
Product information

boraident HST checkmarker[®] pen



Contents

Background Studies	page 03
Spontaneous glass breakage phenomenon	page 03
Heat Soak Test process	page 04
Legal situation	page 05
Product Information	page 06
Sophisticated Technology	page 06
Application	page 07
Material details	page 08
Contact	

HST checkmarker® pen background studies



Spontaneous breakage of toughened safety glass

Spontaneous glass breakage is a phenomenon by which toughened glass may spontaneously break without any apparent reason. It could be caused by the inclusion of nickel sulphide (NiS) what might occur during the glass manufacturing process of all float glass. The NiS inclusions ("stones") change structure over time and expand - what creates internal stresses in the glass.

When these stresses exceed the strength of the glass, breakage results.

Thus, special provisions are fixed by law for overhead installation of glass or the usage in public areas (DIN EN 14179-1, ASTM C 1048).

NiS caused breakage



HST checkmarker® pen background studies



The Heat Soak Test process

In order to make spontaneous breakings less likely, toughened glass should undergo the Heat Soak Test process. This is a process which, when properly performed, can destructively uncover most NiS inclusions, if any are present. Hence, the glass panes are placed in a special heat soak chamber and subjected to a temperature of 280 - 300°C (540 – 570 F) over a time period of 2 to 4 hours (depending on local regulations).

This treatment causes the expansion of the NiS inclusions what leads to a desired breakage of the infected pane. Thus, the HST process ensures only a minor risk for a spontaneous breakage of the residual panes.

Heat Soak Chamber



HST checkmarker® pen background studies



Legal situation

The residual risk of spontaneous breakage of heat soak treated glass, the so called “probability of failure”, is only slight but differs from zero probability.

According to the product standards (may differ from country to country), the manufacturer is held responsible for the correct execution of the HST process and all relevant documentation.

In case of breakages after installation and resulting damages, the manufacturer's evidence will be the basis for legal decision making. Only complete and unambiguous documentation keeps the manufacturer indemnified against all liability.

But how can the correct test been evidenced?

boraident's answer: on the glass directly!



HST checkmarker® pen product information



Sophisticated technology

HST checkmarker® is a thermocromic and UV active ink for the qualitative evidence of the Heat Soak Test. It will be applied to the glass surface of the tin side directly.

During the HST process or, to be exact, at a temperature of 200°C (390 F) it results a **change of colour** from blue to white, what is visible for the human eye.

Additionally, at a temperature of 250°C (480 F) and a dwell time of 1 hour minimum, the ink creates a resistant **fluorescence marking** inside the glass material. This marking is invisible under daylight conditions but with 254 nm UV.

The advantage: The white surface coating can be removed after the test in order not to affect the product aesthetics.

But the proof remains throughout the product life-cycle in form of an unambiguous, forgery-proof fluorescence marking.

Friedmann & Kirchner
[Gesellschaft für Material- und Bauteilprüfung mbH]

Test certificate

Number: 2010-08-3898-01

Client: boraident GmbH
Köthener Straße 33a
D - 06118 Halle

Product: HST checkmarker pen

Description: The purpose of the HST checkmarker pen is application of temperature activated marking on glass panes.

Tests: Storing of marked glass at different temperatures and different hold times.

Results: On basis of the tests performed, we confirm:

Temperatures > 200°C produce a change of color on surface visible at daylight. The marking can be removed with typical glass cleaning products.

In addition to this, temperatures > 250°C and hold times of > 1 hour produce a fluorescence that is visible in ultraviolet light of a wavelength of 254 nm. The marking is inside of the glass and cannot be removed.

Rohrbach, September 23rd 2010

Dipl.-Ing. Michael Friedmann Dipl.-Ing. Robert Kirchner

The results communicated in this test certificate apply only for the products mentioned herein.

