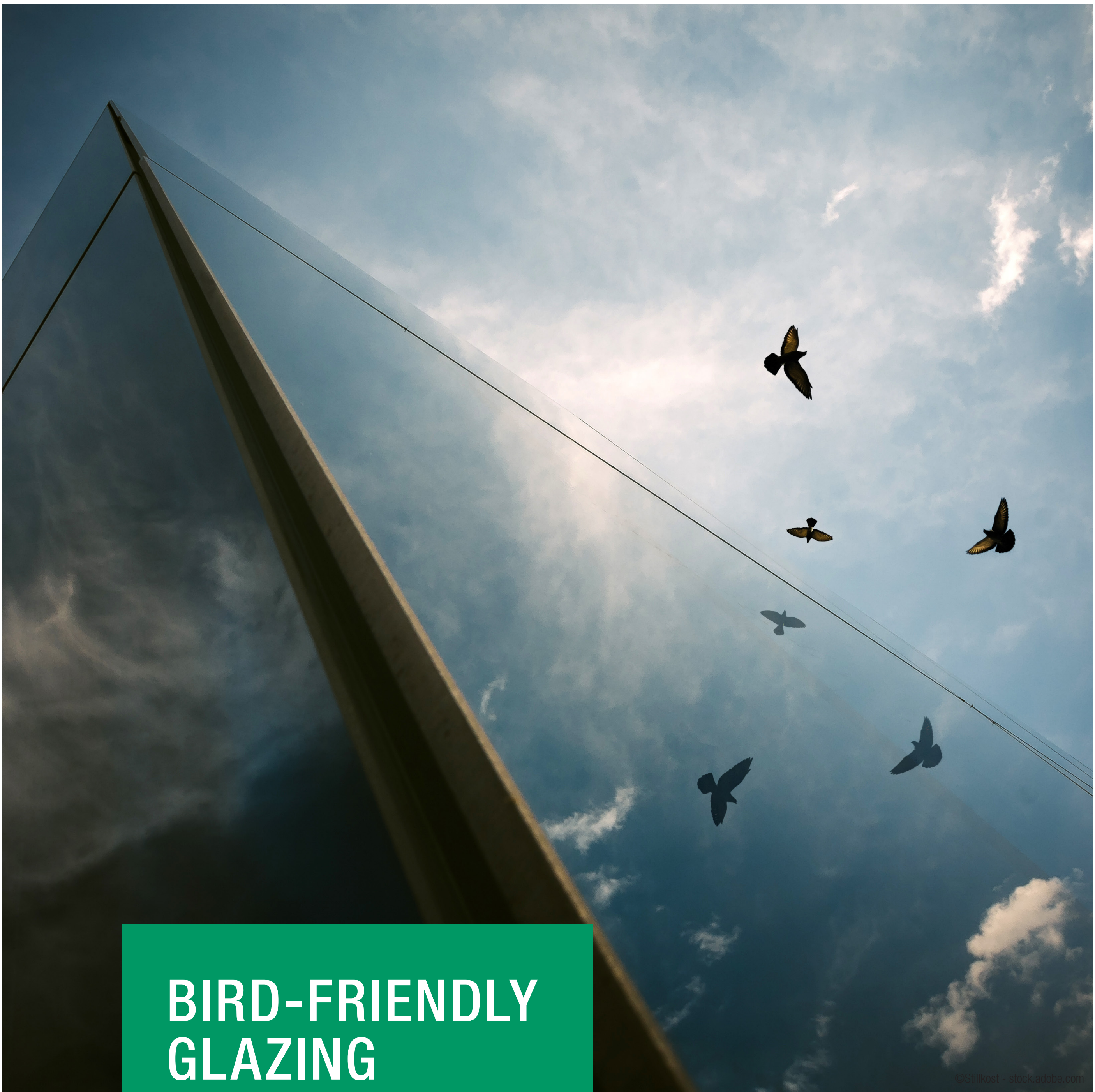
ISOLAR® Compass 4/2021



BIRD-FRIENDLY GLAZING

REDUCE BIRD STRIKES

ISOLAR® GLAS

MEHR AUS GLAS

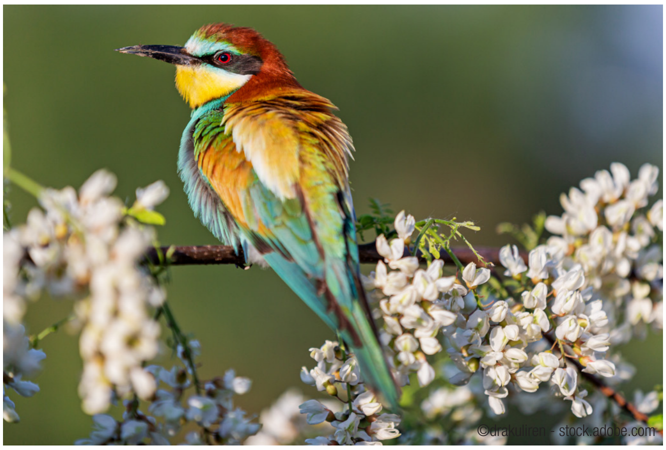
INTRODUCTION

Every year, hundreds of millions of birds die or are injured in collisions with glass surfaces of buildings. The reflective and transparent properties of glass make it difficult for birds to recognize windows and façades, so they cannot swerve away from these obstacles in time.Worldwide, bird strikes are a major factor contributing to in the decline of bird populations – it ranks second only to destruction of natural habitats. With growing environmental awareness, the requirements for nature conservation and bird protection are increasing worldwide. In many countries, it is a statutory requirement to reduce bird strikes by taking suitable measures.

The problem in this case is relatively easy to identify:

- Birds do not see glass panes as spatial boundaries and due to the transparency of the glass, they believe they can fly through them.
- Birds do not recognize highly reflective surfaces as obstacles and believe they can continue their flight in to the reflected "space".
- Another well-known but less studied phenomenon are the illuminations at night, which can cause disorientation in birds, especially during their night-time flights in the migration season.

Due to changing conditions such as the time of day (day/night), the angle of approach and the light conditions (cloudy or sunny), the glass element can be perceived as either transparent or reflective. Birds have a different visual perception compared to humans. This is in part due to the additional cones on the avian retina, which makes birds perceive colours on a different scale. Some birds have the ability to see radiations of wavelengths 350 nm and longer. Thus, compared to humans (400-780 nm), many bird species can also detect ultraviolet light or respond to the violet spectrum. Among such birds are: passerines or perching birds (oscines and suboscines), parrots and gulls. A large number of birds inhabiting urban areas have this enhanced visual perception. Other bird species such as owls, ducks, some birds of prey, some pigeon species and ravens cannot benefit from the perception of the ultraviolet radiation spectrum.



