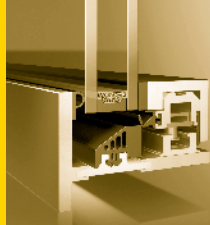


MHB



AESTHETICS AND SUSTAINABILITY

SL30-ISO[®] PROFILE SYSTEM

TECHNICAL DOCUMENTATION



WWW.MHB.NL



1. SL30-ISO[®] AND SL30-ISO-PLUS[®]

Sustainability is getting worldwide more and more the attention it deserves. We at MHB are convinced of thinking and acting sustainably, which is shown in the materials we use and the products we make from them. Therefore we use steel as our basic material; strong and sustainable, and an inspiration for MHB for over 70 years.

After years of development, MHB and Montanstahl AG together have created the SL30-ISO[®] steel profile system in which the qualities of steel have been optimally integrated to make a slim and sustainable profile system. We have applied all knowledge and experience in professional steel profile systems. The result is the slimmest profile system on the market, fully thermal-insulated and 100% wind and watertight. Various ingeniously devised technical solutions were developed and patented specially for this system.

The most recent innovation is our SL30-ISO-PLUS[®] profile system: a super-slim profile system with insulation values that are equalled by only few other systems. SL30-ISO-PLUS[®] insulates better than any commonly used (and much broader) profile systems in aluminium and wood.

Moreover, the steel we use for our profile systems is made from 100% recycled steel.

CONTENTS:

1. GENERAL INTRODUCTION

2. SL30-ISO[®]

| | |
|---|----|
| 2.1. Characteristics | 4 |
| 2.2. Thermal insulation | 6 |
| 2.3. Range of application | 8 |
| 2.4. Technical details text | 9 |
| 2.5. Sightline drawings and details | 10 |
| 2.6. Glass enclosures SL30-ISO [®] | 27 |

3. SL30-ISO-PLUS[®]

| | |
|--|----|
| 3.1. Characteristics | 28 |
| 3.2. Excellent thermal insulation | 30 |
| 3.3. Range of application | 32 |
| 3.4. Technical details text | 33 |
| 3.5. Sightline drawings and details | 34 |
| 3.6. Glass enclosures SL30-ISO-PLUS [®] | 43 |

4. RECENT DEVELOPMENTS

| | |
|-----------------------------|----|
| SL30-ISO-ULTRA [®] | 44 |
|-----------------------------|----|



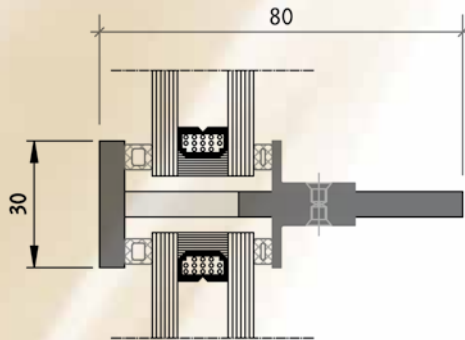
2. SL30-ISO® PROFILE SYSTEM



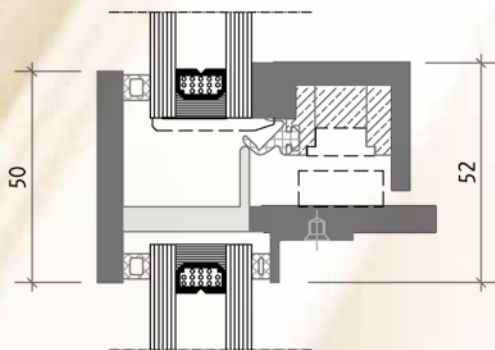
2.1. CHARACTERISTICS

Very slim sightline width of 30 mm

The sightline width is 30 mm for the stiles and rails with glazing on both sides.



The total sightline width for a tilt-and-turn window in frame with glazing on both sides is 50 mm.



See section 2.4. for other dimensions.

Invisible water drainage

SL30-ISO® has no visible water drainage holes.

Excellent thermal insulation

The thermally separated interior and exterior profiles ensure that the SL30-ISO® system has good thermal insulation with matching low insulation values. See also section 2.2.

High strength

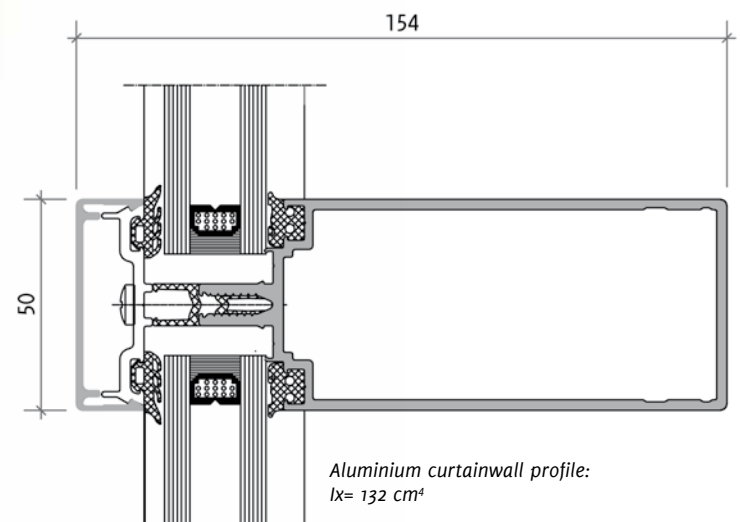
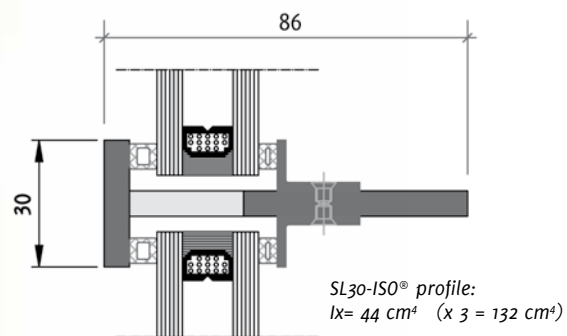
The standard SL30-ISO® profile is slim (30 mm sightline width) and is less deep than the currently known profile-systems, but is still extremely strong. Depending on the intended application, there are several options for profile depths.

| | |
|----------------|------------------------|
| Profile depth: | <i>I_x</i> : |
| 60 mm | 17 cm ⁴ |
| 80 mm | 36 cm ⁴ |
| 86 mm | 44 cm ⁴ |

In relation to common profile systems, these are very high values that can be achieved with relatively small profile depths.

In comparison: an SL30-ISO® Profile with a depth of 86 mm generates the identical bending resistance of an aluminium curtain wall profile with a total depth of 150 mm and a profile width of 50 mm.

By way of comparison: an SL30-ISO® profile drawn to the same scale as an aluminium wall curtain profile with the same bending resistance.



Please note: As the modulus of elasticity of steel is 3x bigger than that of aluminium, the linear moment of inertia of a steel profile can be 3x smaller but still generate the same bending resistance.

Windtightness and watertightness

Despite the fact that SL30 ISO® is very slim, it contains an integrated central seal and hidden water drainage which is fully integrated into the system. This results in a high wind resistance and water tightness.

- 450 Pa for fixed parts and wings; class 8A of EN12208
- 300 Pa for doors; class 7A of EN 12208.

Visibility of edge sealing of insulating glass

Standard insulation glazing cannot be applied in the SL30-ISO® profile system because this system makes the side seal of the insulation glass often visible (a standard edge sealing is often bigger than the sup-

port of the glass behind the flange plus the height of the rubber).

We have worked together with glass suppliers Saint Gobain and AGC to find a solution to this problem whereby not only the side seal is smaller but also the dimension variation in the glass is reduced. In the most extreme situations, when all tolerances are “negative” for visibility of the edge seal, the edge seal has only a visibility of a few millimetres. maximum.

CE Marking

The system is tested and CE certified in all prescribed ways and in conformity with the European product standard EN 14351-1.





2.2. THERMAL INSULATION

In the SL30-ISO® system, the internal and external profiles are thermally separated and have a good thermal insulation with matching low insulation values.

The thermal insulation of a window or a door must be calculated in accordance with EN 10077-1 and -2. The total thermal insulation of a window or a door is determined by the insulation value of the profile and the insulation glass and is calculated with the following formula:

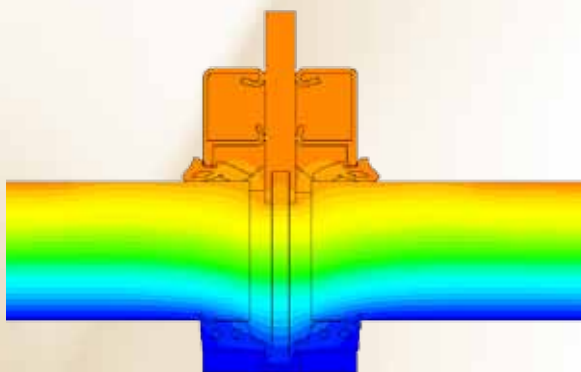
$$U\text{-window} = \%gl * Ugl + \%fr * Ufr + Lg * \text{¶}gl$$

In which:

- U-window** insulation value total window or door
- %gl** surface of the glazed part as a percentage of the total surface
- Ugl** insulation value of the glass
- %fr** surface of the profile expressed as a percentage of the total surface
- Ufr** insulation value of the profile
- Lg** total circumference of the glass / total surface
- ¶gl** indicating the heat loss for edge-sealing the glass.

