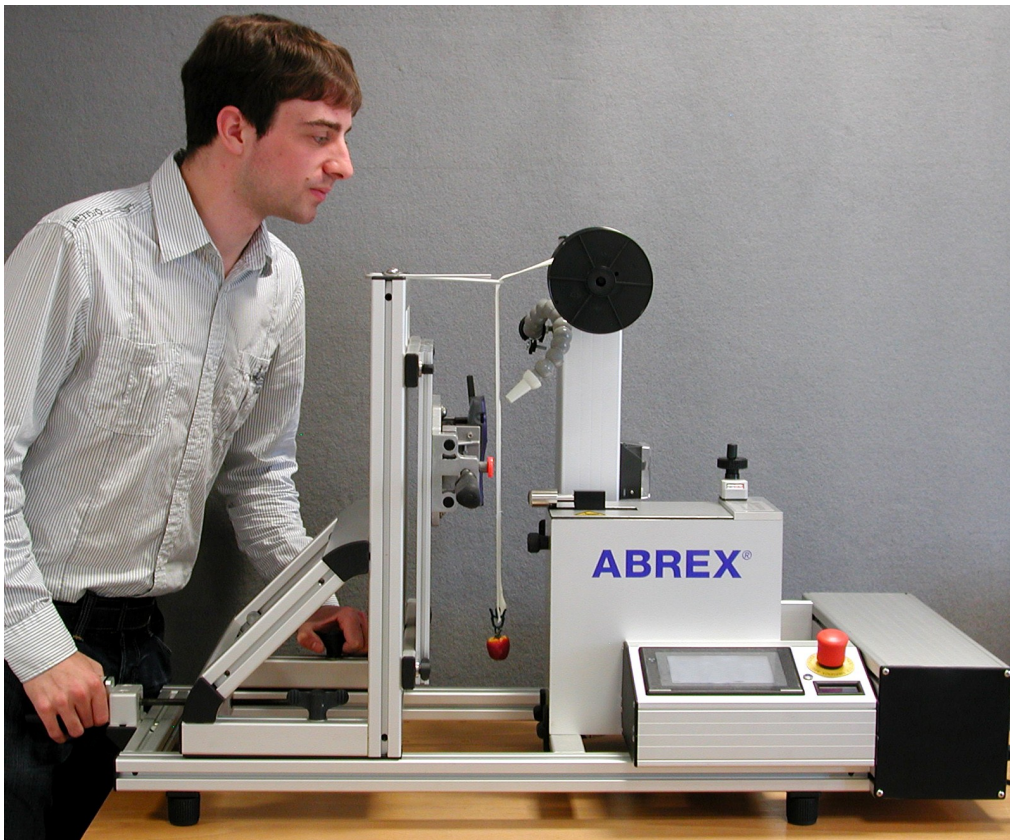


Test report ABREX[®]

standardized chemo-mechanical hand abrasion tester



Würzburg, 2012-04-17

Customer:

Samples: Artificial leather

Report no.:

Test engineer:

Report by:

(sign)

1. Description of the ABREX[®] system

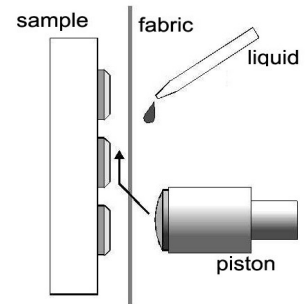
Measurements of hand abrasion with the ABREX instrument according to DIN EN 60068-2-70 / IEC 68-2-70.

This procedure assures a one to one simulation of continuous abrasion due to contact with the human hand even on extremely curved and structured surfaces.

A silicone load piston with defined shape and viscoelasticity is pressed onto a surface in a combined impact, fulling and friction movement. Located between specimen and load piston a specific standardized fabric guarantees constant standardized impact and friction.

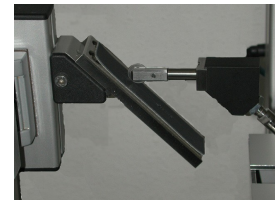
To permit realistic chemo-mechanical testing the friction material will automatically be moistened with testing fluids. (i.e. artificial sweat, lotions, ...)

