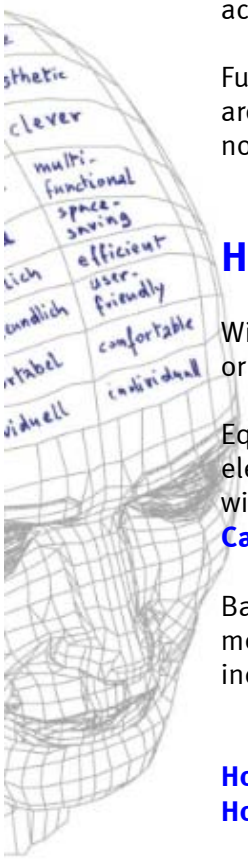
Frequently Asked Questions

iku® windows – the intelligent self-cleaning facade

iku® windows: self-cleaning window and facade systems

The system is a perfect replacement for traditional BMU systems, which in the long run are not only expensive (regular TÜV testing, use of personnel) but also, and more importantly, dangerous. accidents during facade cleaning are a frequent hazard.

Furthermore, moving cradles are the main cause of glass breakage in facades. These older systems are usually highly weather-dependent: even at modest heights the ever-present wind is a hazard not to be underestimated.



How it works

Windows are sprayed on the outside with cleaning liquid, and then cleaned by means of vertical or horizontal wiper strips – over the full height of the building if required.

Equipment needed for the system:
electric motor, control system, special designed profiles which integrate the belt drive system, wiper strip with spring-loaded rubber wiper blade, connection to central water supply.

Can the iku®windows self-cleaning system be incorporated in an existing façade?

Basically iku®windows facades are complete façade systems with integrated self-cleaning mechanism. A refurbishment is possible by adapting vertical profiles to the existing facade, incorporating the cleaning mechanism, according to the individual design.

How is the system's water consumption controlled?
How often does the water tank have to be filled up?

The system is connected directly to the central water supply, so there is no water tank to be filled. The system automatically takes up the amount of water it needs through a magnetic valve.

The required amount of cleaning fluid is added to the water automatically by a central dosing unit. The ratio of cleaning liquid to water is roughly 1:100, depending on water quality, and can be adjusted to suit individual requirements.

Can the water freeze up in the pipes?
Can this damage the system?

The water spray system is controlled by magnetic valves which automatically empty the pipes after use – the system can also be fully emptied manually before the winter – so there is no water to freeze up in the pipes.

On sunny days, the wiper lips become flexible, so the system is able to be operated also at low temperatures. At temperatures below 0°C, however, windows do not get easily dirty: dirt is carried on to the facade by moisture in the air or by rain, and this does not really happen below 0°C to any significant extent.

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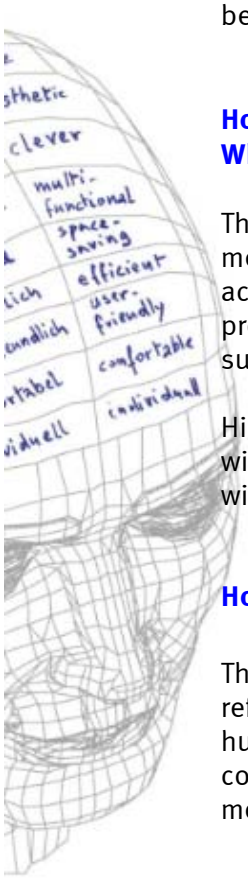
When it has been raining, a rain sensor can operate the wipers automatically. In this case no spraying of the facade is necessary, as the rainwater alone is used.

Does the spray system involve any hazards?
(freezing risk, installation, tolerances etc.)

No, because the liquid is applied through holes made directly in the profile section. So there are no installation problems and no tolerances to worry about. In addition, the nozzles cannot freeze because the system is always kept empty of water by means of magnetic valves.



How long does the spray process generally take?
What are the effects of wind on the spraying process (in high-rise buildings)?

The length of the process depends on the duration of the spraying. A longer spraying process means that the water containing the cleaning liquid is distributed in the most effective way across the facade, as the water runs downwards over the facade. The length of the spraying process and the application of the wipers can be coordinated by the electronic control system to suit individual requirements.

High winds can badly affect the spraying process. In high-rise buildings in particular, strong winds are a fairly frequent occurrence. This problem can be solved quite easily by incorporating a wind sensor. Then the cleaning system does not operate above an adjustable wind speed limit.

How does the system cope with excessive heat?

The system was tested for heat endurance at Dubai airport for 5 months, as well as at several reference projects in the Middle East. At temperatures of up to +50 degrees Celsius, 95% humidity, and the extreme conditions caused by airborne sand, the motor and the electronic control systems were exposed to the external environment, which is not normally the case. After 5 months the system was still working perfectly!