Ufr - Thermal insulation profile system SL30-ISO®

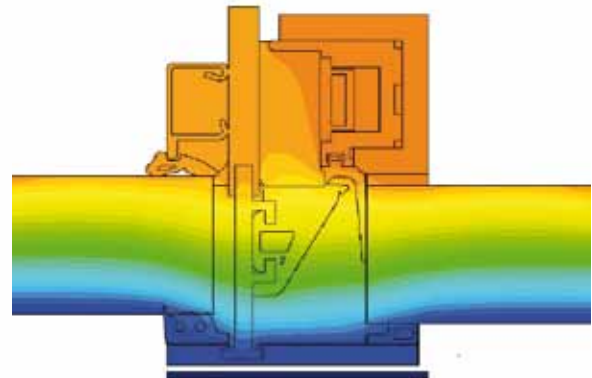
The SL30-ISO® profile series have the following values for thermal insulation U-fr:



SL30-ISO® fixed glazing: **Ufr = 2.55 W/m2K**

(in conformity with EN 10077-2)

Please note: as to thermal insulation, it is almost comparable to Ufr=1.35 W/m2K for a profile with a sightline width of 60 mm with a Ugl=0.5 W/m2K *



SL30-ISO® tilt-and-turn window: **U-fr = 2.79 W/m2K**

(in conformity with EN 10077-2)

Please note: as to thermal insulation, it is almost comparable to Ufr=1.35 W/m2K for a profile with a sightline width of 100 mm with an Ugl = 0.5 W/m2K *

* When comparing these values with other profile systems, please note that Ufr is expressed in Watt per m2.

SL30-ISO® is generally 50% slimmer than a common system. This means that SL30-ISO® insulates much better than a system with the same Ufr but with a broader sightline.

The above values for thermal insulation are calculated in accordance with the current European standards, the EN-ISO 10077-1 and EN-ISO 10077-2.

Ugl - Thermal insulation of glass

Insulation glass with one cavity can be produced with an insulation value of Ugl= 1.0 W/m2.

Improved insulation values can be achieved with so-called triple glazing. These glass panels have two air cavities and can attain extreme low insulation values of Ugl= 0.5 W/m2.

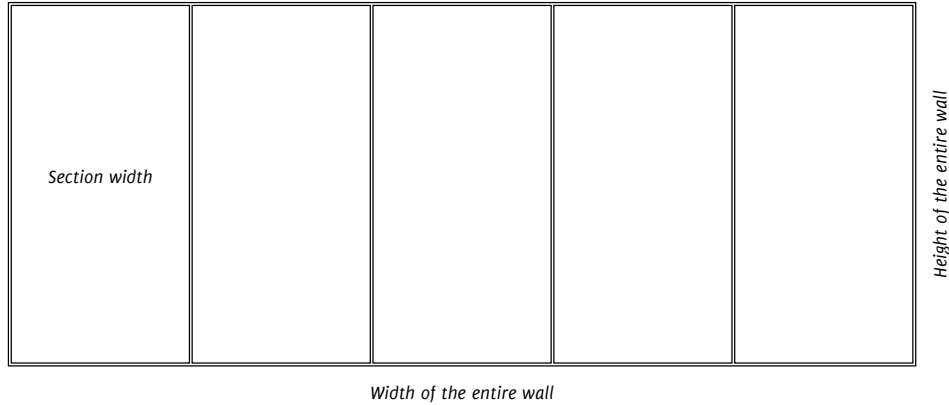


U_w - Resulting insulation value of the entire window

Calculation of thermal insulation value of glass wall consisting of 5 glass panels.

Calculation in conformity of EN 10077-1 and -2.

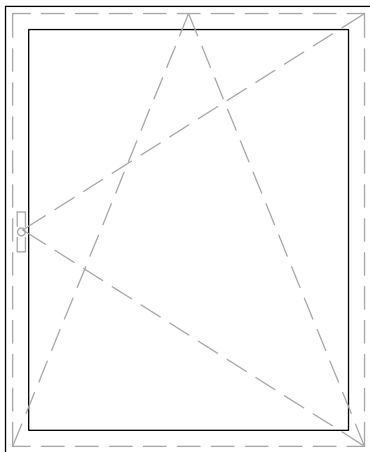
Glass wall with steel sections constructed with SL30-ISO® profiles



Resulting U_w (W/m²K) for different widths and heights of the glass panes

| glass width (mm) | number of sections | total width (mm) | U _{gl} = 1,0 W/m ² K | | U _{gl} = 0,7 W/m ² K | | U _{gl} = 0,5 W/m ² K | |
|------------------|--------------------|------------------|--|---------|--|---------|--|---------|
| | | | glass height 2500 mm | 3000 mm | glass height 2500 mm | 3000 mm | glass height 2500 mm | 3000 mm |
| 600 | 5 | 3000 | 1,31 | 1,3 | 1,04 | 1,02 | 0,85 | 0,84 |
| 800 | 5 | 4000 | 1,23 | 1,24 | 0,98 | 0,96 | 0,79 | 0,77 |
| 1000 | 5 | 5000 | 1,22 | 1,21 | 0,94 | 0,93 | 0,75 | 0,74 |

U_w - Resulting insulation value of the complete tilt and turn window



Resulting U_w (W/m²K) for tilt-and-turn windows with different widths and heights

| glass width (mm) | U _{gl} = 1,0 W/m ² K | | U _{gl} = 0,7 W/m ² K | | U _{gl} = 0,5 W/m ² K | |
|------------------|--|---------|--|---------|--|---------|
| | glass height 1000 mm | 1500 mm | glass height 1000 mm | 1500 mm | glass height 1000 mm | 1500 mm |
| 600 | 1,82 | 1,72 | 1,6 | 1,49 | 1,46 | 1,34 |
| 800 | 1,70 | 1,59 | 1,46 | 1,35 | 1,31 | 1,19 |
| 1000 | 1,62 | 1,52 | 1,38 | 1,27 | 1,22 | 1,1 |





2.3. RANGE OF APPLICATIONS

The following range of application applies to the patented SL30-ISO® system:

Maximum dimensions

- fixed parts: maximum height of 3,3 m
- side-hung windows and doors: maximum height 2,5 m
- tilt-and-turn windows: maximum height 1000 mm and 1500 mm respectively.

Glazing

- interior and exterior glazing.

Glass thickness

For the standard system, the thickness of the glass is maximised to 40 mm. But as we are also the producer of the profiles, on special order we are able to accommodate glass with almost all gauges. Please note: the glass in the tilt-and-turn window can have a thickness of 30 mm at the most (for the SL30-ISO® glued wing).

Moveable parts

- turning inward:
 - tilt-and-turn window
 - side-hung or bottom-turn window
 - Please note that the inward turning door is expected in the 2nd half of 2011
- turning outward:
 - door
 - side-turn or top-hung window.

Please contact us if you wish to order items that do not come within the above range of applications. We always can continue the development of the SL30-ISO® system on the basis of your wishes.

Please note: SL30-ISO® is still developing and other possibilities are added every month.



2.4. TEXT OF THE TECHNICAL SPECIFICATIONS SL30-ISO®



Supplier: MHB bv

Type: profile system MHB SL30-ISO® with invisible water discharge

Wind- and Watertightness: 450 Pa for fixed parts and wings; class 8A of EN12208. 300 Pa for doors; class 7A of EN 12208

Material: bare steel or stainless steel

Dimensions: see the plans (see range of applications)

Partitioning: see the plans (client-specific partitioning of the glass front is possible)

Profile type: steel SL30-ISO® profile, built-in depth 80 mm (see also the details)

Surface treatment: sandblasting, powder-coating and enamelling: zinc epoxy powder primer 40 µm, primer 30 µm, final colour layer thickness 40 µm

Colour: RAL colour according to the colour card

Glazing: double isolationglass, as desired by the architect, fixed with steel glazing beads of 12 mm high, choosing from 4 options (see paragraph 2.6.)

Weatherseals: continuous EPDM rubber profile in frame

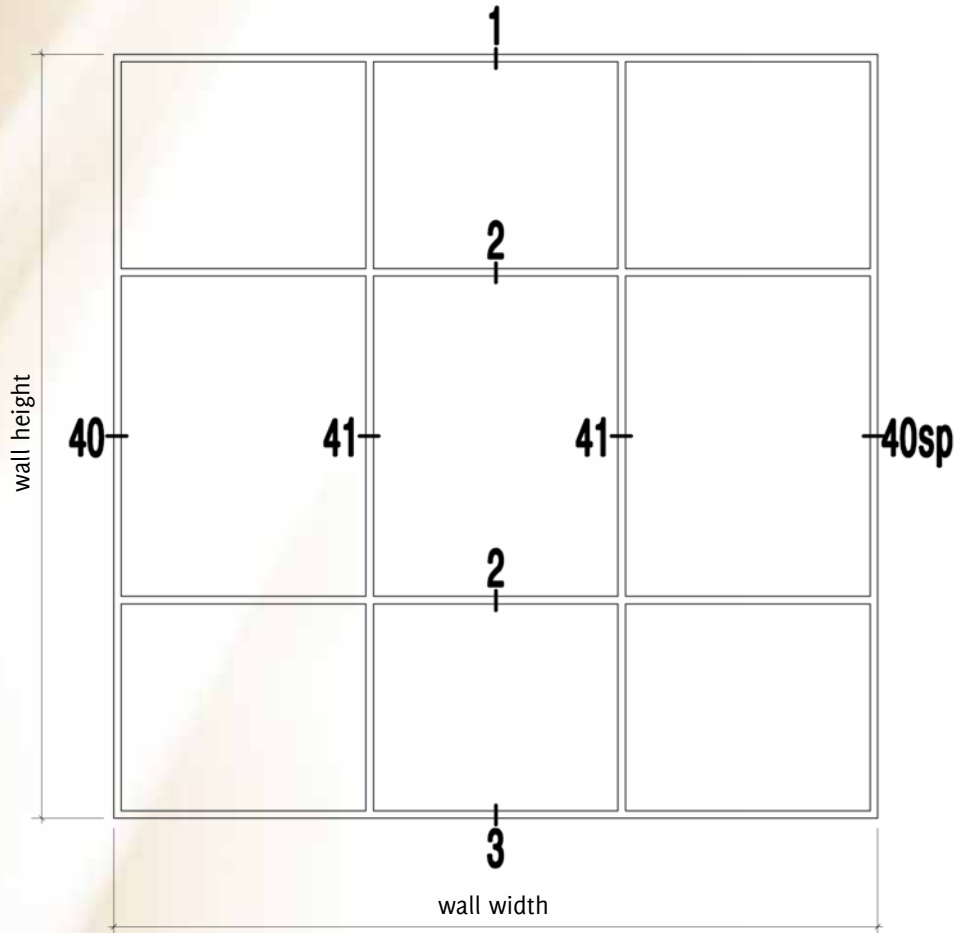
Hinges, locks and handles: side-hung windows are produced with lift-off hinges and lockable window handles. Tilt-and-turn windows are produced with the MHB tilt-and-turn system with lockable window handles. Doors are produced with lift-off hinges, MHB three-point lock and crank-operated night latch bolt and MHB door handle. The passive door of the double door is equipped with 2 edge bolts