ABREX is constructed to assure natural hand-abrasion. All parameters concerning the above standard are automatically observed.



Nail Scratch Automotive

This setup is an enhancement to the ABREX[®] instrument for the reproducible simulation of fingernail scratches during hand abrasion (e.g. according to BMW standard). A PMMA plate simulates the fingernail which is moved over the sample with different, increasing pressures to model a fingernail scratch.



Shoe Sole Test

Enhancement for the evaluation of the resistance against damages caused by shoe soles (according to BMW standard). A leather wheel made either of natural leather or SBR (sole rubber material) is moved over the sample with different, increasing pressures to model wear caused by shoe soles.



2. Task

The task was to test artificial leather samples backed by their original setup according to BMW test standards GS 97034-1, -2, -3, -4, -5 and -6.

3. ABREX[®] test results

3.1 BMW GS 97034-1: Manual abrasion test, part “instrument panel/non-functional decorative strips

Parameter	Description
Load piston	Silicone, hardness 47±5 Shore A, Ø 20mm, bending diameter 20 mm
Test load	10 N
Friction path	40 mm
Strokes	60
Test fabric	standard abrasion fabric DIN 60068-2-70

Sample no. “1H”



before measurement



after measurement

A minimum surface luster is visible.

3.2 BMW GS 97034-2: Finger nail test

Parameter	Description
Load piston	PMMA plate, Ø 16 mm, thickness 1 mm
Test load	1, 5, 10, 15, 20 N
Friction path	100 mm
Test cycles	5 x 1

Before evaluation the samples were cleaned with clear water and a fuzz-free cloth. The samples were evaluated from a distance of 80 cm under standard light.

Sample no. "2IT"



measurements at 1, 5 and
10 N



measurements at 15 and 20
N

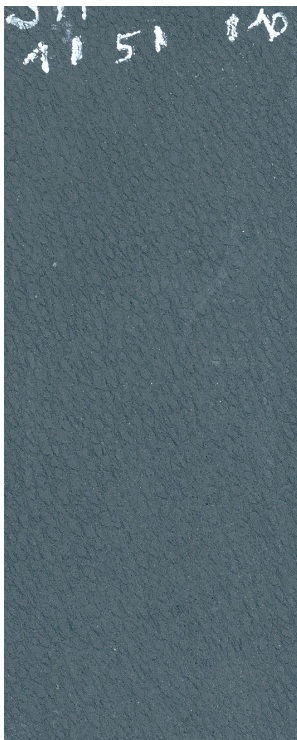
Only at 20 N there are minimal traces of a groove visible.

3.3 BMW GS 97034-3: Shoe sole test

Parameter	Description
Load piston	Leather wheel, Ø 52 mm, thickness 4 mm SBR (sole rubber material), Ø 52 mm, thickness 4 mm, Shore hardness (95 ± 3) Shore A
Test load	1, 5, 10, 15, 20 N
Friction path	100 mm
Test cycles	5 x 1

3.3.1 Leather wheel

Sample no. "3IT"



measurements at 1, 5 and
10 N

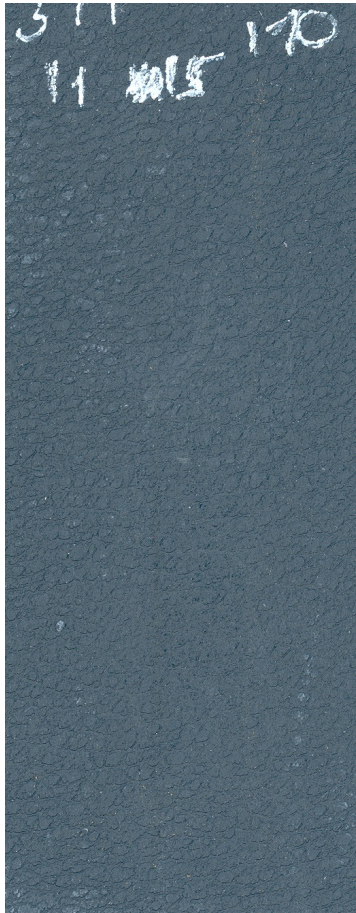


measurements at 15 and 20
N

Even at 20 N there are no traces visible.

