SYSTEM SOLUTIONS
FOR SOPHISTICATED ARCHITECTURE

CURTAIN WALLS / INTEGRATION WINDOWS

RAICO
Every façade is different...
Based on its consistent modular design, the THERM+ curtain wall system provides you with nearly unlimited possible combinations of its various components. With this unique flexibility, you will find the most suitable, safe, viable, and economic solution for every individual project.

- Thermally insulated curtain wall
- Passive house (certified)
- Structural glazing
- Burglary resistance WK2
- Burglary resistance WK3
- Glass roof down to 2° inclination
- Passive house (certified)
- Structural glazing
- Fire resistance EI30
- Burglary WK2
- Burglary WK3
- Exterior gasket with integrated adaptable thermal insulation
- Reliable sealing and effective insulating in one component
- Height 9, 21 or 39 mm for step by step adaptation of the Uf value
- Efficient energy conservation due to Uf values down to 0.8 W/m²K
- Simple assembly with the pressure profile
The THERM+ aluminium curtain wall stick systems combine a maximum application range with straightforward planning and manufacture, providing high processing reliability due to the consistent modular technology.

**THERM+ A-I**

- All profiles for mullion and transom
- Extremely solid T connections
- Glass weight up to 400 kg
- Thermal insulation down to $U_f=0.8 \text{ W/m}^2\text{K}$

**THERM+ A-V**

- Extremely solid T connections
- Glass weight up to 550 kg with German general approval
- Extremely rigid connections due to a spreader-clamping mechanism when fixing with screws
- Ideal for the pre-fabrication of transportable units in the workshop
- Perfect optical T-connections due to an optimum contact between mullion and transom over the entire profile
- The T-connectors can be used as profiles for structural reinforcement, head or sill connections and for profile joints.

**The special advantages**

- Economic solutions and maximum energy conservation due to adaptable thermal insulation with Insulation bloc gaskets, with $U_f$ values down to 0.8 W/m²K
- Wide selection of structural profiles in box and in tee-shape
- All profiles can be used for mullions and transoms, thus minimizing waste in production and optimising stock
- Perfect optical appearance even when using mullions and transoms of the same depth
- Maximum structural values of the profiles due to optimised design
- Solid T-connections in various options
- Comprehensive range of accessories for all applications

**Technology in detail**

A distinctive feature of the THERM+ aluminium curtain walls is their innovative T-connection technology. Every single detail has been analysed in its development to provide an abundance of advantages:

- The connectors are identical for THERM+ A-I and THERM+ A-V and for all system widths
- Easy butt joint with straight profile cuts, no notching required
- Various options for structural requirements and assembly methods
- T-connectors for vertical loads up to 550 kg with German general approval
- Extremely rigid connections due to a spreader-clamping mechanism when fixing with screws
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**THERM+ A-I**

- System width 50 and 56 mm
- Box profile depth 23 - 200 mm
- Expansion profile depth 75 - 200 mm
- Tee profile depth 50 - 200 mm
- Profiles in tee shape 75 - 50 mm
- Joint thickness 4 – 64 mm
- Glass weight up to 300 kg
- Drainage levels up to 4,5°
- Glass roofs down to 2° inclination
- Conservatories yes

**THERM+ A-V**

- System width 50 and 56 mm
- Box profile depth 25 - 200 mm
- Expansion profile depth 100 - 175 mm
- Tee profile depth 50 - 200 mm
- Profiles in tee shape 50 - 50 mm
- Joint thickness 4 – 64 mm
- Glass weight up to 400 kg
- Drainage levels 2 or 3
- Polygonal assembly up to 45°
- Glass roofs down to 2° inclination
- Conservatories yes

**System testing / Approvals / CE system declarations acc. to BS/EN 13830 product standard curtain walling**

- Thermally insulated curtain walling down to $U_f = 0.95 \text{ W/m}^2\text{K}$
- Wind resistance 2500 Pa / 3200 Pa
- Positive / negative wind resistance 1,875 / 2,813 kN/m²
- Resistance against impact inside I5, outside E5
- Air permeability AE 1950
- Water tightness static / dynamic RE 1200
- Airborne sound insulation $R_w (C; C_{tr}) = 41 (-3; -7) \text{ dB}$
- Fall protection yes, without additional measures
- German general approval Z-14.4-454
- British general approval Z-14.4-504
- German general approval T-connector Z-14.4-461
- British general approval T-connector Z-14.4-461
The THERM+ steel curtain wall system combines the advantages of structural steel profiles with those of a continuous aluminium screw channel. This offers virtually endless design possibilities due to the free choice of steel profiles available on the market, or those individually produced. The special THERM+ application technology, featuring no metal components in direct surface contact to each other, guarantees the best possible protection against corrosion.