The picture shows a bee-eater, a small bird with a size of just under 30cm, benefits from its UV perception more than its larger relatives for anatomical reasons. Most birds—unlike humans—have not just thee, but four cones on their retina. This additional layer enables them to perceive UV light. However, this is not true for nocturnal birds, such as the owls. These bird species have more rods than cones on their retina, which responsible for light sensitivity not for colour diversity.

Further, it is further believed that compared to humans, most birds have reduced three-dimensional perception. This is due to the anatomy and position of the eyes on the head. Birds that have their eyes on the sides of their heads have 360-degree all-around vision. This enables them to detect threats and attackers at an early stage. As a result, the viewing angle of the individual eyes hardly overlaps and stereoscopic vision and three-dimensional perception are therefore reduced.

Bird-friendly architecture involves a master plan that takes into consideration not only the use of bird-friendly glass in particularly dangerous areas, but also in the actual building design, size of the glass panes, plantings in the surroundings and other factors. Even though tested bird-friendly glass products contribute significantly to the reduction of bird strikes, complete avoidance of bird strikes cannot be guaranteed.

THE SOLUTION

To assess the possible perception of coatings and patterns on bird-friendly glazing, the glass panes are installed in a flight tunnel and tested in standardized preference tests. For purpose of these tests, birds are caught in the wild (wild birds) and made to fly once in a flight tunnel. Instinctively, they fly towards the perceived opening. There are two glass elements installed next to each other. A control glazing (usually a clear float glass pane) and the test glass pane that is to be tested. In front of the glazing there is a fine net, which prevents the birds from colliding with the glass pane. To obtain a statistically meaningful result, at least 80 test birds are needed for each test.

The basic structure of flight tunnels is also similar worldwide. However, they differ in certain details. In some tunnels, for example, additional light is introduced into the tunnel tube to create reflections on the glass surface. Also, different light conditions can be created in the space behind it during the test. To date, there are no uniform standards for these tests at the global as well as the European level.

