



ISOLAR
ORNILUX®



**BIRD PROTECTION
SOLUTIONS**

**ISOLAR®
GLAS**

MEHR AUS GLAS

EVERY YEAR, SEVERAL HUNDRED MILLION BIRDS WORLDWIDE DIE AND ARE INJURED DUE TO COLLISIONS WITH GLASS SURFACES OF BUILDINGS. ORNILUX® IS A CERTIFIED SOLUTION FOR BIRD-FRIENDLY BUILDINGS.

■ REDUCE BIRD STRIKE WITH ORNILUX®

The reason for collisions of birds with glass surfaces are the reflective and transparent properties of glass. The animals find it very difficult to recognise windows and façades and therefore are sometimes unable to avoid the obstacle. In addition to the destruction of their habitat, bird collisions are a major factor for the decline in bird populations worldwide.

Thanks to the increasing environmental awareness in the building industry, architects, planners, investors and builders are more often facing up to the responsibility of sustainable, "green" architecture. This does not contradict the functionality, efficiency and aesthetics of modern architecture.

As a pioneer in the development of transparent bird protection solutions, Arnold Glas began to address the problem of bird strike with scientific solutions as early as 2003. The know-how and extensive experience has resulted in a product family that offers different solutions depending on the different requirements.

Just as standard insulating glass units ORNILUX® can be installed in all window and facade systems. The coating makes the difference and can additionally be combined with other functions such as sound and heat insulation as well as solar control is possible without any problems



Mountain station Karwendel, Mittenwald Germany

■ EXAMPLE OF A FLIGHT TUNNEL TEST SET-UP

Flight tunnel



Net

Control pane

Test pane

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.

■ TRANSPARENT COATING OR ELEGANT DESIGN

ORNILUX® mikado is hardly visible to the human eye, as the reflection of this special coating is predominantly in the ultra-violet range. Unlike humans, many birds are able to perceive UV light thanks to an additional cone on their retina. This helps the birds to recognise the glass as an obstacle in time and to fly around it.

The development of ORNILUX® is rooted in Biomimicry, which uses the models, systems and elements of nature and contributes to the solution of complex problems. ORNILUX® mikado was inspired by the UV-reflecting web of the orb-weaver spider.

The filigree, spider web-like appearance of ORNILUX® mikado is barely perceivable to the human eye. It has been tested and certified by the American Bird Conservancy in Pennsylvania/USA.

■ ORNILUX® MIKADO VARIATIONS



ORNILUX® mikado

for use in multi-pane insulating glass units



ORNILUX® supermikado

The enlarged transparent pattern is particularly suitable for freestanding applications and is approved by ABC for installation situations with bird approach from both sides.

ORNILUX® MIKADO – FEATURES & BENEFITS

- Tested in flight tunnel tests by the American Bird Conservancy (ABC)
- Transparent UV-reflecting structure in the insulating glass unit
- Compatible with thermal insulation and solar control coatings
- oHT coating (tempering is optional)
- Approved by ABC for use as railings and balustrades (ORNILUX® supermikado)

TESTED GLASS COMBINATIONS ORNILUX® MIKADO

The tested ORNILUX® mikado glass types meet the criteria for bird-friendly glazing of the American Bird Conservancy (ABC); ABC classifies the test panes in the "Effective" category, meaning

they were avoided by at least 70% of birds in the flight tunnel. This results in a Threat Factor (TF = approach rate to the test pane) of max. 30.

ORNILUX® mikado for double insulating glass

Product name	Glass Build-Up Outer / Cavity / Inner	EN 673	EN 410				EN ISO 717-1	Thick- ness mm	TF (Threat Factor) %	
		U _g -Value	Light transmission	g-Value	Light Reflection (external)	Light Reflection (internal)	Colour Rende- ring Index R _s			Sound Insulation R _w / C / C _{tr}
		W/(m ² K)	%	%	%	%				dB
ORNILUX® mikado advance // 1,1	4 / 16 / :44.2	1,1	77	61	15	14	98	38 / -2 / -7	28	23
ORNILUX® mikado A71 // 66.37	6 / 16 / :44.2	1,0	66	36	15	17	96	39 / -2 / -6	30	20
ORNILUX® mikado A61 // 58.32	6 / 16 / :44.2	1,0	58	32	14	15	93	39 / -2 / -6	30	23
ORNILUX® mikado A51 // 51.26	46.2 / 16 / :4	1,0	51	26	16	12	91	-	30	25
ORNILUX® mikado A40 // 41.22 ²⁾	46.2 / 16 / :4	1,0	41	22	23	11	91	-	30	25