What is the long-term experience of the system?
How long is the system expected to last?

iku® windows – the intelligent facade has been in operation in several climatic zones for some years. In addition, all the components of the facade system have been in use in other applications for many years. For example, we use standard production motors from the car and engineering industries. The drive elements and toothed belts have been used for many years in engineering, where they are subjected to considerably greater stresses and are in continuous operation. The belt is made of top-grade synthetic material strengthened by 10 stainless steel wires for greater strength.

How long is the system designed to last? (signs of wear and tear)

The system is designed to last as long as the façade, with a necessary annual maintenance. A system guarantee is given only in connection with a maintenance contract. Movable and wear parts are exchanged within this contract.

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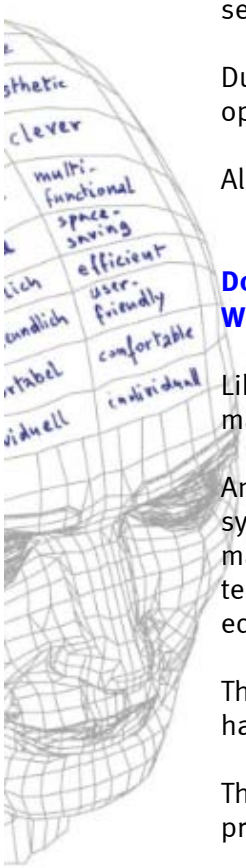
How long do the wiper blade and spring last?
In general, how easy is it to replace these wear parts?

The life of the wiper blade depends mainly on the frequency of use, like as car windscreen wiper.

The relatively rapid material fatigue that occurs in a windscreen wiper is caused by UV radiation. Although the iku® wiper is made of the same high grade material as a windscreen wiper, it is not exposed to UV radiation when in the non-operating position, because it goes inside an end profile section when not in use. So it is protected against solar radiation.



Durability tests have shown that the wiper lip should be exchanged roughly after 10.000 m operation distance.

All wear parts are easy to replace.

Does the system require any maintenance?
What maintenance work is necessary?

Like any other mechanical system, iku® windows – the intelligent facade requires regular maintenance.

An obligatory annual service, covered by a maintenance contract, does ensure the extended system guarantee. Maintenance work is simple to carry out, and is specified in a maintenance manual. The maintenance involved is considerably simpler and cheaper than the TÜV (German technical inspection agency) testing that must be carried out by law on moving cradle or crane equipment.

The maintenance for the self-cleaning mechanism can be done from inside. The access to wipers has to be considered in the planning.

These parts can be replaced easily when necessary. An appropriate maintenance contract can provide guarantees that exceed statutory requirements.

How will damaged glasses be changed?

For the Structural Glazing façade as well as for the Unitized façade, the exchange of damaged glass is possible, because the glasses are fixed mechanical without use of silicone.

iku®windows developed a facade maintenance unit to carry huge panes to any desired position in the façade, even at upper floors, in a hamper from outside. So an easy change of glasses from the inside can be done at any level of the building.

What are the general tolerances that have to be considered when installing the system?

Basically, the requirements for building the iku® system are the same as for traditional facade systems.

The systems are designed in accordance with the standard unfinished shell tolerances of +-20 mm.

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These variations between the unfinished state and the intended dimensions are incorporated into the design of the primary construction. This is normally done by using a combination of horizontal and vertical slotted holes.

The adjustment of the cleaning system and the iku® windows profile system is done in accordance with engineering tolerances. However, these are already incorporated in the system by the precision components, and do not affect the construction of the facade.

How does the system work in case of glass ageing (deformation)? Is effective cleaning still possible?

The wiper is fitted with a flexible spring-pressure system that is able to compensate for variations of up to 5 mm (!) in the levelness of the glass surface. Large panes of glass are not flat even when new. The pressure-spring system easily compensates for any unlevel areas.

Furthermore, the main cause of defects in older glass is infrequent or nonexistent cleaning: dirt caused by airborne pollutants is becoming increasingly damaging. iku® windows therefore actively helps to counteract glass ageing.

Can satisfactory cleaning be achieved even where windows are very dirty or are particularly contaminated (e.g. bird droppings)?

Because the cleaning system is so easy to use – at the touch of a button – windows will never get dirty, as they can, effectively, be cleaned every day. However, the system has proved effectiveness even on extreme levels of dirt. In a test carried out at the airport in Dubai, a test area of the facade was not cleaned for 5 months. The resulting layer of sand and exhaust fumes was cleaned completely by operating the cleaning process twice.

Bird droppings are particularly difficult to remove because they become very hard when they dry out. The risk of drying out is minimised by regular cleaning, but even when dry the droppings can be removed by repeated wiping, especially as the possibility of manual operation oft the system enables the wiper to be directed precisely to a specific area that is particularly dirty.

What can be done to prevent cleaning from being carried out in certain situations (e.g. open windows, freezing temperatures)?

The system's electronic control options can prevent cleaning in certain risk situations.

1. Freezing: the electronic control system could incorporate a lock to prevent operation at temperatures below freezing.

2. Open windows: the simplest way to deal with this is by using the central control system. A centralised link ensures that the cleaning process is not put into operation when windows are open.