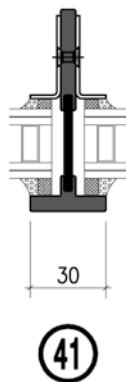
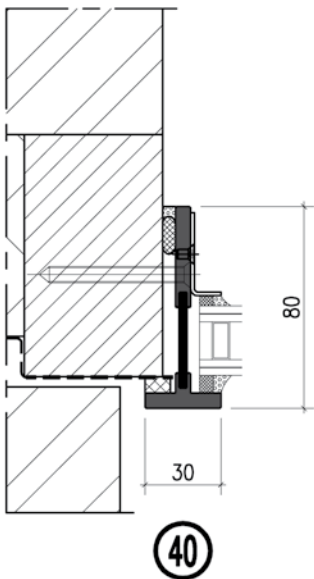
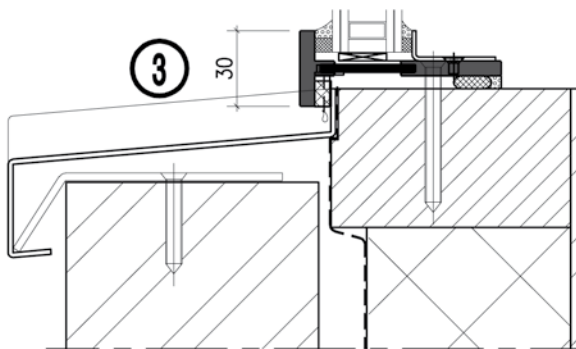
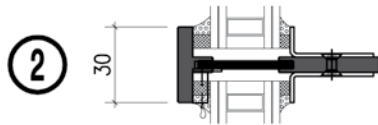
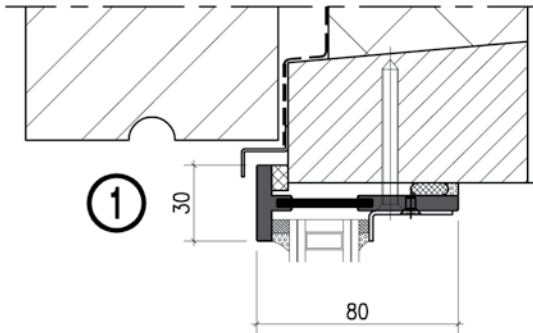
Range of application: Please see above section 2.3.



2.5. SL30-ISO[®] DRAWINGS AND DETAILS

FRAMED GLAZED WALL

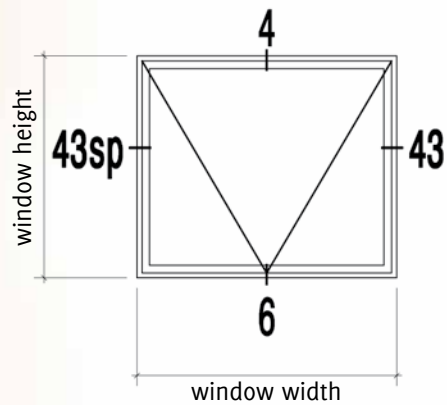
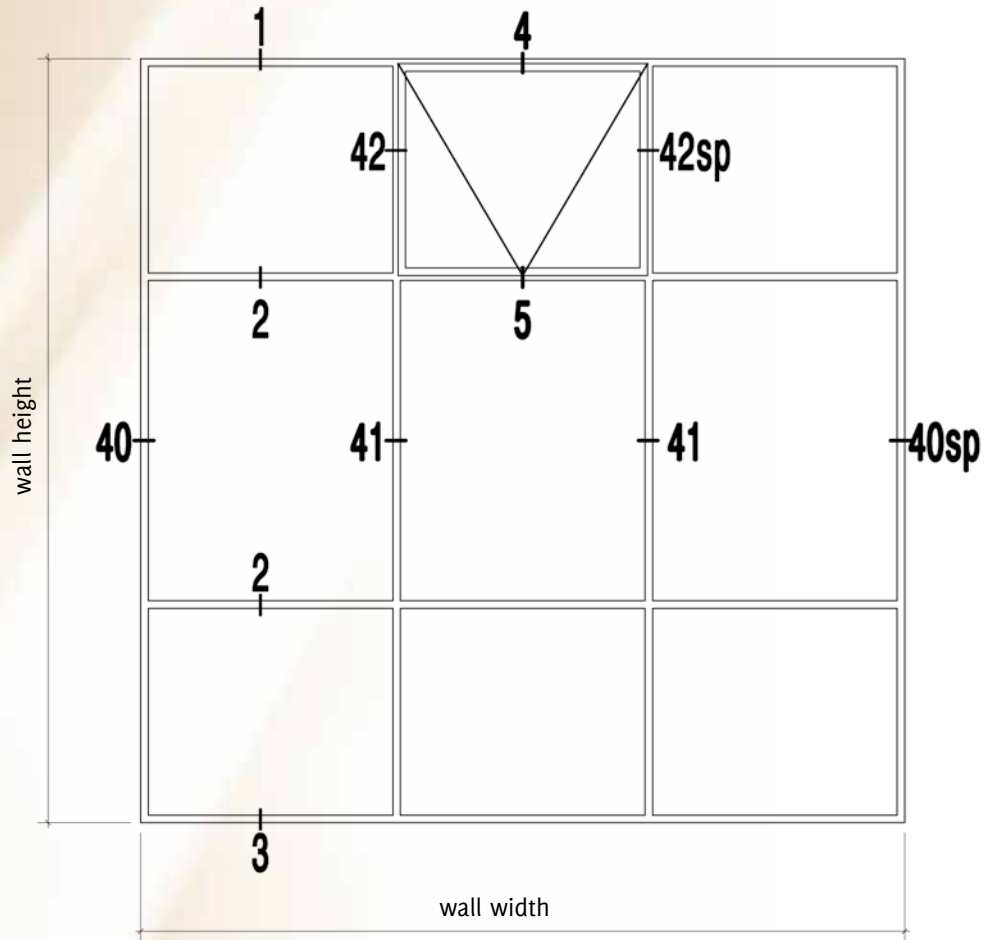




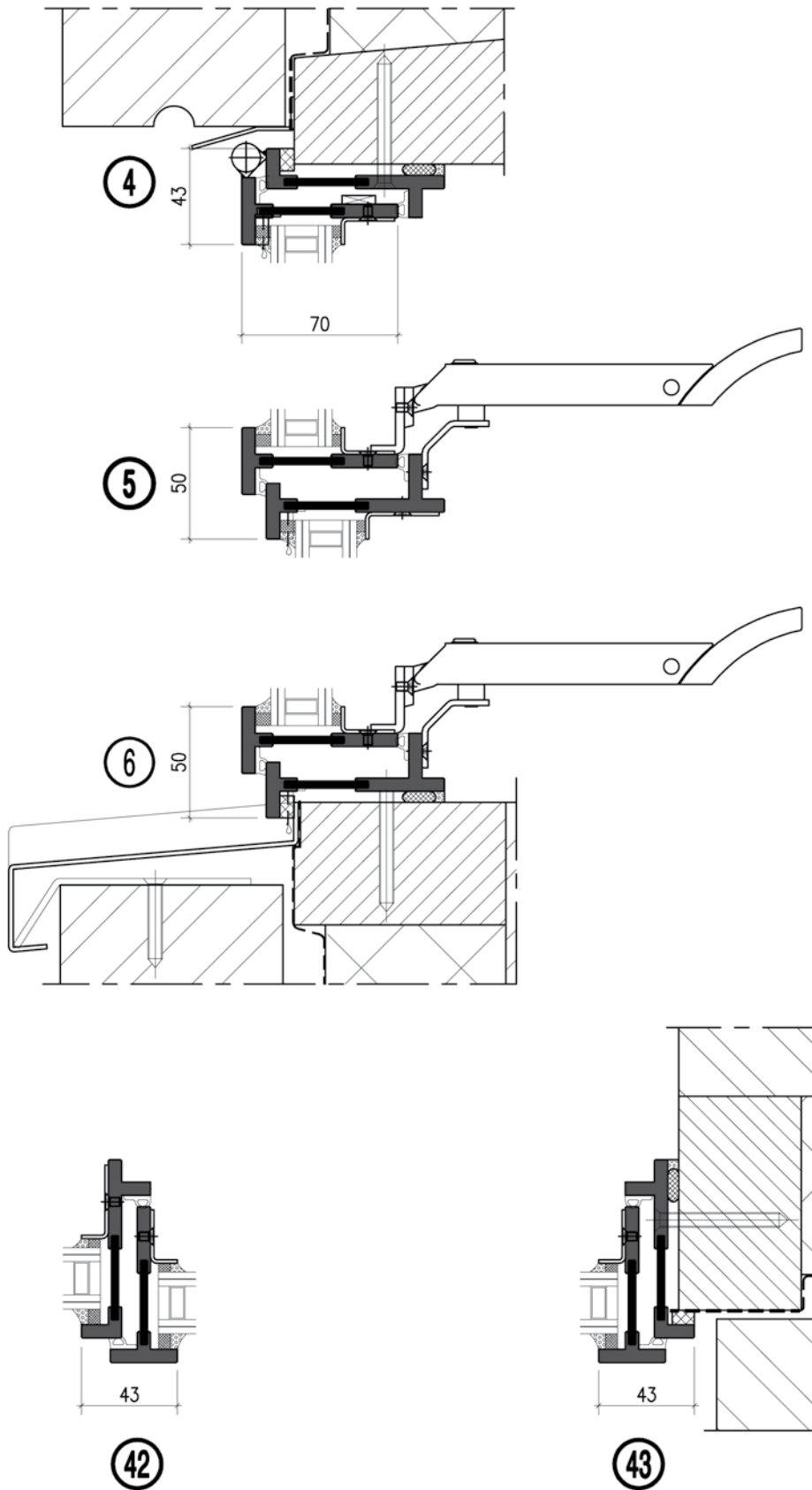
Details for glass retention see section 2.6.



