

TEST SUMMARY REPORT  
BIRD COLLISION ON GLASS SURFACES

**Saflex® FlySafe™ 3D / SEEN shiny 9/90mm and  
Saflex® FlySafe™ 3D / SEEN matt 9/90mm**

**(2019 – 2021)**

WIN test in the Flight Tunnel II  
of the Biological Station Hohenau-Ringelsdorf in commission of  
SEEN AG, Waldstatt, Switzerland

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## TASK AND METHOD

On behalf of SEEN AG, Waldstatt, Switzerland, a metallic dot matrix marking called Saflex® FlySafe™ 3D / SEEN shiny / matt 9/90mm was examined in the years 2019 to 2021 to determine the suitability of this bird protection marking for avoiding bird collisions to check on glass panes. These are dots with a diameter of 9mm in a vertical and horizontal grid spacing of 90mm with an aluminum-coated, slightly concave front side with 89% reflectance (shiny) or a flat, diffuse-reflecting surface with 74% reflectance (matt) which is embedded in the laminate layer of VSG. Four tests were aimed at window and façade applications with a dim interior background and reflections on the outside of the pane, one test at the same lighting conditions in front of and behind the pane (bright background, few reflections).

The test procedure involves standardized choice tests in which birds are encouraged to fly in a directed, delay-free manner through a tunnel setting and make a choice of direction between a marked test disk and an unmarked reference disk. The selection experiments take place under natural lighting conditions with daylight-adapted wild birds from the scientific trapping program of the Biological Station Hohenau-Ringelsdorf. With this method, the birds are released unharmed into the wild immediately after a single flight. The test method is described in detail in the individual test reports (Rössler 2020, Rössler 2021, Rössler 2022).

According to the Hohenauer evaluation scheme, the criterion for highly effective bird protection glass is that no more than 10% of the test birds fly to the marked pane. In addition, no quantitative predictions can be made about the number or percentage of rescued birds for the multitude of different applications. The research method aims to compare different candidates.

## RESULTS

In the test years 2019 - 2021, the marking Saflex® FlySafe™ 3D / SEEN matt 9/90mm was tested once and Saflex® FlySafe™ 3D / SEEN shiny 9/90mm four times in different glass and test setups. LSG without a functional coating were tested on item 4, insulating glass with a Low E coating on item 4 and LSG with a sun protection coating and an external reflection factor of 19%. The sample sizes were 80 to 104 valid individual attempts. In all test series, between 6% and 10% of the birds flew to the test disc, the rest to the reference disc (Tab. 1). All are therefore considered highly effective.

Table 1: Tests of Saflex® FlySafe™ 3D / SEEN matt 9/90mm and Saflex® FlySafe™ 3D / SEEN shiny 9/90mm in the years 2019 -2021. The panes were tested against a faint background (WIN) and against a light background (NPW) with different structures and with different coatings with sample sizes from n=80 to n=104. All results (% approaches to the test pane) were max. 10% and are highly effective according to the collabs evaluation scheme.

Test Year	Description	Test method	Configuration	Coating	Number of valid birds	% Hits
2019	9/90 matt	WIN	VSG	-	97	<b>9</b>
			VSG	-	90	<b>9</b>
2020	ISO		CLIMA GUARD	104	<b>6</b>	
2021	9/90 shiny		VSG 19%	COOL LITE, AR 19%	91	<b>10</b>
			NPW	VSG	-	80

## RECOMMENDATIONS AND LIMITS

Saflex® FlySafe™ 3D / SEEN shiny 9/90mm has repeatedly and exclusively proven to be highly effective in various glass constructions up to an external reflectance of 19% and there is no reason to assume that Saflex® FlySafe™ 3D / SEEN matt 9/90mm, its Points having a diffusely light-reflecting surface are not as effective. A test in 2020 with a functional coating (low-e "Clima Guard Premium" at position #4 resulted in a 6% approach to the test pane for a Saflex® FlySafe™ 3D / SEEN shiny 9/90mm insulating glass pane. The test of a Saflex® FlySafe™ 3D / SEEN shiny 9/90mm laminated safety glass pane with an external reflectance of 19% now also provides information on this problem and a positive result, since here too the mark of a maximum of 10% approaches to the test pane is not exceeded and the marking in this version as can be addressed highly effectively. We therefore recommend the markings mentioned as suitable bird protection markings for both window/façade applications and for free-standing glass.

The results described above can also be transferred to structures that have not been tested under the following conditions:

1. The maximum external reflection of the glass (VSG, double and triple insulating glass) is 19%
2. A study of the optical properties of different monolithic glass, laminated safety glass, double and triple insulating glass with laminated safety glass to determine the glasses and coatings that meet the criteria is available from collabs in a draft original: Caestecker, A.: FlySafe 3D (SEEN). Determine criteria for selection of Lam. Safety Glass (LSG) and Insulating Unit's (IGU's). AARP 2022 01 0083 – AARP 2021 06 280. Intermediate work document.
3. The point grid corresponds to the tested point grid with the following properties:  
  
Diameter of the markers: 9mm  
  
Distance of the markings: 90mm in X and Y axis  
  
Reflection of the markings: SEEN shiny >88% SEEN matt >74%
4. Production of the laminated safety glass according to the laminating guidelines
5. In the event of deviations in the glass structure and use of the glass behind suspended facades, deviations in the point grid, type of markings and in the LSG production, the flight tunnel test results lose their applicability.