Any other special situations can be taken into account at the planning stage.

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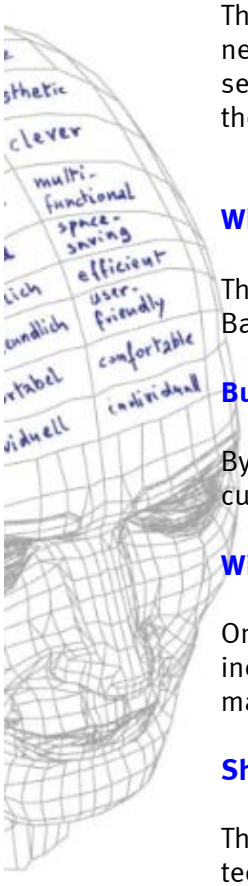
Does the system cause smears and scratches on the glass?

The system gives a highly effective cleaning result without smearing. This is because the spring-loaded wiper adjusts itself closely to the surface and applies the best wiping pressure to the glass, even on areas that are slightly uneven. Unlike manual cleaning there is no smearing. However, the cleaning process should not be activated during solar radiation (as when cleaning manually) as the water dries of too quickly and the effect could be smears on the glass.

The possibility to control the quantity of water and/or the number of cleaning cycles to suit the needs of each individual project means that there is no scratching of the glass. The system can be set to suit individual requirements, first of all to spray water on to the facade, and only then to start the wiper movement, either from top to bottom or from bottom to top as preferred.



What are the limits of the system?

This question is covered in detail in our technical catalogue.
Basically, though, the system is able to meet the following requirements:

Building height:

By linking several system units together, the system can cope with buildings of any height. We currently offer a system height of about 60m within one system.

Width of glass:

One wiper can cover a continuous surface of approximately 2 m; narrower panes can be dealt with inexpensively by using multi-span wipers. The current limit is a wiper covering 3 panes, with a maximum width of 4.8 m.

Shape of glass:

The system is able to clean straight windows, and can be used even if the panes are curved. Wiper technologies that are also capable of cleaning triangular or trapezoidal panes are possible on a project basic.

External profile sections:

The iku® windows cover cap system is compatible with all available systems by simply replacing the external cover sections to the iku®windows technology incorporating the cleaning mechanism. The horizontal cover sections are also replaced – the special design enables the spring-loaded wiper to negotiate even the horizontal sections.

The iku® windows structural glazing system is a total system, and has no external profile sections.

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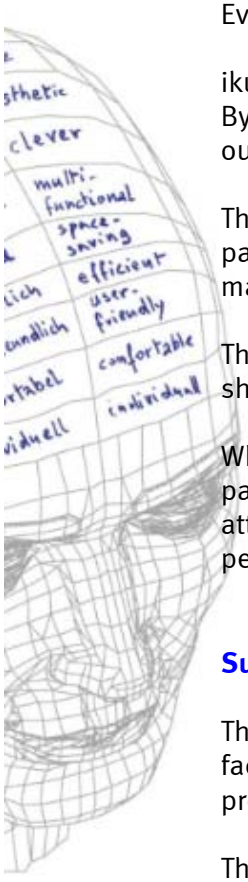
A multifunctional façade attracts the viewer

High-rise buildings create several challenges, which should be considered by the architects already in the planning stage: Cleaning of the façade, necessary change of damaged glasses and maintenance work.

iku®windows is able to solve all these problems and offers additional solutions:

Evacuation of people in case of disaster.



iku®windows is able to support the protection of the façade against influences of fires:
By increasing the pressure of the water spraying, originally intended for cleaning only, the outside surface of the façade can be protected from fire and smog.

The iku® windows facade system is also perfect for cleaning of integrated photovoltaic and solar panels. Dirty solar panels lose up to 50% efficiency in energy production. Solar energy is the future market in energy production.

The iku®windows system components ensure that the wipers can easily move also behind shading and louvers, as well as behind lightening systems.

When the cleaning action is in process on a building it definitely attracts the attention of people passing by: in the case of prestigious buildings this is a desirable benefit. With creative ideas the attention of passengers could be increased: Lightened wipers for cleaning procedure at night, perhaps accompanied by music (“wiper ballet”).

Summary

The iku® windows system enables any building to be cleaned at the touch of a button. Glass facades, above all, demonstrate the image of the building's owners and users. Dirty glass facades present an undesirable image to the outside world and cause annoyance to the users and tenants.

The use of the iku® system involves no special structural requirements. The iku® windows system avoids the disturbing use of cradles and does not spoil the visual appearance of the building.

Even where access to facades or glass roofs is difficult, there is no need to provide any special facilities for crane trolley access.

Existing facades can also be upgraded up to a certain height, bringing useful financial benefits.

The investment pays for itself quickly, and the system's ease of use is a substantial benefit.

References are available.
For any further information needed, we will be happy to be of your assistance.

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