**THERM+ S-I**

for curtain walls, conservatories and sloped glass roofs with an inclination down to 2°, applied on any steel profile from 50 mm width.

**THERM+ tee-shape steel profiles**

are ideal for slim sightline structures with their width of 60 mm and depth of 60, 90 or 120 mm. Further special profiles available on request.

**THERM+ S-I base profile options**

Integrated aluminium screw channel within stainless steel shroud or, when galvanizing, with posterior insertion in a mild steel shroud

**THERM+ S-I interior gasket options**

Type “S” with lateral fixation on a synthetic base profile.

Type “L” with lateral fixation and extension to cover the radius of steel tubes.

Type “D” for direct placement on the steel profile.

The special advantages

- Efficient thermal insulation, gradually adaptable down to $U_f = 0.8 \text{ W/m}^2\text{K}$
- Application on any structural steel profile from 50 mm width
- Entire load compensation tested and approved by the German Building Institute, including the weld connections, the glass loads and the screw fixations
- Safe and simple glass load compensation for infill weights up to 800 kg, with additional components up to 1500 kg
- Possibility of heated curtain walls with hot water circulation
- Special system solutions for screwed transom fixture without visible screws
- Spot-welding fixation for reduced production times
- High screw retention values and smooth screw fastening due to the aluminium screw channel
- Easy and efficient fabrication with practical system tools

### Technical data

<table>
<thead>
<tr>
<th>THERM+ S-I</th>
<th>THERM+ S-I</th>
</tr>
</thead>
<tbody>
<tr>
<td>System width</td>
<td>50, 56 and 76 mm</td>
</tr>
<tr>
<td>For steel profiles from</td>
<td>50 mm system width</td>
</tr>
<tr>
<td>Steel profiles in tee shape</td>
<td>60 mm system width, 60 / 90 / 120 mm depths</td>
</tr>
<tr>
<td>Infill thickness</td>
<td>4 – 64 mm</td>
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<tr>
<td>Glass weight</td>
<td>up to 1500 kg</td>
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<tr>
<td>Drainage levels</td>
<td>2 or 3</td>
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<tr>
<td>Polygonal assembly</td>
<td>up to 45°</td>
</tr>
<tr>
<td>Glass roofs</td>
<td>down to 2° inclination</td>
</tr>
<tr>
<td>Conservatories</td>
<td>yes</td>
</tr>
</tbody>
</table>

System testing / Approvals / CE system declarations acc. to BS/EN 13830 product standard curtain walling

- Thermal insulation down to $U_f = 0.8 \text{ W/m}^2\text{K}$
- Wind resistance positive / negative 2000 Pa / 3000 Pa
- Air permeability $AE (>600)$
- Water tightness RE 1050
- Acoustic sound insulation $R_w (C; C_{tr}) = 41 (-3; -7) \text{ dB}$
- Fall protection yes, without additional measures
- German general approval glazing system Z-14.4-446
The THERM+ timber curtain walls provide a thousandfold approved glazing technology for application on structural frames made of any timber based material from 50 mm width. For a sustainable and lasting function the consistent system design assures a strict separation between the structural and design levels made of timber and the functional components made of aluminium and EPDM.

### THERM+ H-I

- For curtain walls, conservatories and sloped glass roofs with an inclination down to 2°, thus also ideal for any type of timber-aluminium conservatory

### Coupling mullion

An ideal aid for efficient assembly. Pre-fabricated frames can be finished in the workshop with split coupling mullions, base profiles, interior gaskets and glass supports. On site these frames are simply coupled, glazed and finished with pressure profiles.