ORNILUX® mikado for triple insulating glass

Product name	Glass Build-Up Outer / Cavity / Mid / Cavity / Inner	EN 673	EN 410V				EN ISO 717-1	Thick- ness mm	TF (Threat Factor) %	
		U _g -Value	Light transmission	g-Value	Light Reflection (external)	Light Reflection (internal)	Colour Rende- ring Index R _s			Sound Insulation R _w / C / C _{tr}
		W/(m ² K)	%	%	%	%				dB
ORNILUX® mikado advance /// 0,6 ³⁾	4 / 14 / :4 / 14 / :44.2	0,6	70	51	17	17	97	-	44	29
ORNILUX® mikado A71 /// 60.33 ³⁾	6 / 14 / :4 / 14 / :44.2	0,6	60	33	17	18	95	-	46	28
ORNILUX® mikado A61 /// 52.29 ³⁾	6 / 14 / :4 / 14 / :44.2	0,6	52	29	16	17	92	-	46	30
ORNILUX® mikado X60 /// 52.24 ³⁾	6:6.2 / 14 / 4 / 14 / :4	0,6	52	24	16	16	93	-	49	18

ORNILUX® supermikado for balustrades & railings

Product name	Glass Build-Up Outer / Cavity / Mid / Cavity / Inner	EN 673	EN 410				EN ISO 717-1	Thick- ness mm	TF (Threat Factor) %	
		U _g -Value	Light transmission	g-Value	Light Reflection (external)	Light Reflection (internal)	Colour Rende- ring Index R _s			Sound Insulation R _w / C / C _{tr}
		W/(m ² K)	%	%	%	%				dB
ORNILUX® supermikado / ¹⁾	:66.2	5,4	79	71	16	16	99	36	13	19

1) Technical data for monolithic build-ups are approximate. 2) Outer pane is thermally toughened (toughened safety glass). 3) Middle pane with additional low-e coating is thermally toughened (toughened safety glass). | All ORNILUX® mikado multi-pane constructions have achieved an approach rate of at least 70% to the control pane in ABC flight tunnel tests („EFFECTIVE“ category). In accordance with ABC's 'Bird Smart Glass' programme, we would like to point out as a precaution that no glass product currently available on the market can guarantee complete prevention of bird strikes. Results vary depending on the bird population, lighting conditions, landscape, the product used and the building design. More information at www.birdsmartglass.org. The flight tunnel results form the basis for LEED Credit 55. www.usgbc.org. Further information on request. See also ISOLAR® Compass 4/2021: Bird protection glass (www.isolar.de/en).



Glass railing with ORNILUX® supermikado

■ ORNILUX® DESIGN: REFLECTIVE MARKINGS

ORNILUX® design, unlike our transparent solutions, is clearly visible to both humans and animals. It utilizes a new coating process based on visible, metallic markings in the form of dots or lines. These chrome markings create maximum contrast in both reflection and transmission and are particularly suitable when bird protection is to be combined with an attractive and exclusive