SL30-ISO[®] CANTILEVER WINDOW



SL30-ISO[®] CANTILEVER WINDOW - DETAILS

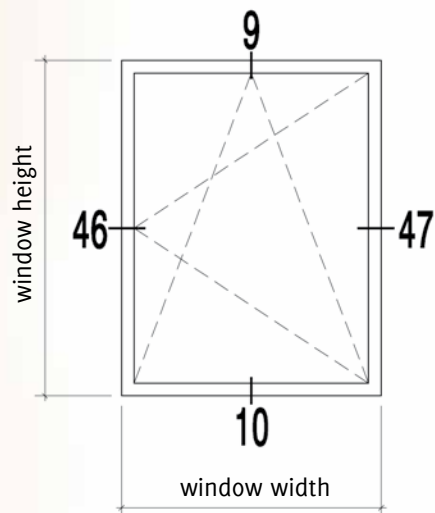
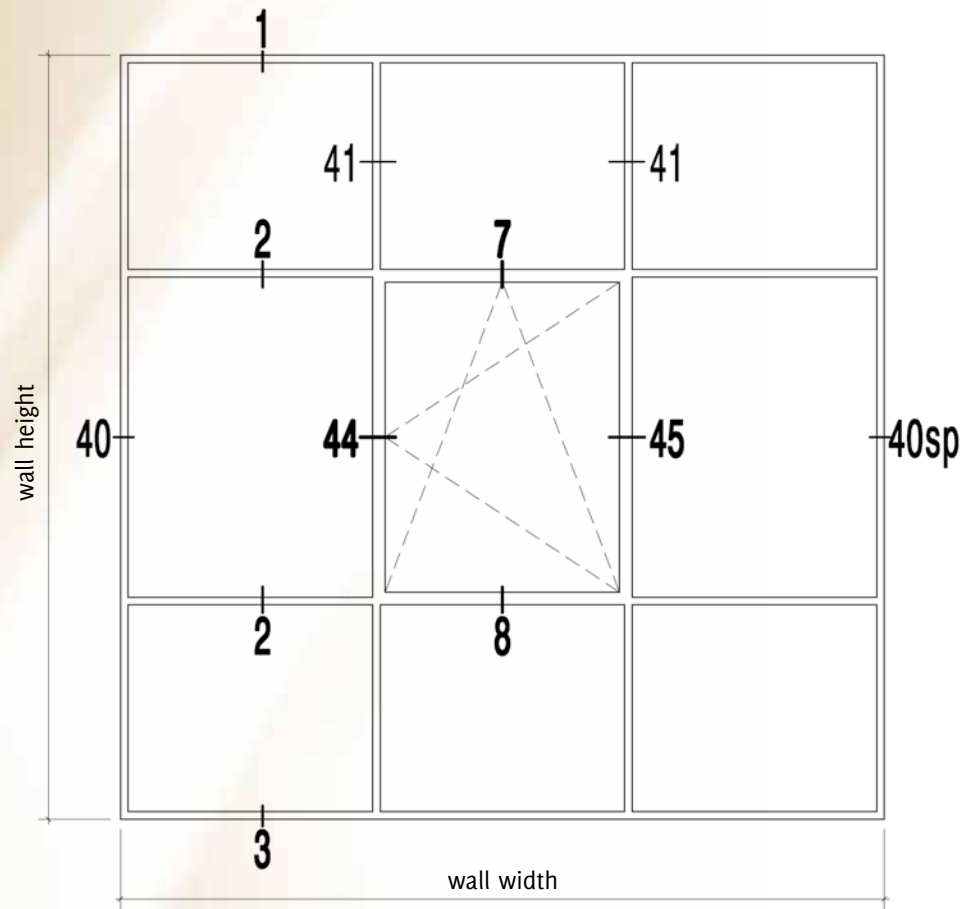


See page 11 for details 1 - 2 - 3 - 40 - 41. Details for glass retention see section 2.6.

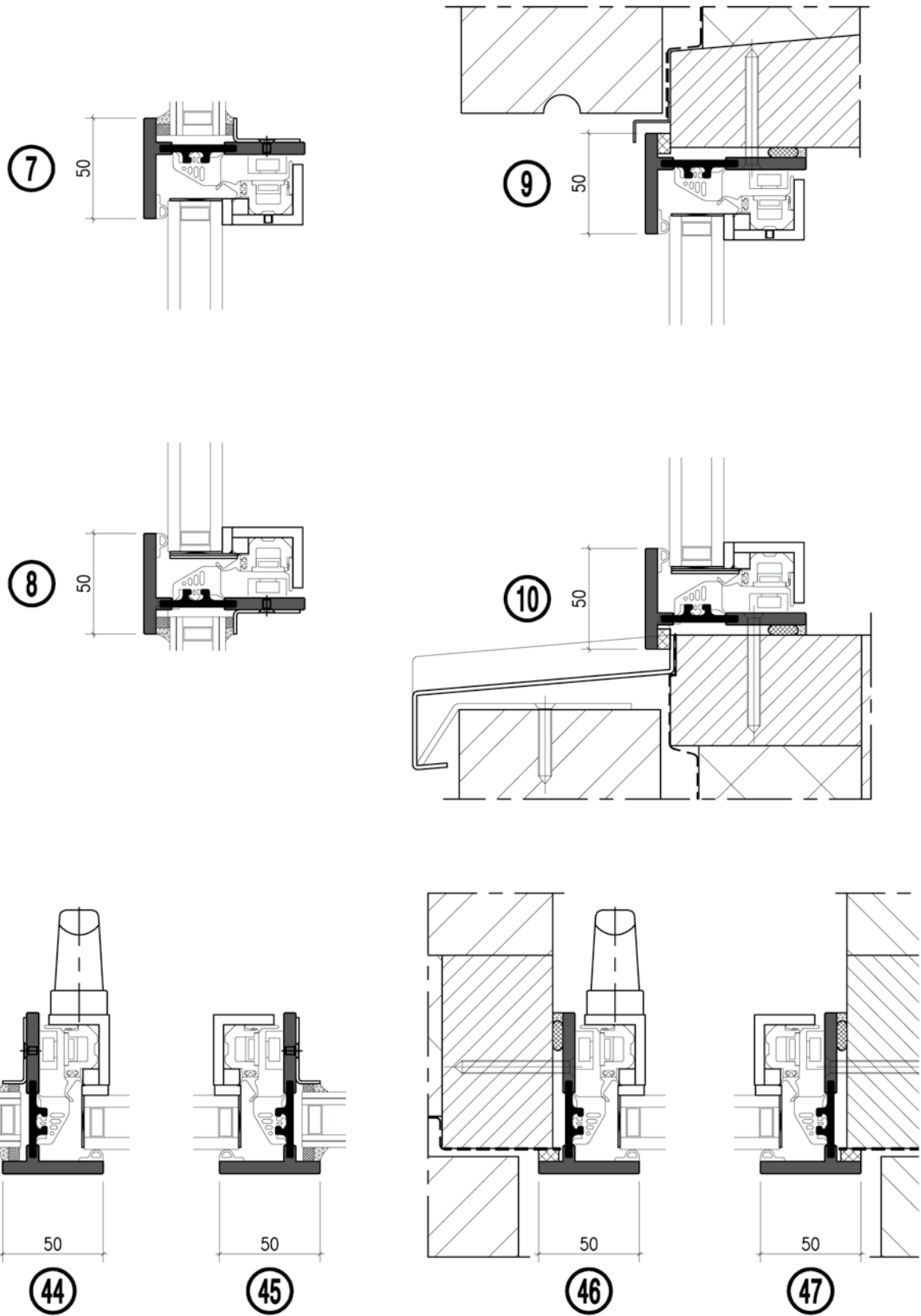




SL30-ISO[®] TILT AND TURN WINDOW

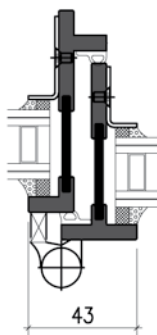
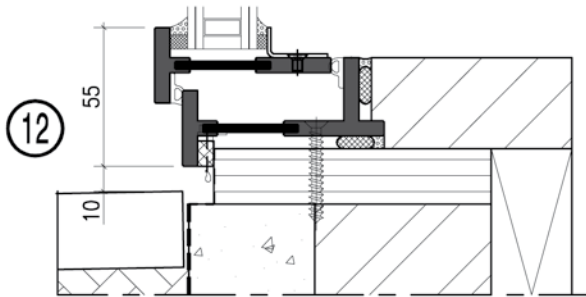
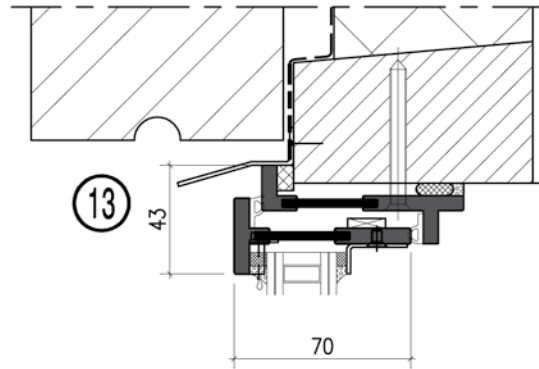
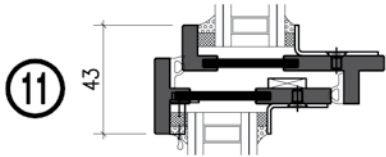


SL30-ISO® TILT AND TURN WINDOW - DETAILS

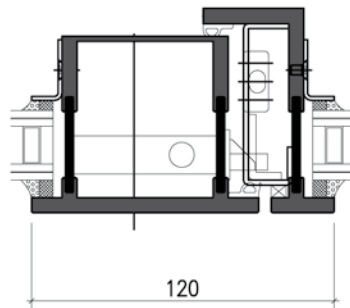


See page 11 for details 1 - 2 - 3 - 40 - 41. Details for glass retention see section 2.6.