### THERM+ H-V

is ideal for slim-line, economical curtain walls, with reduced interior gasket dimensions.

### Timber cover profiles

can be executed in a sustainable and dependable way with THERM+. The glazing technology is based on aluminium and EPDM components. The decorative timber profile is retained by a hidden aluminium profile.

### The special advantages

- Fast and simple screw fixation of the base profile, also possible with the use of an automatic screw gun
- Smooth screw fastening due to the aluminium screw channel
- No components going directly from the exterior into the wood

### Technology in detail

Especially in the case of timber curtain wall, the connection between mullion and transom must fulfil specific requirements. The dead load of the infill units lies in front of the timber structure, and the connectors must compensate for this torsional effect as well as the wind pressure and suction forces. RAICO offers a connector system which has been developed specifically for this application and approved by the German Building Institute.

- **Three versions:**
  - **SOLO** for glass weights up to 248 kg
  - **KOMBI** for glass weights up to 596 kg
  - **INTEGRAL** for glass weights up to 694 kg

- **For THERM+ H-I and THERM+ H-V**

- **For transom depths between 60 and 300 mm**

- **Minimum preparation:** only a notching in the transom and drilled holes in the mullion

- **Simplified assembly:** fix mullion and transom element, insert transom, secure transom with nail screws, finished.

- **Automatic flush position of the transom due to the integrated stop element**

- **Pre-fabrication of transportable units possible in the workshop**

- **Perfect T-connections due to pressure between transom and mullion over the entire depth**

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### Technical data

- **System width:**
  - THERM+ H-I: 50, 56, 76 mm
  - THERM+ H-V: 50 and 56 mm

- **Infill thickness:**
  - THERM+ H-I: 4 – 64 mm
  - THERM+ H-V: 10 – 64 mm

- **Glass weight:**
  - THERM+ H-I: up to 450 kg
  - THERM+ H-V: up to 400 kg

- **Drainage levels:**
  - THERM+ H-I: 2 or 3
  - THERM+ H-V: 2 or 3

- **Glass roofs:**
  - THERM+ H-I: up to 45°
  - THERM+ H-V: up to 45°

- **Conservatories:**
  - THERM+ H-I: yes
  - THERM+ H-V: yes

### System testing / Approvals / CE system declarations acc. to BS/EN 13830 product standard curtain walling

- **Thermal insulation:**
  - THERM+ H-I: down to Uₜ = 0.8 W/m²K
  - THERM+ H-V: down to Uₜ = 0.8 W/m²K

- **Wind resistance:**
  - THERM+ H-I: 2500 Pa / 3200 Pa
  - THERM+ H-V: 2500 Pa / 3750 Pa

- **Resistance against impact:**
  - THERM+ H-I: inside 15, outside E5
  - THERM+ H-V: inside 15, outside E5

- **Air permeability:**
  - THERM+ H-I: AE 1950
  - THERM+ H-V: AE

- **Water tightness:**
  - THERM+ H-I: RE 1200
  - THERM+ H-V: RE 2100

- **Airborne sound insulation:**
  - THERM+ H-I: Rₜ₁₀(C,Cₜ₁₀) = 41 (-3; -7) dB
  - THERM+ H-V: Rₜ₁₀(C,Cₜ₁₀) = 51 (-1; -5) dB

- **Fall protection:**
  - THERM+ H-I: yes, without additional measures
  - THERM+ H-V: yes, without additional measures

- **German general approval:**
  - THERM+ H-I: glazing system 2.16.4.455
  - THERM+ H-V: glazing system 2.16.4.516

- **German general approval:**
  - THERM+ H-I: T-conneector 2.9.1.621
  - THERM+ H-V: T-conneector 2.9.1.621
GLASS ROOFS

The curtain wall systems THERM® A-I, S-I and H-I for aluminium, steel and timber structures provide ideal characteristics for the erection of glass roofs. The tried and tested RAICO glazing and sealing technology assures a safe and easily executable solution for any construction and roof shape with an inclination of down to 2 degrees.