The tests in the flight tunnel operate worldwide on the principle of the preference test. The test equipment evaluates the direction of flight of each bird and in this way determines the number of birds that would fly against the control pane or the test pane. The proportion of birds flying towards the different glass panes allows comparison of different test panes with each other, as well as the classification of the effectiveness based on a rating scale.

An impact rate of 50% / 50% means that the same number of birds fly into the test pane and control pane, respectively (normal distribution). Therefore, no effectiveness is apparent. A statistically significant deviation from the normal distribution occurs at a bird approach rate of more than 60% to the control pane and thus a certain effectiveness is evident. If the result were 100% (bird approaches to the control pane), no bird would fly against the test pane, but this has not yet been achieved with any test pane that was tested. Due to the lack of standardization of test conditions and evaluation criteria (at the global and European level), different rating scales are used by different testing institutions to determine the effectiveness of a test pane in the flight test. The associated rating terms such as “Effective” and “Highly effective” are therefore comparable only to a limited extent. The bird approach rate is probably the key figure that provides the best answer about the effectiveness in the test.

It is impossible for the glass industry to test all glass combinations and functional layers in flight tunnels. Considering the different glass thicknesses (3-15mm), glass substrates (float glass, low-iron glass, white glass), combinations in laminated glass, assemblies in double and triple insulating glass, the different inter-pane spacing, functional coatings and bird-friendly markings and coatings, there are several 100,000 possible combinations. For the following reason, some testing institutes have established certain combination rules based on empirical values. Thus, on the basis of the tested assemblies, the glass thickness, inter-pane space width, glass substrate (float or white glass) and the number of laminated safety glass films can be varied in laminated safety glass. The type and position of the coatings defined in the test must not be changed.

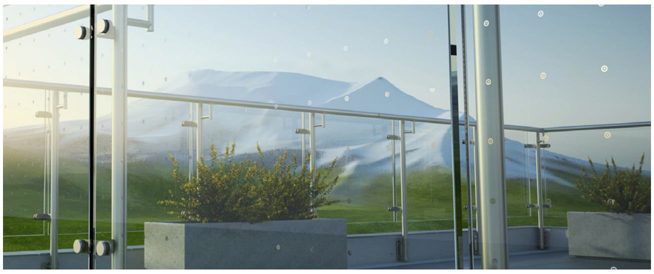
EXAMPLE OF A FLIGHT TUNNEL TEST SET-UP

TYPES OF BIRD PROTECTION GLASS

Products that reduce bird impact can have innumerable appearances and function principles. One of them is the marking on the surface of the glass with paint or metallic patterns. These markings are also clearly visible to the human eye and they limit the actual transparency of the glass surface. To put it simply, such systems can achieve high level of effectiveness in tests (85-95%). Systems based on the effect of ultraviolet light are only partially visible to the human eye and allow the architect almost limitless freedom to design. The effectiveness of such glazing in flight tunnel tests are usually in the range of 70-85%.

Based on the test results known so far, it can be said: the better the visibility of bird protection products to the human eye, the higher the effectiveness in the tests and the lower the creative freedom for the architect. The design of the patterns on the glass surface should follow simple rules. The pattern should be applied homogeneously over the entire glass surface. Individual bird silhouettes or pattern elements on the surfaces are ineffective. The "mesh width" of the pattern should not exceed the wingspan of small songbirds, otherwise they will see a flight path. The widely known 'rule of palm' is a good indicator for the pattern size.

The filigree, spider web-like appearance of ORNILUX® mikado is barely visible to the human eye.



ORNILUX® design reduces bird strikes through visible markings in elegant metallic design, for example in the form of dots

BIRD-FRIENDLY GLASS – THE KEY BENEFITS

- Taking responsibility towards nature and anchoring sustainable architecture
- Flexibility through a large number of tested products
- No compromise on energy efficiency and other technical properties
- Harmonious design of buildings – using the same coatings in areas requiring bird protection and in other areas where there is no high risk of bird strikes

LEGAL NOTICE

Ausgabe: 04/2021
ISOLAR® Compass is a product of ISOLAR GLAS Beratung GmbH.

Publisher: ISOLAR GLAS Beratung GmbH
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