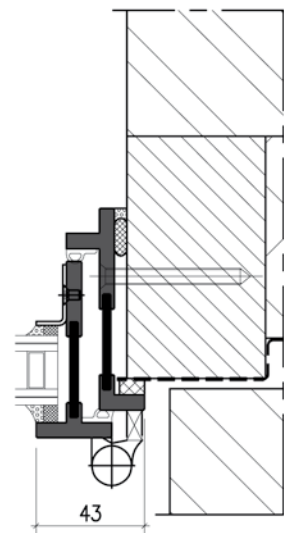
SL30-ISO® DOUBLE DOOR WITH BROAD LOCKING STILE - DETAILS



48



49



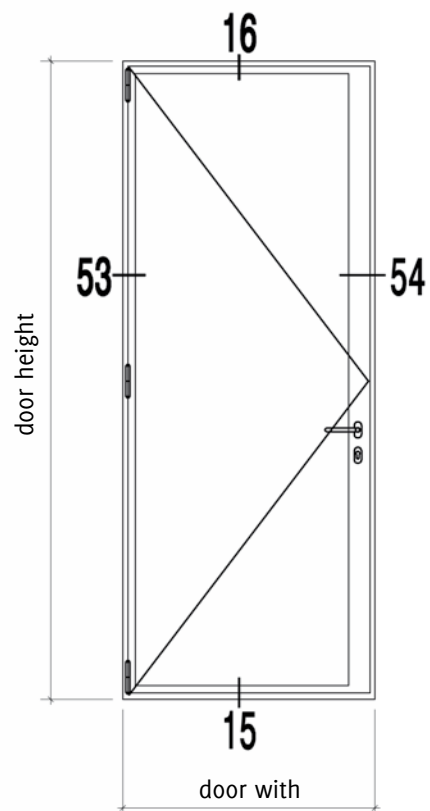
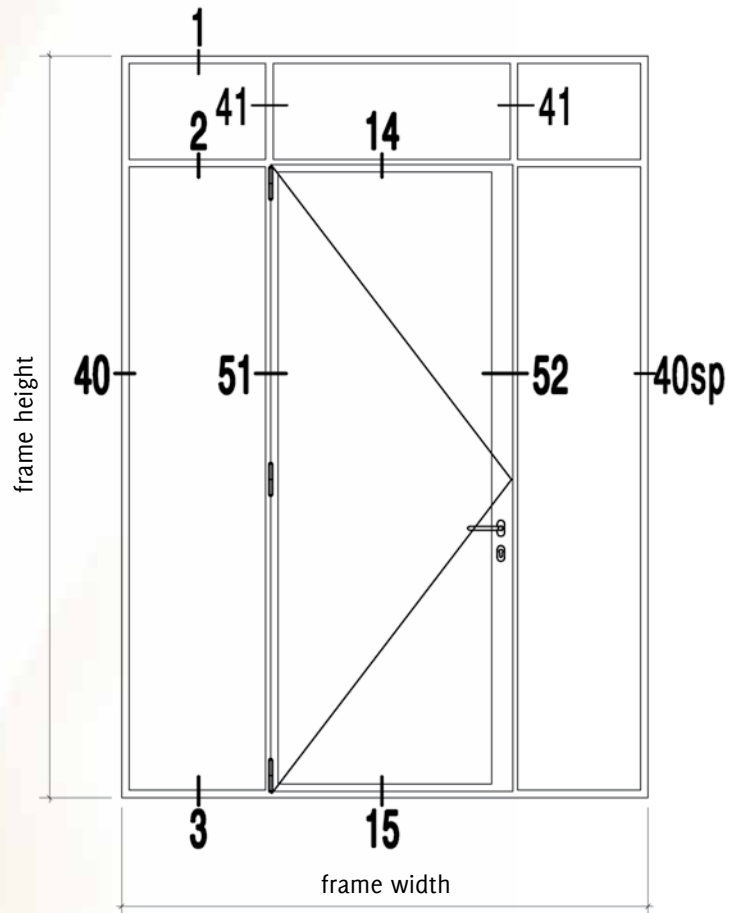
50



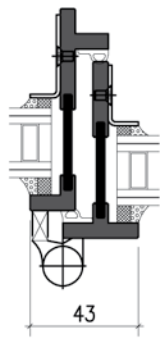
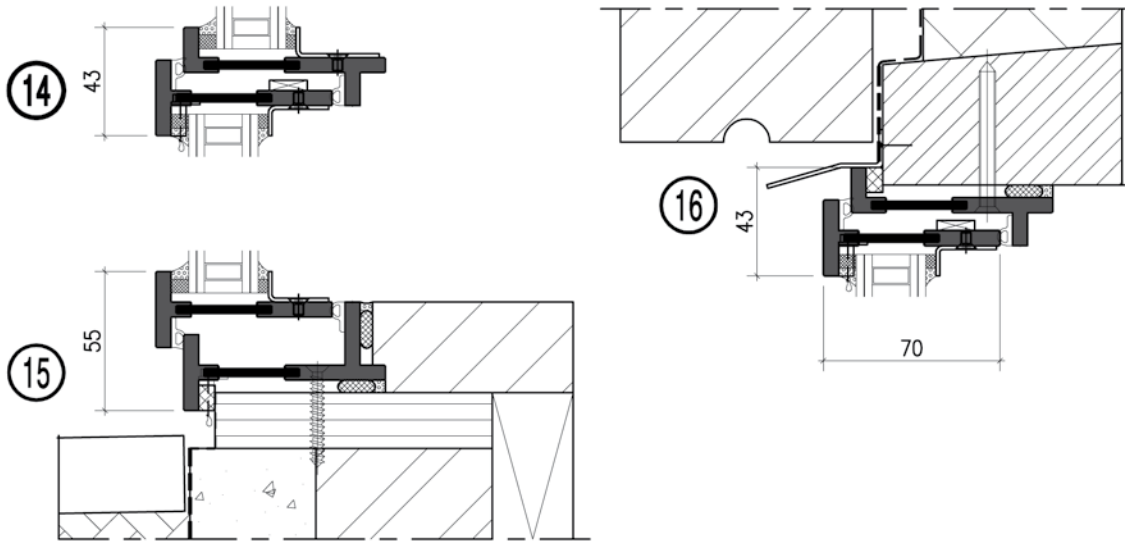
See page 11 for details 1 - 2 - 3 - 40 - 41. Details for glass retention see section 2.6.



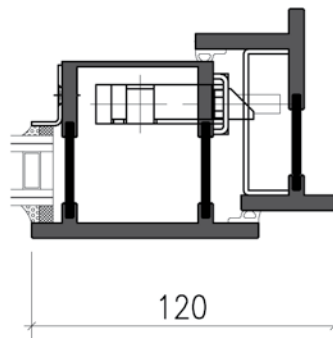
SL30-ISO[®] SINGLE DOOR WITH BROAD LOCKING STILE



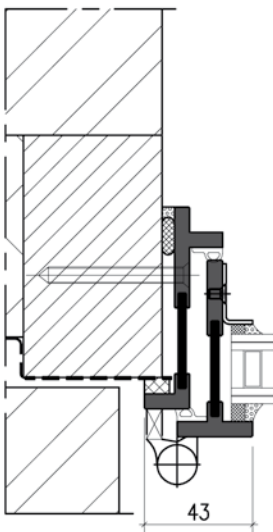
SL30-ISO® SINGLE DOOR WITH BROAD LOCKING STILE - DETAILS