- Tested with an inclination of 2 degrees
- For all roof shapes
- Efficient and reliable fabrication and assembly

The special advantages

- The system structure is identical to the THERM® standard systems, providing glass roofs with the same characteristics and applications as curtain walling
- Tested with an inclination of only 2 degrees, with outstanding results and classifications
- Accessories such as sun protection devices and building connection components were included in the testing
- The execution is feasible with special bevelled pressure profiles, flat pressure profiles, silicone joints or any combination of these
- Openings at the end of the pressure profiles drain screens and prevent stagnant water
- Execution possible in burglary prevention class WK2 and WK3
- For ventilation or smoke and heat control the insertion window WING 105 D, also tested with an inclination of 2 degrees, presents a technically viable and optically perfect solution
- Results for a glass roof tested with an inclination of 2 degrees:
  - Resistance against wind load: 2000 Pa / 3000 Pa
  - Air permeability: AE (> 600 Pa)
  - Water penetration: RE 1050

CONSERVATORIES

CLIMA

The CLIMA conservatory system is an extension of the THERM® curtain wall system. It offers well-studied detail solutions with perfect optical appearance and the maximum of individual design possibilities. Only a few additional multifunctional items turn the curtain wall system into a complete and comprehensive conservatory system. The execution is feasible in unitised assembly with window units in the vertical area or as a stick system construction.

- Maximum application safety
- Perfect design in all areas
- Comprehensive range of accessories

The special advantages

- Maximum processing reliability and functional safety for all conservatory designs
- Only a few multifunctional components enable the entire fabrication without any folded aluminium sheet or special profiles for nearly all conservatory types
- Very attractive design with slim frame widths
PASSIVE HOUSE CURTAIN WALL

Simply by supplementing Insulation bloc P, a THERM® standard curtain wall becomes a passive house curtain wall. Additional cost and work is minimised, allowing for the fitment of energy generating glass façades to passive houses in a generous and economic way. The sophisticated insulation technology makes this quality possible from a system width of only 50 mm.

The special advantages

- Possibility with all THERM® series
- Certified by the European Passive House Institute
- Feasible from 50 mm system width
- Supplementation of the standard system with Insulation bloc P

The special advantages

- The systems THERM® H-I and THERM® H-V are certified by the European Passive House Institute in Darmstadt
- All THERM® series achieve peak values in thermal insulation (see table)
- The execution is especially air-tight (blower-door testing)
- Certified with triple glazing of 44 mm infill thickness, argon gas filling and acrylic spacer

Thermal insulation values

<table>
<thead>
<tr>
<th>THERM® A-I</th>
<th>THERM® A-V</th>
<th>THERM® S-I</th>
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<tbody>
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<td>System width</td>
<td>50 and 56 mm</td>
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<td>50, 56 and 76 mm</td>
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</tr>
<tr>
<td>Uₚ</td>
<td>0.8 W/m²K</td>
<td>0.8 W/m²K</td>
<td>0.8 W/m²K</td>
<td>0.9 W/m²K</td>
</tr>
</tbody>
</table>
| *Certified by the European Passive House Institute as passive house component

STRUCTURAL GLAZING CURTAIN WALL

The THERM® Structural Glazing curtain walls offer the most slim-line glazing technique. Only a fine silicone joint remains between the double glazed sealed units. The fixation of the interior screen is realized in a simplified, efficient and reliable way by means of a special toggle. The sophisticated insulation design leads to outstanding thermal insulation values, which achieve even passive house quality.

The special advantages

- Feasible with all THERM® series
- Very efficient thermal insulation
- System width 50 or 56 mm
- Combination possible with pressure profiles or suction discs

The special advantages

- Can be combined with any of our other system variations, with any pressure profiles and also with suction discs if preferred
- Efficient and safe glass fixation with special structural glazing toggles that engage in an aluminium profile in the edge of the glass spacer
- The Insulation bloc SG provides an exceptional thermal insulation (Uₚ = 1.4 W/m²K with 32 mm glazing, 0.9 W/m²K with 44 mm glazing) and solid backing for the silicone joint
- Executable with all THERM® series in the system widths 50 and 56 mm
- For double or triple glazing, from 32 to 52 mm thickness
- Both vertical and glass roof application available

Thermal insulation values

<table>
<thead>
<tr>
<th>THERM® A-I</th>
<th>THERM® A-V</th>
<th>THERM® S-I</th>
<th>THERM® H-I</th>
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FIRE RESISTANT CURTAIN WALL

Only minor additions to the THERM® base systems are required to execute THERM® as a fire resistant curtain wall in various protection classes. The maximum size of the panes provides a new dimension in fire protection: with the tested and approved panes of 1500 x 3000 mm in vertical and horizontal format even storey high glazing is possible. The visual appearance of the fire resistant curtain wall is identical to the standard systems.

