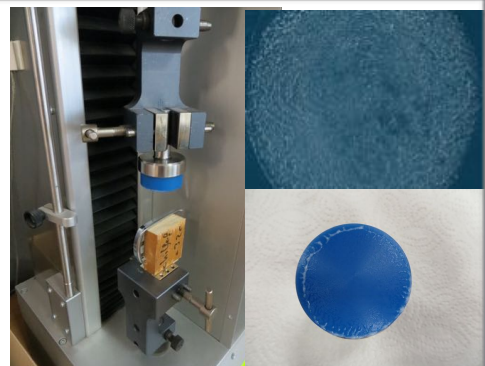
### Shoe Sole Abrasion Test-General

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.



## 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.



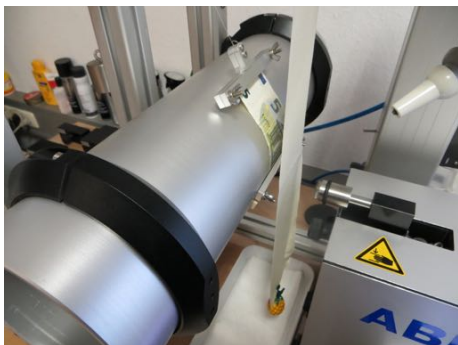
### Steering Wheel Abrasion Test with Wear Analysis

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

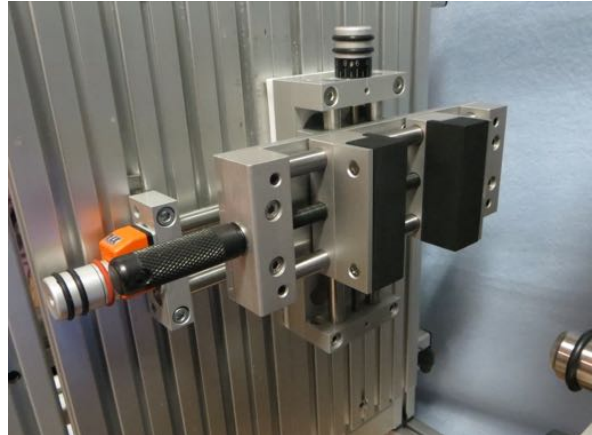
A specially designed adapter to simulate the tooth abrasion for testing the durability of tooth replacement materials. The materials of abrasion counterpart can be customized.



## 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   | • 6N  |
| • 1.5N | • 8N  |
| • 2N   | • 10N |
| • 3N   | • 15N |
| • 4N   | • 20N |
| • 5N   | • 30N |



## 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 soiling 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



## 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 maintenance emulsion  
Sun cream/hand cream  
Cleaner/Spray  
Seasoning  
Cooking oil

For additional textile or liquid supply, please contact [info@innowep.com](mailto:info@innowep.com) for detailed information.



## Model Options

| Model   | ABREX®<br>Standard*                   | ABREX® -E*  | ABREX® -A              | ABREX®-C  | ABREX®-CE  |
|---|---------------------------------------|---|------------------------|---|--|
| <b>Load</b>   | 1-20 N                                |   |                        |   |  |
| <b>Friction Path</b>  | 4-40 mm                               |   |                        |   |  |
| <b>Extension</b>  |                                       |   |                        |   |  |
| <b>Abrasion</b>   | 6 ± 0.5 cm/s                          |   |                        |   |  |
| <b>Speed</b>  |                                       |   |                        |   |  |
| <b>Scratch</b>  |                                       |   |                        |   |  |
| <b>Speed</b><br>(single stroke)   | 6 ± 0.5 cm/s                          | 20 ± 2 cm/s<br>acc.to<br>GS97034-2 for<br>fingernail test; 70<br>± 5 cm/s acc. to<br>GS 97034-3 for<br>shoe sole test | 6 ± 0.5 cm/s           | 6 ± 0.5 cm/s  | 20 ± 2 cm/s<br>acc.to GS97034-2<br>for fingernail test;<br>70 ± 5 cm/s acc.<br>to GS 97034-3 for<br>shoe sole test |
| <b>Cycles</b>   | 1-10,000,000                          |   |                        |   |  |
| <b>Piston</b>   | 20mm& 10mm<br>Standard                | 20mm Standard<br>10mm Standard  | 20mm& 10mm<br>Standard | both 10mm &<br>20mm for three<br>temperature<br>range: -40-0°C,<br>0-30°C , 30<br>-85°C | both 10mm &<br>20mm for three<br>temperature<br>range: -40-0°C ,<br>0-30°C, 30 -85°C                               |
| <b>Liquid</b>   | automatic, manual                     |   |                        |   |  |
| <b>Fabric</b>   | automatic, feed adjustable            |   |                        |   |  |
| <b>Electricity</b>  | 230V / 50 Hz ; 110V / 60 Hz           |   |                        |   |  |
| <b>Compressed</b>   | 4 bar, external, oil free, water free |   |                        |   |  |
| <b>Air</b>  |                                       |   |                        |   |  |
| <p>* <b>ABREX®</b> can be upgraded to <b>ABREX®-A</b> &amp; <b>ABREX®-E</b> respectively.</p> <p>* <b>ABREX®-A</b> can run both standard abrasion test and “swiping mode” with higher frequency of 2Hz with the friction path of 20mm and 5N load. Other frequency can also be achieved upon request.</p> |                                       |   |                        |   |  |

## 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](mailto:info@innowep.com) for detailed information.