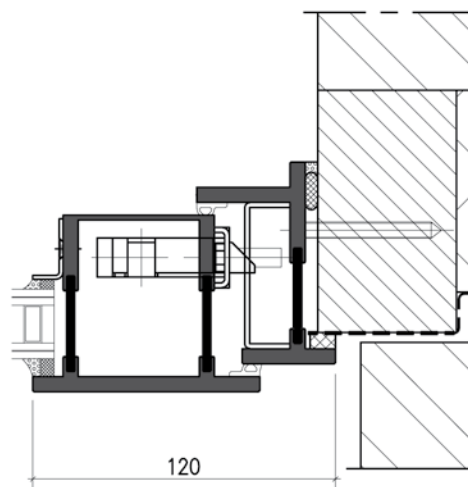
51



52



53



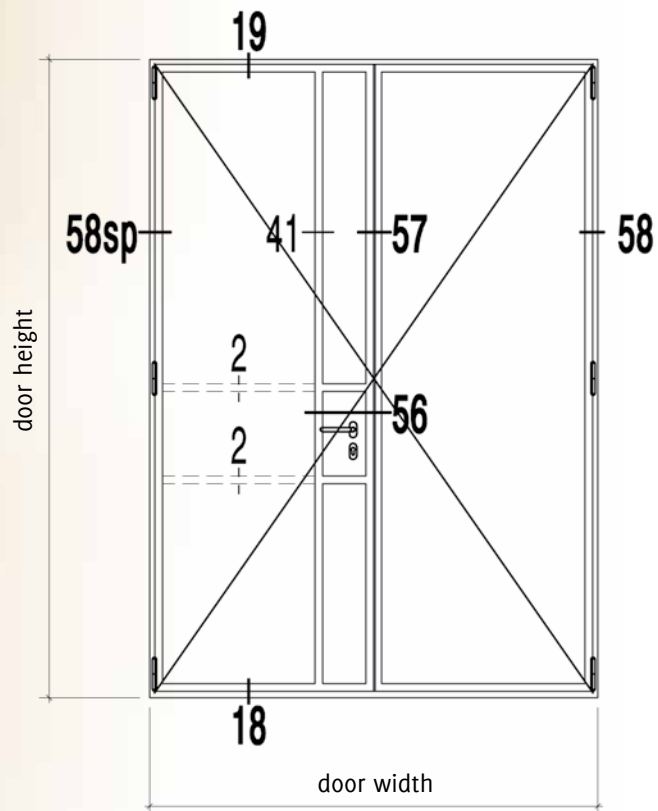
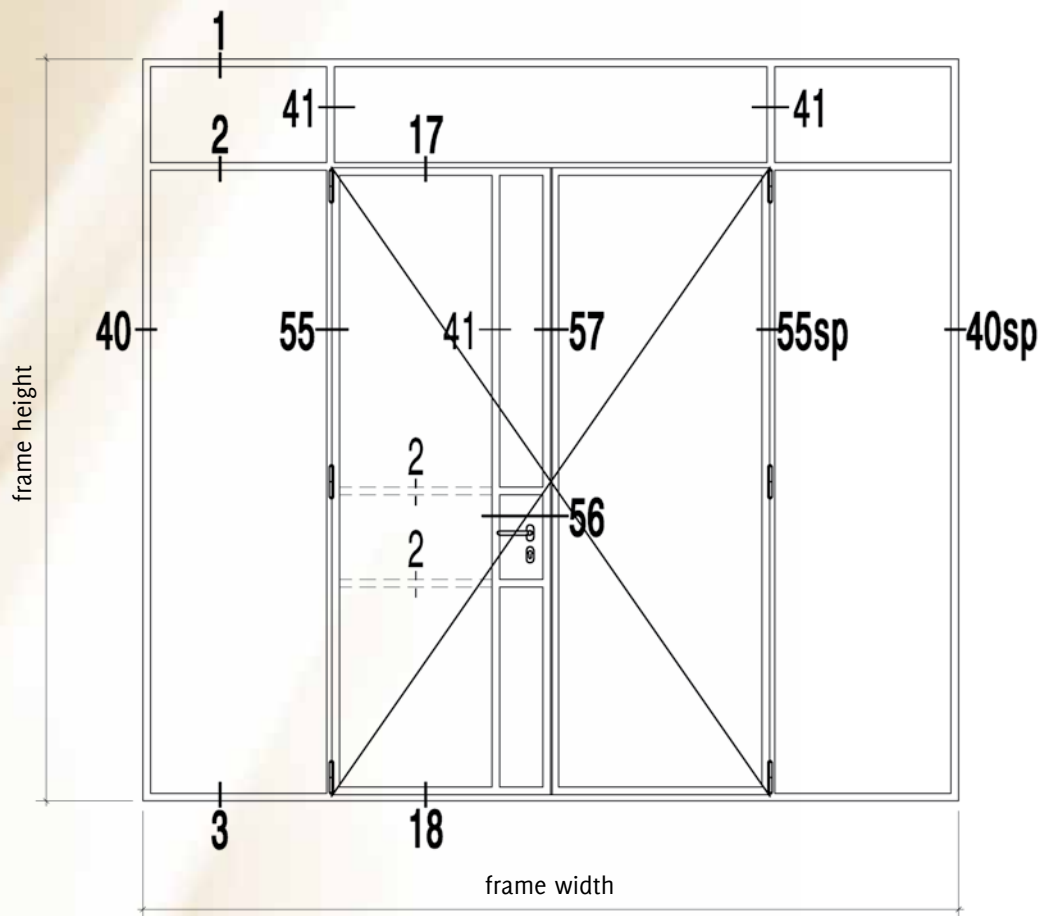
54

See page 11 for details 1 - 2 - 3 - 40 - 41. Details for glass retention see section 2.6.

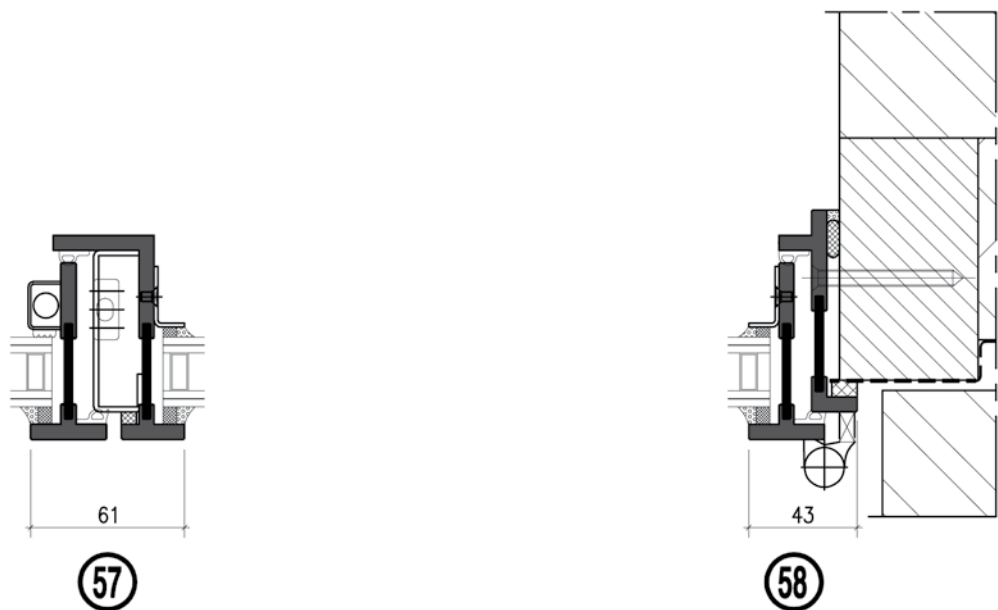
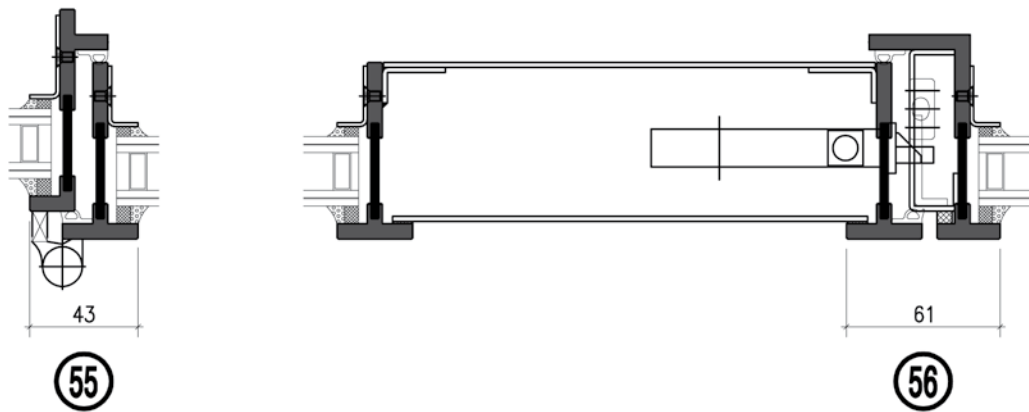
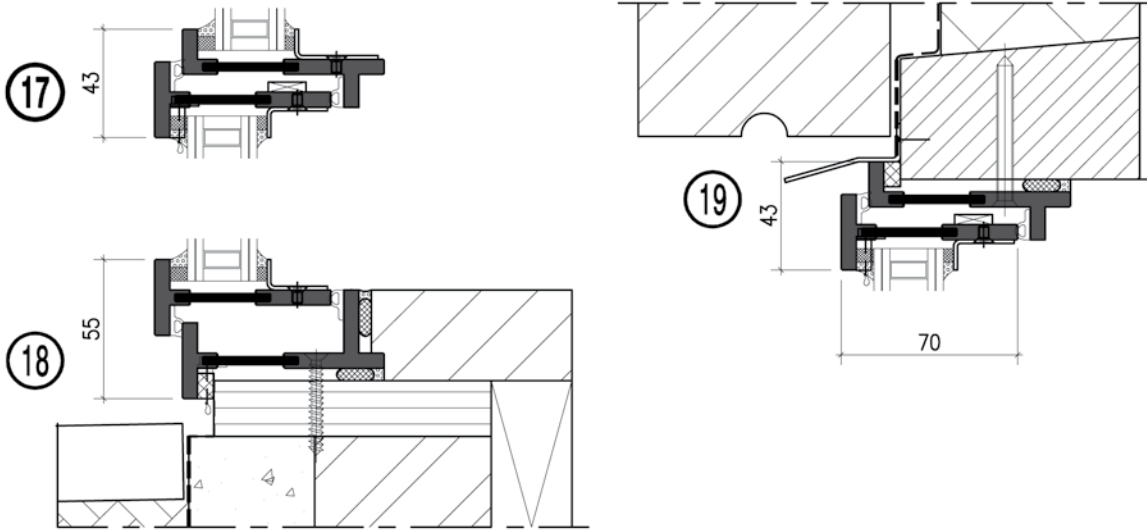