The special advantages
- The design of fire protection curtain wall in aluminium and timber is identical to the standard systems, thus requiring a minimum of additional cost and fabrication effort.
- No visual difference between the variations.
- All standard structural profiles and interior and exterior gaskets can be applied, leading to production and assembly as efficient as with the standard systems.
- Maximum freedom in design with any cover profile.

Technical data:

<table>
<thead>
<tr>
<th>THERM® A-I</th>
<th>RAICOTHERM S-I</th>
<th>THERM® H-I</th>
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<tbody>
<tr>
<td>System width</td>
<td>50 and 56 mm</td>
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</tr>
<tr>
<td>Fire resistance class</td>
<td>class EI 30</td>
<td>class G 30</td>
</tr>
<tr>
<td>Max. glass formats</td>
<td>1500 x 3000 mm, Horizontal and vertical</td>
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BURGLARY RESISTANT CURTAIN WALL

Complemented by only a few additional system components any of the THERM® curtain wall series can be executed with burglary resistant properties in classes WK2 or WK3. For a maximum freedom in design any of the system widths and all pressure profiles with visible screws or with cover profiles as well as the flat pressure profile (WK2) can be applied. For glass roofs the execution in class WK2 and WK3 is possible, too.

The special advantages
- The execution of glass roofs in class WK2 only by the use of additional shimming with glass carriers and balls in the screw heads, for WK3 a supplementary pressure profile reinforcement and reinforced screw fixing in the screw channel.
- No visual difference between the variations.
- Execution identical to the standard system, thus production and assembly as rational as with the standard systems.
- Wide selection of pressure and cover profiles.
- System width and infill thickness as with standard systems.

| Resistance class WK2 and WK3 | Visual appearance identical to the standard systems | Only a few additional components | Many opening windows in WK2 available |

Aluminium: Insertion profile with silicate insert, short pieces of s/s reinforcement for pressure profiles, intumescent fire protection strip in the rebate.

Steel: base profile, interior gasket, s/s reinforcement for pressure profile.

Timber: short pieces of s/s reinforcement for pressure profiles, intumescent fire protection strip in the rebate.

Technical data:

<table>
<thead>
<tr>
<th>THERM® 50 / 56 A-I</th>
<th>THERM® 50 / 56 S-I</th>
<th>THERM® 50 / 56 H-I</th>
</tr>
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<tbody>
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Additional items to the standard system:
- Aluminium: Insertion profile with silicate insert, short pieces of s/s reinforcement for pressure profiles, intumescent fire protection strip in the rebate.
- Steel: base profile, interior gasket, s/s reinforcement for pressure profile.
- Timber: short pieces of s/s reinforcement for pressure profiles, intumescent fire protection strip in the rebate.

RAICOTHERM 50 / 56 S-I

THERM® 50 / 56 S-I

THERM® 50 / 56 H-I
System solutions for sustainable architecture and window production

With its modular composition, innovative system components and adaptable thermal insulation FRAME+ sets new standards.