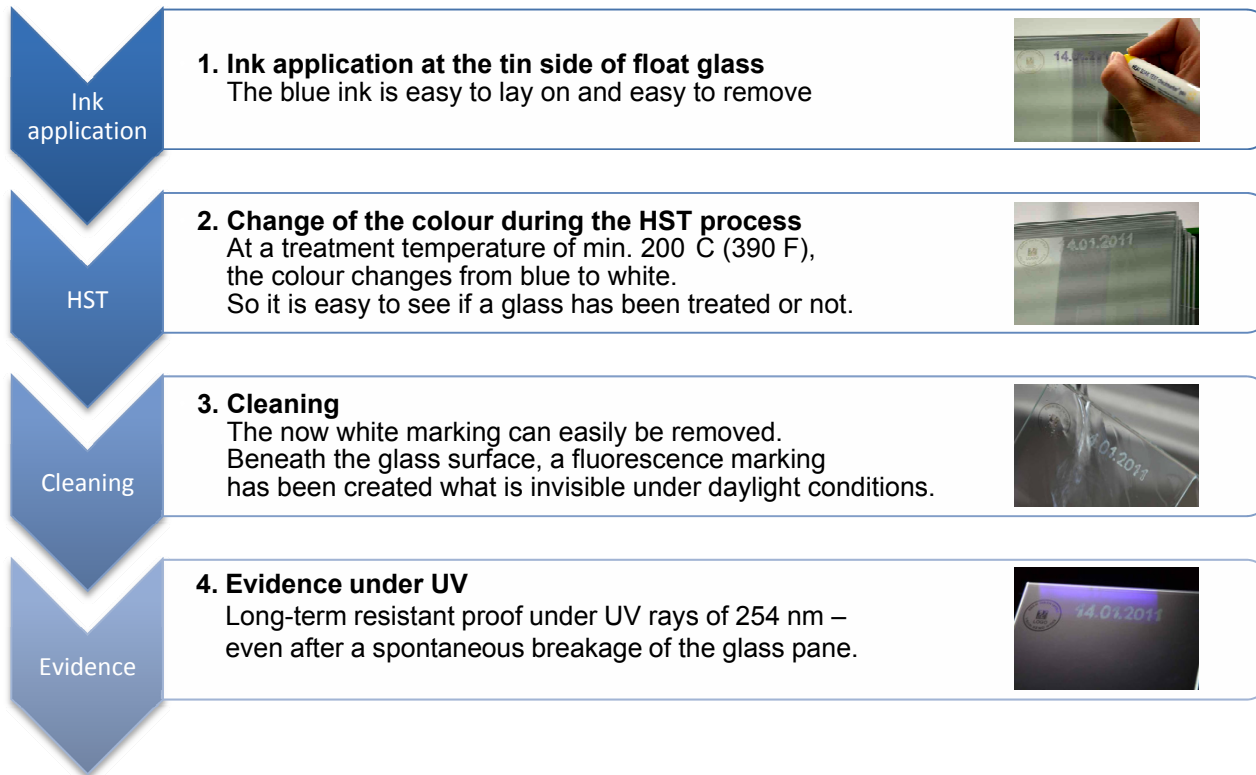
Geschäftsführer: [Dipl.-Ing. Michael Friedmann - Dipl.-Ing. Robert Kirchner - HRB Landau 3143]
Adresse: [Große Anmühle 7 - D-76885 Rohrbach - Tel 0 63 49 93 93 1 0 - Fax 0 63 49 93 93 1 99]
Internet: [info@friedmann-kirchner.de - www.friedmann-kirchner.de]

test certificate
2010-08-3898-01

HST checkmarker® pen product information



Application



HST checkmarker® pen product information



Material details

Product name:	HST checkmarker® pen
Material number:	MAS-HST-239
Description:	Felt pen filled with thermocromic ink
Filling:	8 ml
Price:	49,50 EUR
Stability:	18 months minimum (unopened)
Manufacturer:	boraident GmbH, Germany
Safety:	In accordance with 1999/45/EG (REACH not applicable) no specific requirements
Legal status:	patent registered, certified





contact

boraident GmbH
Koethener Str. 33a
D-06118 Halle (Saale)
Germany

Phone: +49.345.4782 350
Fax: +49.345.4782 3510

Internet: www.boraident.de
www.glass-sensors.de

E-Mail: info@boraident.de

Personal contact

Ms Yvonne Moebius
moebius@boraident.de

Mr Friedrich Wagner
wagner@boraident.de