SL30-ISO[®] DOUBLE DOOR WITH SLIM LOCKING STILE



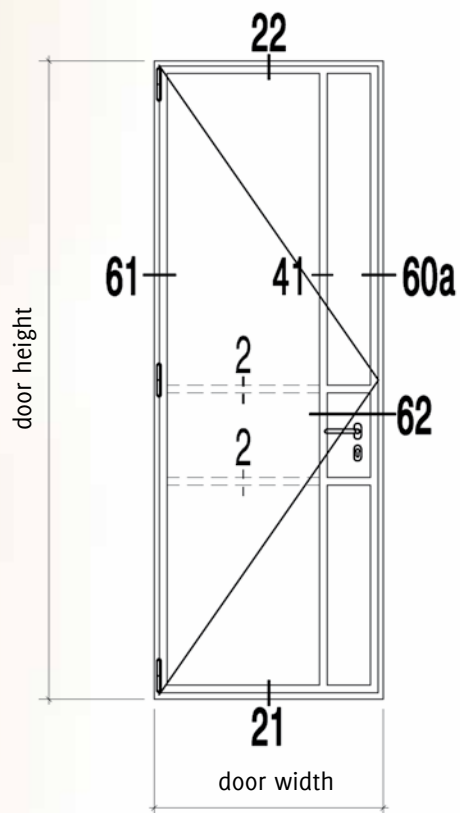
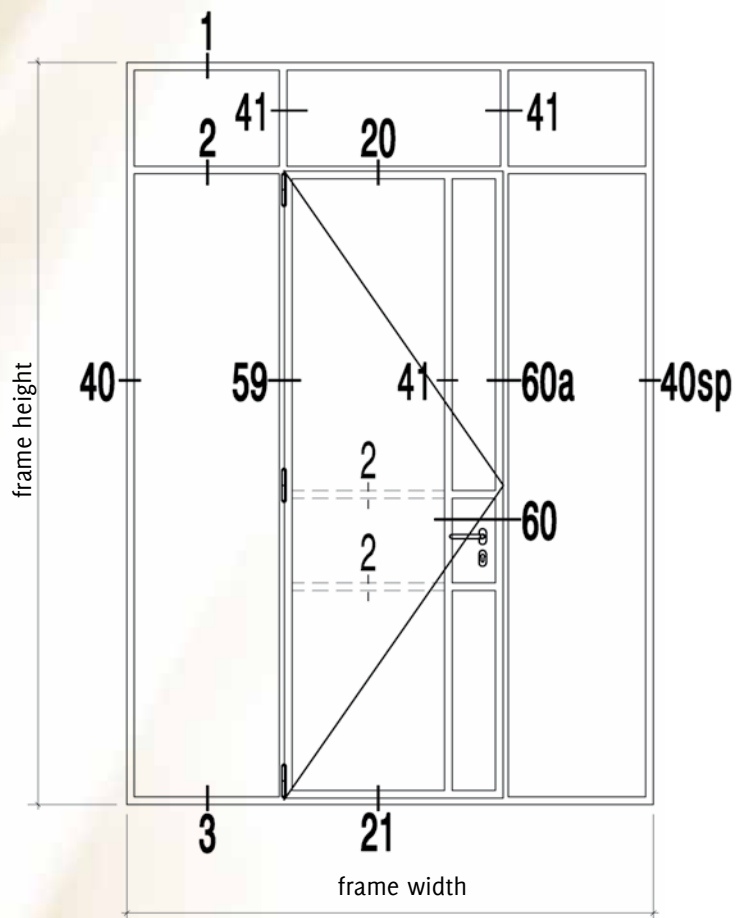
SL30-ISO® DOUBLE DOOR WITH SLIM LOCKING STILE - DETAILS



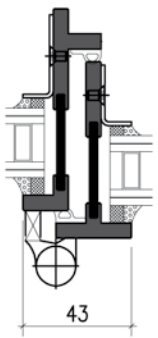
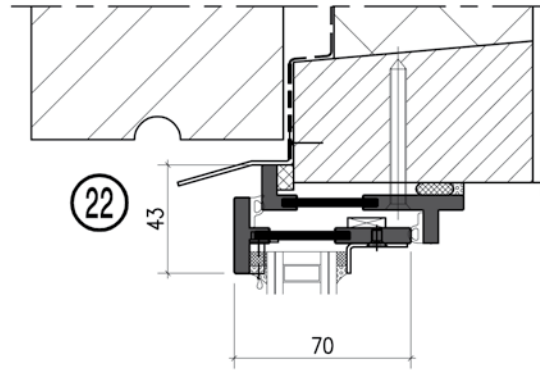
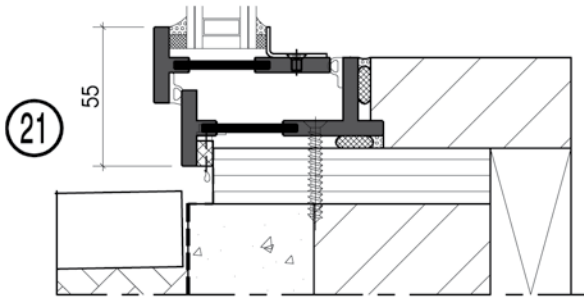
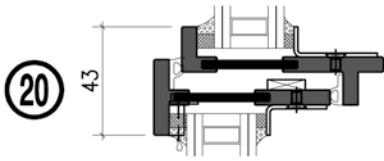
See page 11 for details 1 - 2 - 3 - 40 - 41. Details for glass retention see section 2.6.



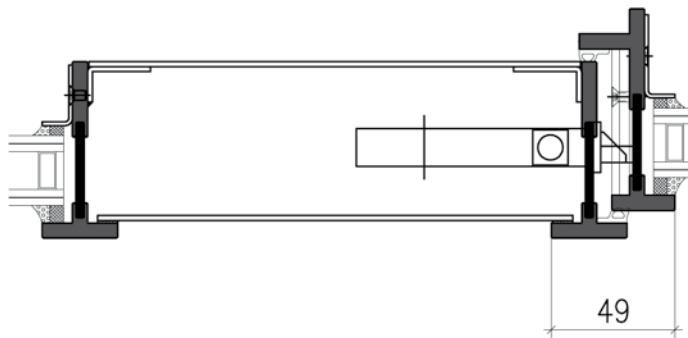
SL30-ISO[®] SINGLE DOOR WITH SLIM LOCKING STILE



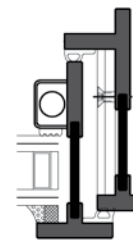
SL30-ISO® SINGLE DOOR WITH SLIM LOCKING STILE - DETAILS



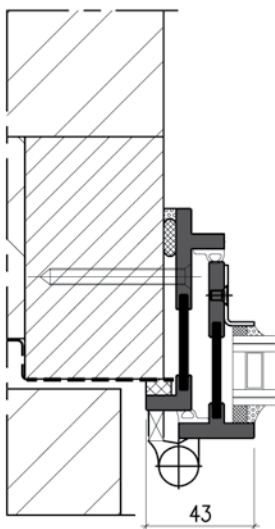
59



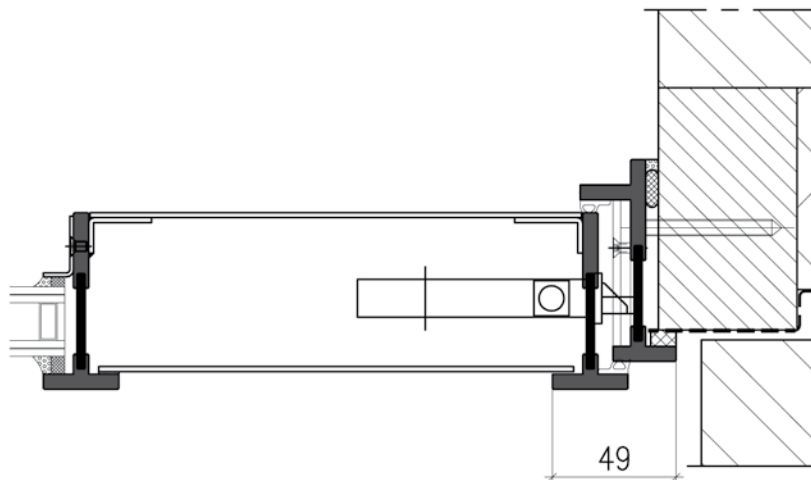
60



60a



61



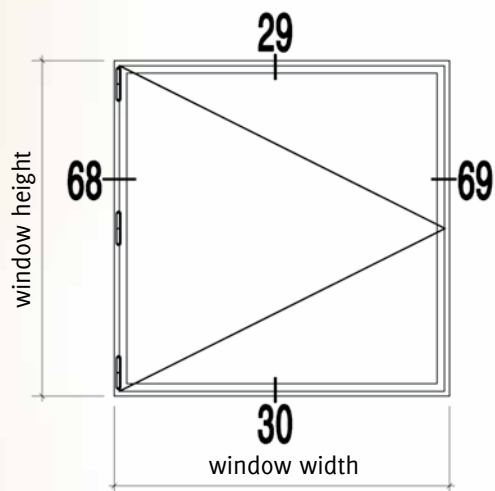
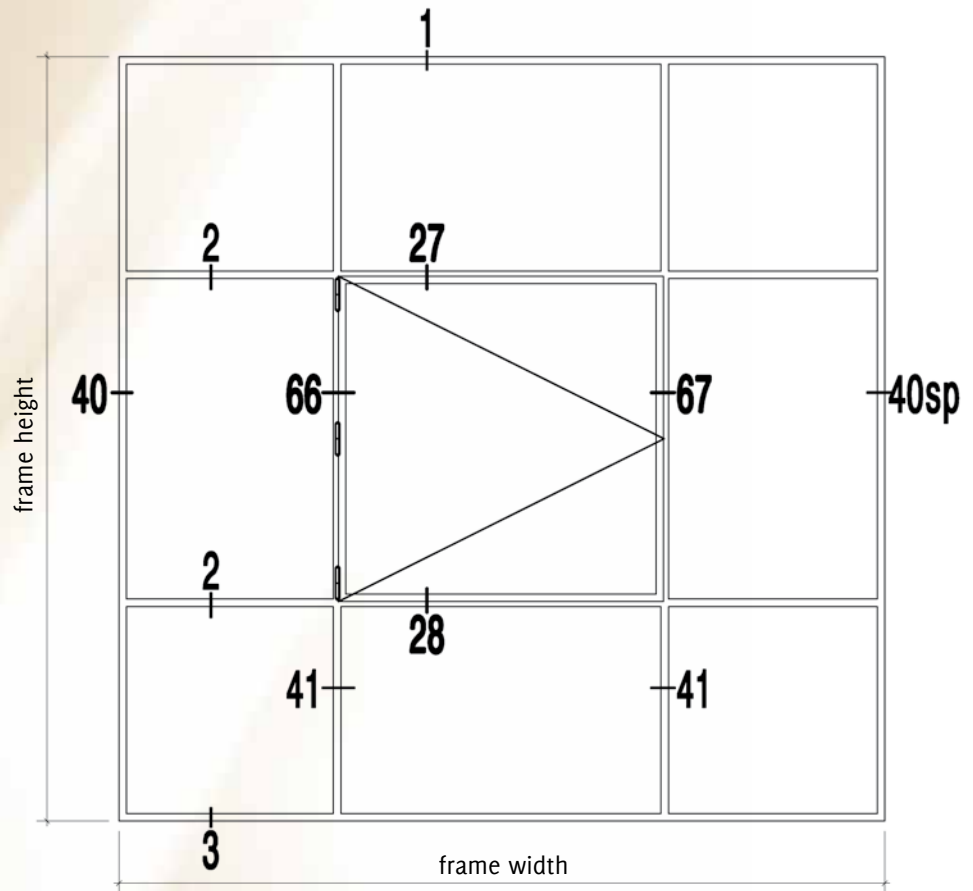
62

See page 11 for details 1 - 2 - 3 - 40 - 41. Details for glass retention see section 2.6.

