



B45 Self-Cleaning Window Glass: Breakage Transfer Process Validation and Subclass/Brand Characterization

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Via high-speed videos filmed at 1000 frames/sec. attendees will be witness to the process of window glass breakage and to the forces producing numerous fragments going back towards the breaker. The goals of this presentation are to graphically validate this process of glass fragment transfer, to qualitatively assess the likelihood that transferred particles tend to originate from the glass surface towards the breaker, and to present results from tests on recovered glass fragments that permit brand identification.

This presentation will study a breaking and entering entrance commonly gained through breaking a window. Although glass does not break back onto the perpetrator, explaining it to a jury can be a trying task. A jury is composed of twelve people, many of whom do not have a background in science. Forensic scientists' ability to explain work and examinations to a jury takes great precedence over the work itself, for it is the jury who is judging the defendant. 90% of all people are visual learners. The videos shown in this presentation will be available to the forensic community with hopes that they will one day be of some use in the courtroom.

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Self-cleaning window glass, a new type of glass intended solely for exterior use, was introduced to the AAFS audience in a presentation by one of the authors last year. One side only of these panes (the exterior facing side) is rich in titanium dioxide (TiO_2), the catalytic ingredient that in concert with the sun's ultraviolet rays acts as an oxidizing agent and breaks down organic dirt and grime. Since only glass at or very near the exterior surface is rich in TiO_2 it is possible to not only discriminate this new subclass from ordinary window glass, it is also possible to identify tiny fragments originating from this surface.

Window breaking tests were conducted at the U.S. Army Proving Ground, Yuma, Arizona, utilizing available high-speed cameras. Under identical conditions, 1' x 1' x 1/4" glass panes mounted at approximately shoulder height were broken by swinging a crowbar. Panes broken included ordinary window glass, and the two available self-cleaning brands, Activ™ glass by Pilkington and SunClean® glass by Pittsburgh Plate Glass. The self-cleaning panes were mounted with the treated side towards the breaker.

With the exception of different colored hoods, the breaker wore identical outfits for each glass-breaking event. Subsequent to each breakage the breaker moved over to an area where clean butcher paper was laid down, and the breaker's outer clothing (hood, gloves, sweater, sweat pants, and sneakers) were separately removed and packaged as evidence. Later, these items were searched for glass fragments. Glass fragment recovery data and results of characterization examinations (fragments originating from the surface towards the breaker, from the middle, and from the side opposite the breaker) will be presented.

Trace Evidence, Glass Breakage and Analysis, Self-Cleaning Window Glass