Energy conservation using maximum thermal insulation:
- Innovative insulation bar technology made of our special material THERMORIT with improved thermal properties
- Adaptable U<sub>f</sub> value down to 1.0 W/m²K for economic applications as well as maximum energy conservation

Freedom in design with multiple application possibilities:
- Five variations from a modular system base with a profile range which is compatible for all series
- Extensive design options due to a multitude of profiles and accessories
- Visible or concealed system hardware for various opening types

High quality and reliable processing:
- All thermally broken profiles* can be powder coated and anodised, leading to easier and more efficient materials management and production
- Simplified planning, logistics and fabrication due to a consistent modular composition with identical components, accessories, fittings and multifunctional tools

The innovative FRAME+ system concept with its modular composition gives you a choice of three window series. The system profiles consist of identical interior and exterior aluminium extrusions and can be adapted to the required depth and thermal insulation by selection of the THERMORIT insulation bars. The major benefits of this consistent modular technology are:
- Simplified planning due to the identical profile and application range in every system depth and insulation option
- The processing steps, tools and accessories like corner cleats, gaskets and hardware are identical for all series and provide an efficient production in highest quality, multifunctional and reduced tool deployment and simplified materials management.

FRAME+ 65 W
System depth 65 mm, U<sub>f</sub> down to 1.7 W/m²K, optimised thermal insulation with THERMORIT insulation bar technology

FRAME+ 75 W
System depth 75 mm, U<sub>f</sub> down to 1.6 W/m²K with THERMORIT insulation bar technology and co-extruded insulating block medial gasket

FRAME+ 75 W-I
System depth 75 mm, U<sub>f</sub> down to 1.0 W/m²K with THERMORIT insulation bar technology, insulating block medial gasket and insulation inserts

*FRAME+ 75 W-I profiles only available with surface treatment
**FRAME⁺**

**One system - multiple applications**

- **Punched opening window**
- **Curtain wall window**
- **Concealed sash**
- **Window wall**

**Aluminium window system FRAME⁺**

- System depth 65 or 75 mm
- Adaptable $U_f$ values down to 1.0 W/m²K
- For punched openings or for integration in curtain wall
- Comprehensive range of profiles and accessories for various outer and sash frame options
- Wide choice of structural and expansion mullion profiles
- Available with Meeting stile frames
- Two different applications for FRAME⁺ 75 W-I

**Option concealed sash FRAME⁺**

- High-insulation window with $U_f$ down to 1.5 W/m²K
- System depth 75 mm
- Application as window for punched openings or, with outer frame extension, for integration into curtain wall
- No visible glazing beads
- Very slim visual appearance
- Available with Meeting stile frames

**Option window wall FRAME⁺ 75 FF**

- Window wall system with stick system appearance and an external visual width of only 50 mm
- Ideal for economic ribbon windows up to storey height
- High-insulation window with $U_f$ down to 1.6 W/m²K
- Comprehensive diversity of design with various cover profiles from the THERM⁺ curtain wall system
- Available with Meeting stile frames

**FRAME⁺: Reliability assured by tested quality**

The FRAME⁺ window system has undergone rigorous testing according to the product standard for windows EN 14351.1 and achieved in all tested characteristics the highest classification. These values are at the same time the base for simplified CE marking.

**Test configuration**

<table>
<thead>
<tr>
<th></th>
<th>Aluminium window FRAME⁺ W</th>
<th>Window wall FRAME⁺ 75 FF</th>
<th>Concealed sash FRAME⁺ 75 WB</th>
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</thead>
<tbody>
<tr>
<td>Air permeability</td>
<td>class 4</td>
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<td>class 4</td>
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<tr>
<td>Resistance to wind load</td>
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<td>class C5 / B5</td>
<td>class C5 / B5</td>
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<td>Water tightness</td>
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<td>up to E 1350</td>
<td>up to E 1350</td>
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<td>Operating forces</td>
<td>class 1 and 2</td>
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<td>class 1 and 2</td>
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<td>Capacity for safety devices</td>
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</tbody>
</table>

**FRAME⁺ Quality in detail**

<table>
<thead>
<tr>
<th>FRAME⁺ 65 W</th>
<th>FRAME⁺ 75 W</th>
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<th>FRAME⁺ 75 WB</th>
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<tr>
<td>System values</td>
<td></td>
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<td>$U_f$-Wert in W/m²K</td>
<td>1,9</td>
<td>1,6</td>
<td>1,3</td>
<td>1,7</td>
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<tr>
<td>(for width of 117 mm)</td>
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<td>Bautiefe</td>
<td>65 mm</td>
<td>75 mm</td>
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<td>Applications</td>
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<tr>
<td>Wandfenster</td>
<td>X</td>
<td>X</td>
<td>X</td>
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</tr>
<tr>
<td>Fassaden-Einsatzelement</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Blockfenster</td>
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<tr>
<td>Fensterfassade</td>
<td>X</td>
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<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