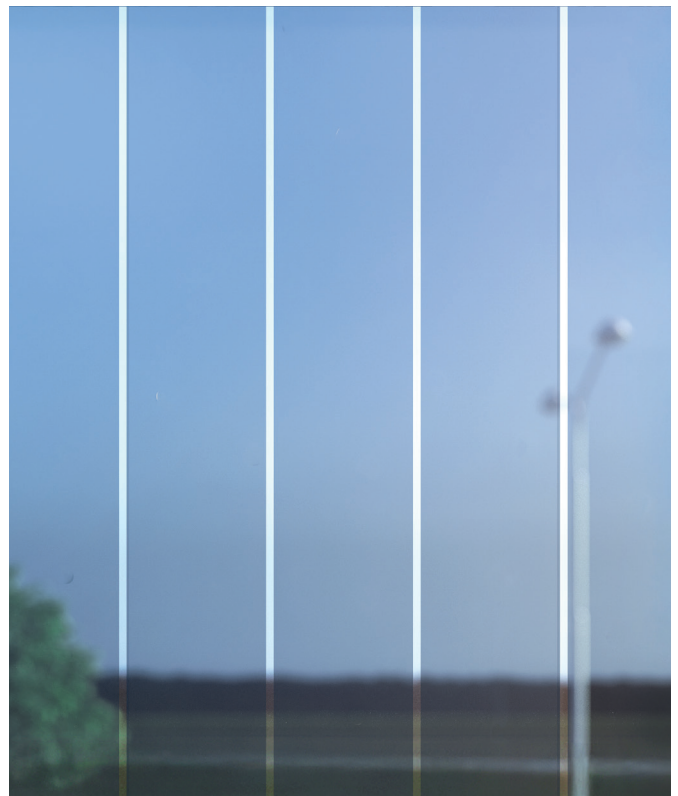
design. This enables highly effective bird protection on the outer glass surface. The semi-transparent ORNILUX® design dots, in particular, are characterized by a minimalist facade appearance, as the coated area of the glazing is less than 1%. Thanks to the seamless design, no additional material is wasted, allowing for straightforward further processing without limitations.

■ ORNILUX® DESIGN VARIATIONS



ORNILUX® design dots

Easy planning of facades and model panels thanks to seamless design



ORNILUX® design lines

Highly effective marking in an elegant striped pattern on the outer surface of glass.

ORNILUX® DESIGN – FEATURES & BENEFITS

- Tested in the WIN flight tunnel test at Hohenau-Ringelsdorf, Austria
- Also recommended by ABC (American Bird Conservancy)
- Discreet metallic reflective markings
- For use on surface 1 to reduce reflections
- Scratch- and UV-resistant marking, tested according to EN 1096 Class A
- oHT coating (tempering is optional)
- No impact on mechanical strength
- Sustainable and resource-saving solution, as it is fully recyclable

TESTED GLASS COMBINATIONS ORNILUX® DESIGN

Markings tested in the flight tunnel in Austria that were approached by less than 10% of birds in the test correspond to category A – 'highly effective'. For statistical reasons, markings with an approach rate of up to 12% are also recommended according to the Hohenau rating system.

Our glass with ORNILUX® design lines and ORNILUX® design dots markings comply with this recommendation. The exclusive metallic shiny markings were tested as single-pane glass with markings on surface 1 in the WIN test in Hohenau-Ringelsdorf, Austria.

ORNILUX® design

Product name	Colour impression exterior view	Glass Build-Up Outer → Inner	EN 673	EN 410					EN ISO 717-1	Thick-ness	Approach rate in the WIN test
			U _g -Value	Light transmission	g-Value	Light Reflection (external)	Light Reflection (internal)	Colour Rendering Index R _a	Sound Insulation R _w / C / C _{tr}		
			W/(m ² K)	%	%	%	%		dB		
ORNILUX® design dots ^{4), 5)}	reflective	:6	5,7	89	85	8	8	99	31	6	12
ORNILUX® design lines ^{4), 5)}	reflective	:66.2	5,4	83	73	11	10	98	36	13	8

4) ORNILUX® design was successfully tested in the flight tunnel test in Hohenau-Ringelsdorf/Austria with markings on surface 1. Further information on request. 5) Technical data for monolithic build-ups are approximate. Further build-ups and combinations on request.



ORNILUX® design lines at the Porsche Design Tower Stuttgart, Germany

CLEAR BENEFITS WITH ISOLAR®

ISOLAR® is one of the largest associations of independent insulating glass manufacturers in Europe with members from twelve countries. Thanks to the close cooperation within the group, our products are constantly optimised and new developments are driven forward. You will find an ISOLAR® partner in your area as well, who will support you as an experienced full-range supplier with comprehensive consulting expertise and who will supply you with high-quality functional glass for windows and façades.



Heat insulation



Solar control



Bird protection



Design



Fire protection



Radio transparency



Sound insulation



Attack resistance



Safety glass



Fall protection

WE'RE HERE TO HELP.

ISOLAR Glas Beratung GmbH is your competent partner when it comes to glass. We turn your wishes into clear solutions. Ask us.

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www.isolar.de/en

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