

ABREX®-A

Fingertip Touch Abrasion

Fingertip Swipe/Zoom Abrasion

Soft Chemo Mechanical Abrasion

Dirt, Soiling and Fingerprint Affinity

Cleanability

Fingernail/Shoe sole scratch resistance

Basic Functions

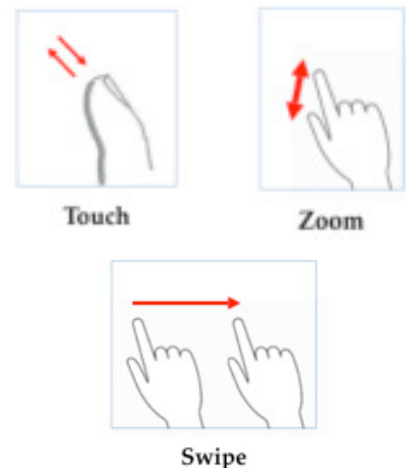
Abrasion is a common mechanical process on touchscreen and display surfaces caused by scuffing, rubbing, or scratching under normal use or environmental exposure. The product with abrasion leads to the undesirable disturbance of its functionality, quality perception and value. Fingertip and hand abrasion is a completely special type of abrasion due to the intensive interaction between the products and human fingertips or hands. This special abrasion, **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-A® is by far the only testing machine which can simulate 3 types of motions generated by human fingertip on the display. Together with a variety of standard textiles and chemical environments, the following tests can be simulated under real-life scenario:

- Fingertip touch motion
- Fingertip swipe motion
- Fingertip zoom motion
- Dirt/soil/fingerprint affinity
- Cleanability
- Fingernail scratch

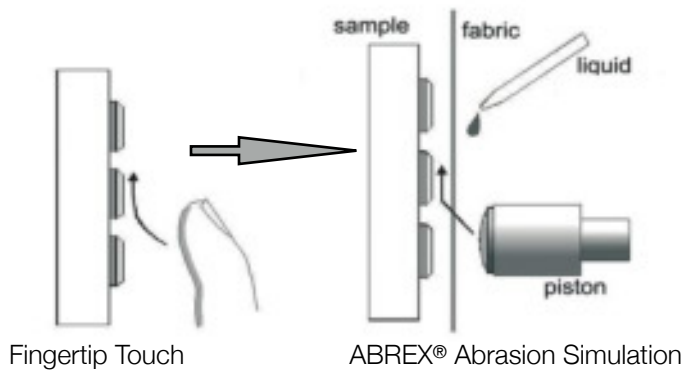


Highlights

- 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

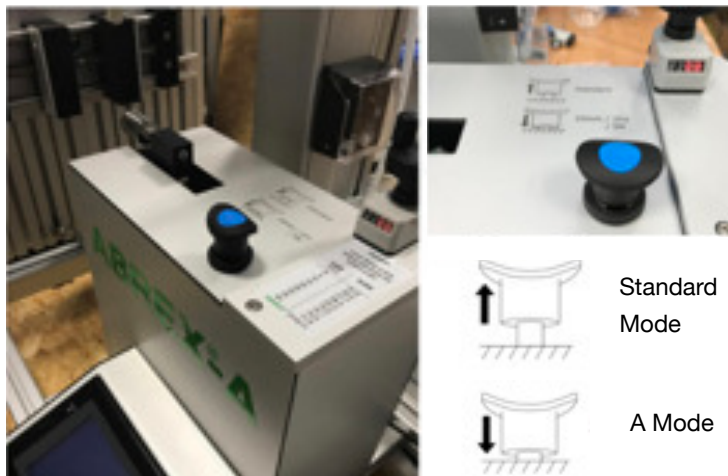


Main features of human Fingertip:

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

- Standard silicone stamp represents the viscoelasticity of the fingertip;
- Standard fabric/textile represents the rough skin ridge 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

ABREX-A®



ABREX-A® has two testing modes:
Standard and A mode:

- standard mode: the extension speed is calibrated to 6cm/s. This is designed to simulate touch&zoom motion;
- A mode: a higher speed (between 6-20cm/s) can be chosen upon request and fixed/calibrated upon delivery. This is designed to simulate the swipe motion.