**Application limits**

- Max. Gewicht Dreh-Kipp: 130 / 200 kg** 130 / 200 kg** 130 / 200 kg** 130 / 200 kg** 130 / 200 kg**
- Max. Gewicht Dreh: 130 / 200 kg** 130 / 200 kg** 130 / 200 kg** 130 / 200 kg** 130 / 200 kg**
- Max. Gewicht verdeckt liegender Beschlag: 130 kg 130 kg 130 kg 130 kg 130 kg

**Opening options:**

- Turn window
- Tilt window
- Turn-tilt window
- Turn-turn window
- Meeting stile frame

**Hardware options:**

- Standard hardware
- Concealed hardware

**Handle / motor options:**

- Individual commercial handles (with RAICO integration gear)
- RAICO system handles
- Motor operation

**FRAME⁺: High performance thermal insulation**

The 10°C isothermal line remains entirely within the frame (ext. temp. –10°C; int. temp. 20°C)
Examples of FRAME+ aluminium window systems applications.
The sections are shown in FRAME+ 75 W, with identical options available in FRAME+ 65 W and FRAME+ 75 W-I.

Punched opening window  
Curtain wall window

Fixed glazing with insulating block  
Mullion/transom, sash with fixed glazing

Meeting stile  
Head detail with building expansion profile, fixed glazing

Sill detail with base profile and sash

The new freedom in the design of windows
OUTWARD OPENING WINDOW
WING 50 A

This top-hung, side-hung or bottom-hung window is perfectly adapted to the requirements of both modern architecture and effective ventilation or fume extraction. It features a fine frame width, an extremely wide opening angle of 60° and the choice between structural stepped edge glazing or standard insulating glass. WING 50 A offers an optimum solution in terms of design, technology and economy for outward opening top-hung, side-hung or bottom-hung windows.

The special advantages
- Outward opening window in its most attractive design with static adhesion
- Economic alternative with standard glass and slim profile design
- Maximum airflow effect due to an opening angle of 60°
- Concealed hinges, mountable on any side
- Ideal for very large or very high sash formats

Technical data

| Max. width | 2675 mm |
| Max. height | 2200 mm |
| Max. sash weight | 130 Kg (60 Kg side-hung) |
| Opening angle | 60° |
| Infill thickness | 24 - 36 mm |

System testing / CE system declarations acc. to BS/EN 14351-1 product standard windows

Wind resistance | class C5 |
Air permeability | class 4 |
Water tightness | class 9A |
Airborne sound insulation | $R_{wx} = 43$ dB (1-5) |
Burglary resistance | WK2 |

PROJECTING WINDOW
WING 50 SK

The innovative glazing technology of WING 50 SK features a pure glass surface on the outside with structural stepped edge glazing. As a more economic alternative it can be equipped with standard insulating glass and a special, extremely fine frame profile. Due to a very compact frame design both options lead to extremely slim window structures. With its diverse glazing options WING 50 SK windows offer an ideal solution for any project size and application.

The special advantages
- Outward opening projecting window with stepped edge glazing, with or without static adhesion
- Economic alternative with standard glass and slim profile design
- Executable as a natural smoke and heat exhaust ventilator in large sizes, tested with a sash size up to 3.5 m²
- Concealed projection hardware
- Extremely slim profile design
- Stepped edge glazing or standard glazing
- WK2 burglary resistance option
- Smoke and heat control application option

Technical data

| Max. width | 2675 mm |
| Max. height | 2675 mm |
| Max. sash weight | 150 Kg |
| Opening angle | 20° / 45° / 50° |
| Infill thickness | 24 - 36 mm |

System testing / CE system declarations acc. to BS/EN 14351-1 product standard windows

Wind resistance | class C5 |
Air permeability | class 4 |
Water tightness | class 9A |
Burglary resistance | WK2 |
ROOF LIGHT WINDOW
WING 105 D

Its design and technical properties make it a special highlight for glass roofs:
WING 105 D features an extremely tight and secure construction, confirmed by outstanding results in product tests with an inclination of only 2°. The very attractive window design doesn’t present any glass bead, profile joint or screw on the outside, the turn hinges are entirely concealed within the frame profiles. With its opening angle of up to 90°, large sash dimensions and its possibility of single, double or triple glazing WING 105 D is the perfect opening window for virtually any glass roof.

