

ABREX®-ABRATION

It is not a conventional abrasion, it is human physiology related fingertip & hand friction and wear.

Introduction

ABREX®- abrasion, namely soft-chemo-mechanical fingertip & hand friction and wear, is generated by the specific movement due to the intensive touch of human fingertips or hands on the product surfaces. This special movement leads to distinct patterns of damages on the materials and its surfaces. The delamination and deterioration of the coating generated by ABREX- abrasion® has its own form of shape which is similar to the human fingertip.

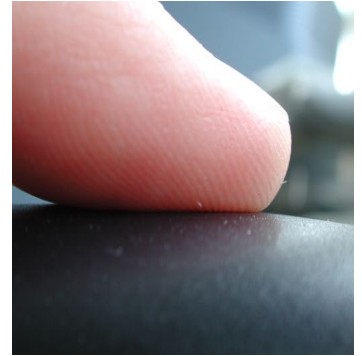


Examples of ABREX® - abrasion on button of ATM machine; steering wheel; toilet panel

Scientific Background of ABREX®- Abrasion

1. Special features of human fingertip & hand

- Viscoelastic
- With curvature
- Rough structure with texture
- Inhomogeneous and nonlinear
- a carrier of dandruff/dirt/sweat/fat/lotion/cream



2. How does human being feel that we are touching a product?

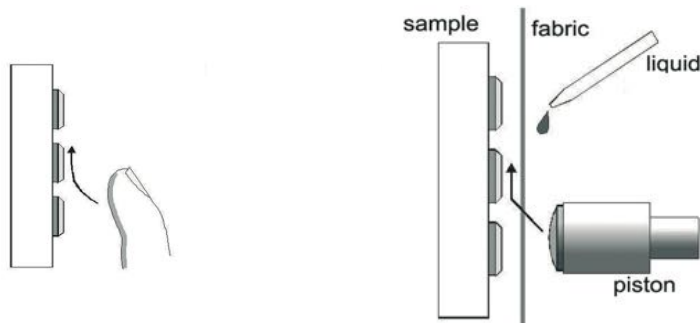
- when two fingertips are in close contact and press onto each other, or;
- when two fingertips are in contact with a small rubbing motion

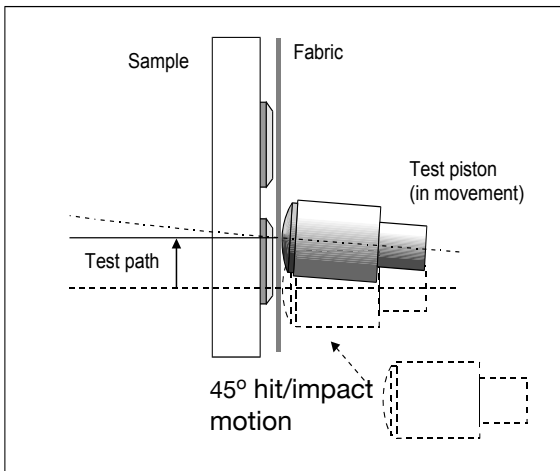
3. A complete fingertip touch motion involves:

- starting with 45° angle touch/hit on the surface instead of 90° perpendicular of the surface;
- the touch/hit is done by a viscoelastic fingertip/hand with an average load of 3.75N;
- followed by one-direction friction;
- repeat step a-c cyclically

* this cyclic motion is often under various liquid environment (sweat, cream or lotion)

4. How does ABREX® simulate human fingertip/hand touch motion:





Step 1:

The standard test stamp/piston with a specific viscoelasticity as the human fingertip/hand takes the standard fabric, and then hits the sample surface with 45° angle and with a certain load under liquid environment;

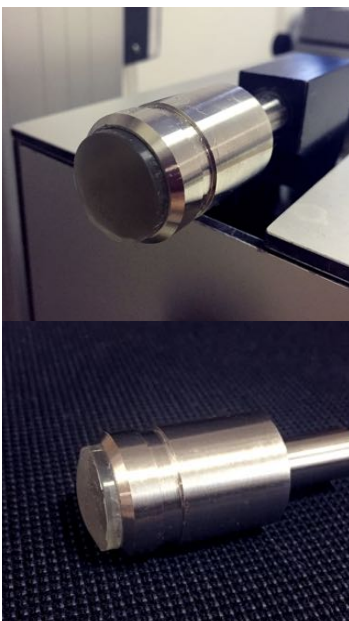
* this hit will create certain surface deterioration due to the sudden impact and the liquid penetration.

Step 2:

A friction rubbing or tumbling motion for a specific length between the sample surface and the standard fabric which ranges from artificial sweat, dirt, dandruff, oil, or various creams.

Step 3:

Cyclic movement of step 1&2.



- Standard silicone stamp/piston represents the viscoelasticity and the curvature 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

Summary

Compared with the conventional mechanical abrasion/rubbing, which is mostly between metal and metal, or between polymers, the human fingertip & hand touch movement creates a special friction and wear, called Abrex®-abrasion.

It is of great importance to simulate the real motion of fingertip and hand with a right tool instead of the conventional abrasion tester which does not involve any aspect of touch by human beings.

The simulation of Abrex®-abrasion needs designated instrumentation instead of any conventional mechanical abrasion. Therefore, the result of Abrex®-abrasion is not comparable with the one done by other conventional methods.

Depending on the material properties of the sample, e.g. viscoelasticity of the coatings, porosity of the surface and molecular structure, this special ABREX®-Abrasion procedure will show quite different results. There might be more surface deterioration than the friction, or vice versa.