Adapters for Touchscreen & Display Application

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.



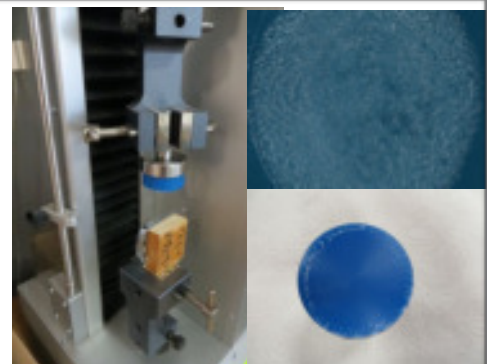
Dynamic Fingernail Test Module Automotive (Shoe Sole Test)

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



Fingerprint/Dirt Test

Generation of a standardized fingerprint/dirt 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/dirt on the surface can be removed.



Adapters for Other Applications

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.



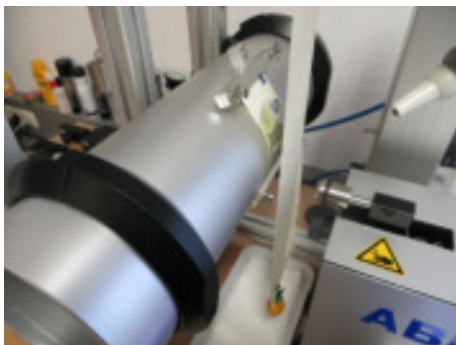
Steering Wheel Abrasion Test with Wear Analysis

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 (Touchscreen & Display Application)



Standard Fine Wool Textile



Standard Soiling Fine Textile



Standard Sebum Wool Textile



Standard Microfibre Textile



Standard Sebum Cotton Textile

Textile Options (Other Applications)

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 Rough

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

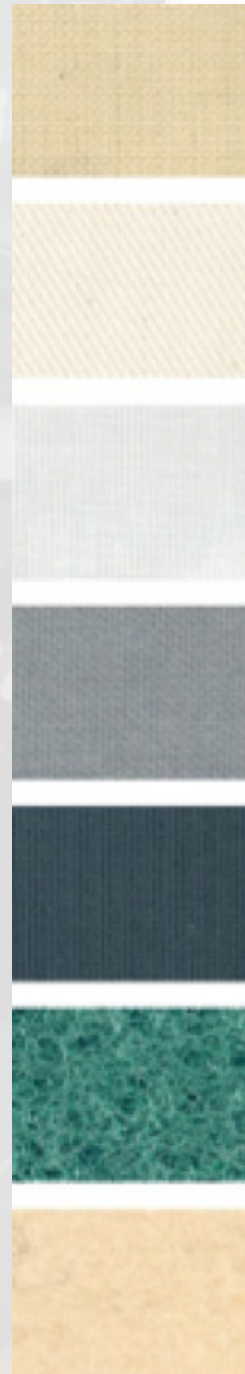
Simulates mechanical abrasion with high-abrasive rubbing pad

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 for detailed information.

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

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.

Technical Specification

Model	ABREX® -A
Load	1-20 N
Friction Path	4-40 mm
Extension Abrasion Speed	6 ± 0.5 cm/s (Standard Mode) One fixed speed between 6-20 cm/s upon request (A mode)
Cycles	1-10,000,000
Piston	Standard 10mm / 20mm / 30mm
Liquid	automatic, manual
Fabric	automatic, feed adjustable
Electricity	230V / 50 Hz ; 110V / 60 Hz
Compressed Air	4 bar, external, oil free, water free
Note: ABREX®-A can run both standard abrasion test and "swipe mode" with higher speed up to 20cm/s. Different speed can be also achieved upon request.	