The special advantages
- Two-frame sash design without any visible screws or glazing beads on the outside
- Reliable drainage due to a special profile design and triple sealing system for safe water tightness
- Maximum airflow effect due to an opening angle of 65° (90° available)
- Completely integrated hinges, mountable on any side
- Available as system for self-fabrication or as pre-assembled units
- The perfect complement to the THERM+ curtain wall systems which are also tested with 2° inclination
- Executable as a natural smoke and heat exhaust ventilator in large sizes, tested with a sash size up to 6.0 m²
- New additional option: The highly thermal insulated variant WING 105 D-I

Technical data
| Max. width | 2700 mm |
| Max. height | 2000 mm |
| Max. sash weight | 165 Kg (60 kg side-hung) |
| Opening angle | 65° (90°) |
| Infill thickness | 9 - 48 mm |

WING 105 D
Infill thickness up to 38 mm

WING 105 D
Infill thickness up to 48 mm

WING 105 D-I
Highly insulated

NATURAL SMOKE AND HEAT EXHAUST VENTILATORS
For smoke control and ventilation

Natural smoke and heat exhaust ventilators according to the latest British/European standard BS EN 12101-2 consist of a jointly tested opening unit with a motorised control system. For maximum diversity, the approved WING windows have been tested for this application with the largest possible sash sizes. As a result even extreme requirements can be fulfilled with RAICO systems. All WING windows for smoke control can also be used without restriction for daily ventilation.

The special advantages
- Efficient ventilation and smoke evacuation due to wide opening angles of 60° in the curtain wall and up to 90° in glass roofs
- WING 50 A and WING 50 SK either with standard sealed units or structural stepped edge glazing
- Various outward opening types available
- For curtain walls and glass roofs
- Extremely large sash sizes tested
- Large opening angles
- Windows based on the approved WING systems

Technical data
(system tests according to BS / EN 12101-2 smoke and heat control systems)
| NRWG WING 50 A | NRWG WING 50 SK | NRWG WING 105 D |
| Max. width | 4000 mm / 1200 mm | 2700 mm | 4000 mm / 1500 mm |
| Max. height | 1300 mm / 2200 mm | 1300 mm | 1500 mm / 4000 mm |
| Max. sash surface | 5.2 m² | 3.5 m² | 8 m² |
| Max. sash weight | 130 Kg (60 kg side-hung) | 150 kg | 165 Kg (60 kg side-hung) |
| Max. opening angle | 60° | 20° / 45° / 50° | 65° (90°) |
SERVICE AND PROJECT SUPPORT

For the best possible project execution we consider it as our task to develop and produce practical systems fulfilling all the requirements for architecture and fabrication to the highest degree. As a matter of course we provide a comprehensive consultation service which includes every step of a project from the initial sketch to completion on site, thereby offering you sustained maximum support.

You can avail yourself of the following extensive services:

- Project consultation in the planning stage for architects and engineers
- Field consultation service for clients
- Individual commercial and technical support, such as technical details or development of special profiles
- Intensive training and instruction in the workshop and on site
- Efficient and reliable supply and materials management
- Comprehensive consultation service
- Support in all phases of the project
- Specific project solutions
- Special profiles
- System independent software

Example of a special profile development

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- Special profiles
- System independent software

Example of a special profile development

Leisure centre Karlsruhe

The objective of close cooperation in partnership is a successful conclusion to a project for all those involved. We are pleased to be able to contribute to such a success with our high-quality profile systems, our comprehensive service and our individual project solutions, as the following examples demonstrate.

Capricorn House

“Shuffle” aluminium curtain wall

Office building Thansau

Heated steel curtain wall

Transom detail reception hall
Every façade is different ... we provide an individual solution