3.3.2 SBR wheel

Sample no. "3IT"



measurements at 1, 5 and
10 N



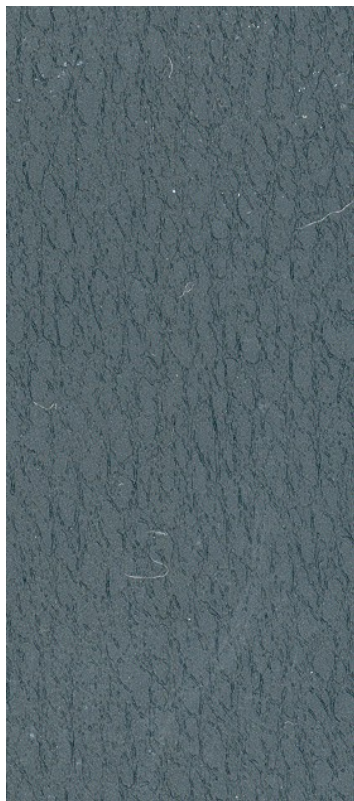
measurements at 15 and 20
N

Even at 20 N there are no traces visible.

3.4 BMW GS 97034-4-A: Color abrasion behavior

Parameter	Description
Load piston	Silicone, hardness 47 ± 5 Shore A, \varnothing 20mm, bending diameter 20 mm
Test load	10 N
Friction path	40 mm
Strokes	20
Test fabric	standard abrasion fabric DIN 60068-2-70
Test liquids	distilled water

Sample no. "4H"



before measurement



dry



with distilled water

Under dry test conditions there is a slight surface luster visible. Evaluated with the naked eye, there is no change in color visible.

3.5 BMW GS 97034-5-A: Resistance to cleaning agents

Parameter	Description
Load piston	Silicone, hardness 47±5 Shore A, Ø 20mm, bending diameter 20 mm
Test load	10 N
Friction path	40 mm
Strokes	20
Test fabric	standard abrasion fabric DIN 60068-2-70
Test liquids	<ul style="list-style-type: none">• glass cleaner• convertible top cleaner• cockpit spray• interior cleaner• plastic maintenance emulsion• leather lotion

The abrasion fabric was fully immersed in the respective medium for one minute. Afterwards it was shortly dabbed on both sides.

Sample no. 5H



glass cleaner
no change



convertible top cleaner
no change



cockpit spray
minimum surface luster



interior cleaner

no change



plastic maintenance emulsion

clear surface luster



leather lotion

slight surface luster

3.6 BMW GS 97034-6-A: Soiling behavior and cleaning ability

Parameter	Description
Load piston	Silicone, hardness 47±5 Shore A, Ø 20mm, bending diameter 20 mm
Test load	10 N
Friction path	40 mm
Strokes	20
Test fabric	soiling fabric (ABR-2056-02)
Test liquids	<ul style="list-style-type: none"> • glass cleaner • convertible top cleaner • cockpit spray • interior cleaner • plastic maintenance emulsion

The specimen is soiled with standardized soiling fabric. Afterwards they are cleaned with the respective test liquids with a fuzz-free cloth and without exerting pressure.

Sample no. "6H"



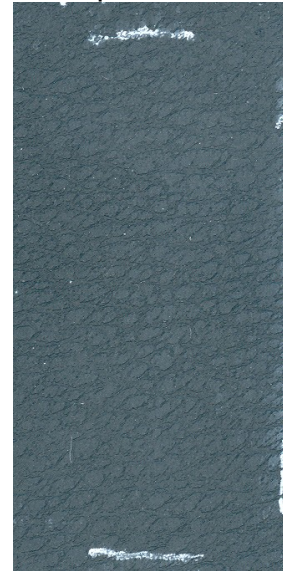
glass cleaner

Sample no. "6H"



convertible top cleaner

Sample no. "6IT"



cockpit spray

Sample no. "6H"



interior cleaner

Sample no. "6IT"



plastic maintenance emulsion

After visual evaluation the degree of cleaning ability could not be determined due to the very low contrast between soiling and color of specimen.