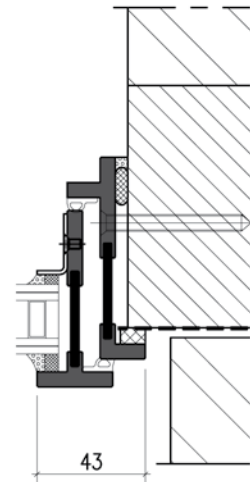
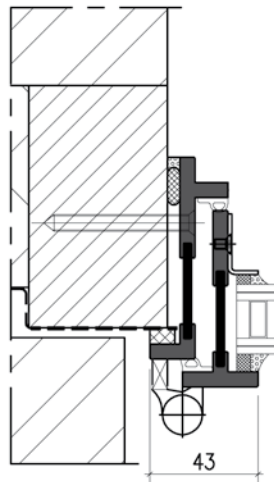
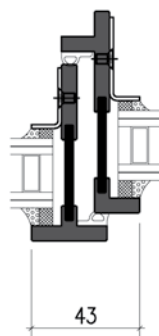
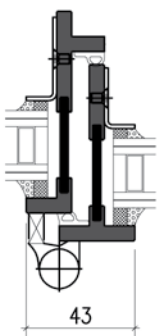
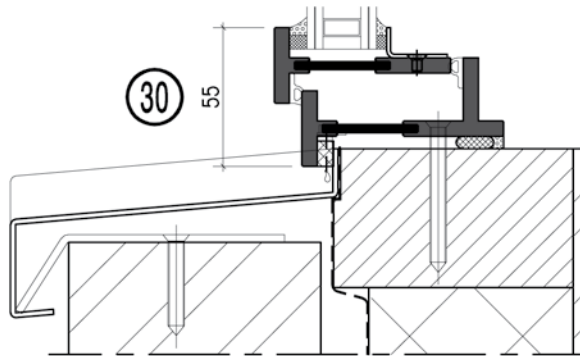
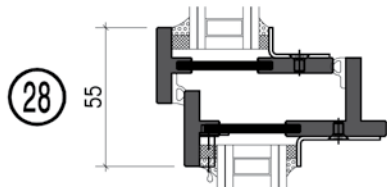
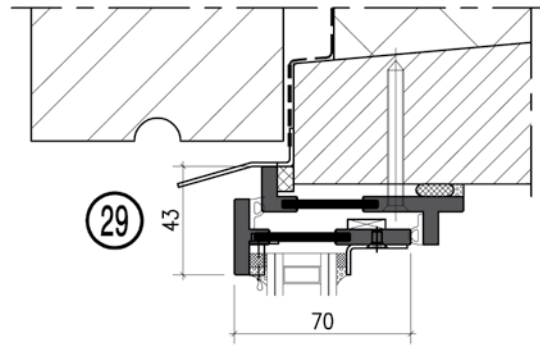
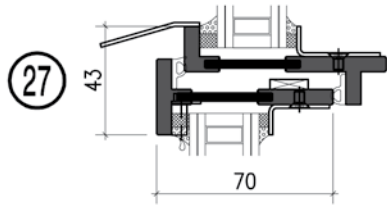




SL30-ISO[®] SINGLE TURNING WINDOW



SL30-ISO® SINGLE TURNING WINDOW - DETAILS



66

67

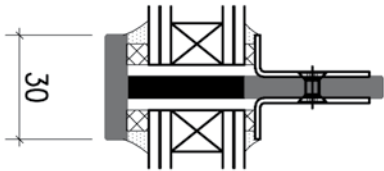
68

69

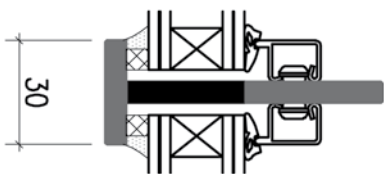
See page 11 for details 1 - 2 - 3 - 40 - 41. Details for glass retention see section 2.6.



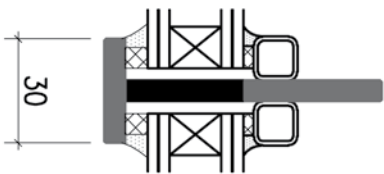
2.6. DETAILS FOR GLASS RETENTION SL30-ISO[®]



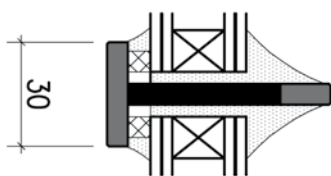
Glazingbead cornershaped



glazingbead U-shaped



MGL glazingbeadsystem
(U-shaped with welded corners)



Renoseal 'puttyglazed'





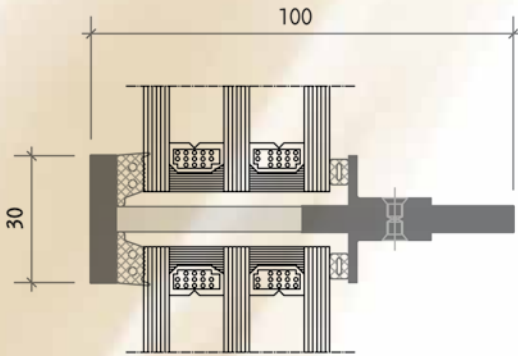
3. SL30-ISO-PLUS®



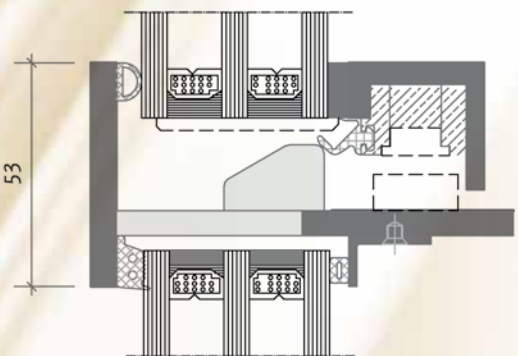
3.1. PROPERTIES

Slim sightline width of 30 mm

The sightline measures 30mm for the stiles and rails with glazing on both sides.



The total sightline for a tilt-and-turn window in frame with glazing on both sides measures 50mm.



See section 3.4. for other dimensions.

Invisible water drainage

SL30-ISO-PLUS® has no visible water drainage holes.

Excellent thermal insulation

In the SL30-ISO-PLUS® system, the internal and external profiles are thermally separated and have a good thermal insulation with matching low insulation values. See also section 3.2.

High strength

The standard SL30-ISO-PLUS® profile is slim (30mm sightline) and less deep than other currently used systems but is still extremely strong. The profile depth can be selected depending on the desired application.

Profile depth:

100 mm

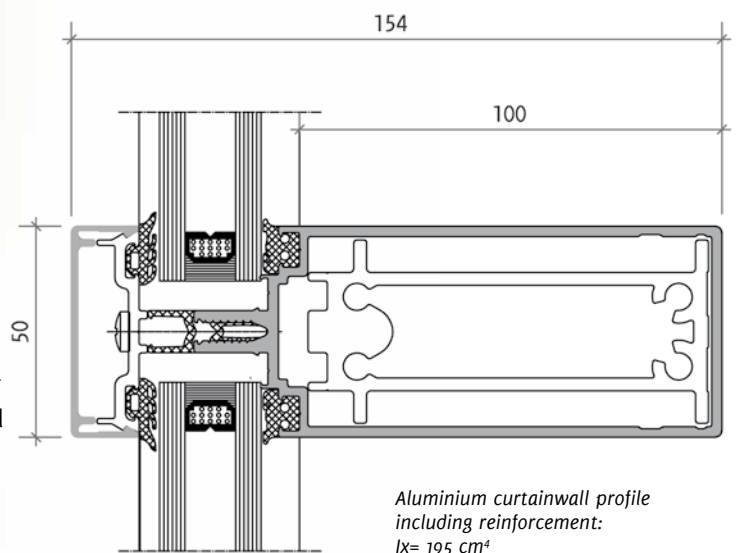
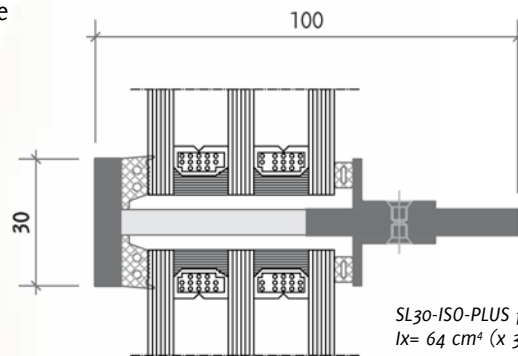
Ix:

64 cm⁴

These values are very high compared to the usual profile systems and can be reached with relatively small profile depths.

In comparison: an SL30-ISO-PLUS® profile with a depth of 100 mm generates the identical bending resistance of an aluminium curtain wall profile with a total depth of 150 mm and a profile width of 50 mm.

By way of comparison: an SL30-ISO-PLUS® profile drawn to the same scale as an aluminium curtainwall profile with the same bending resistance.



Please note: As the elastic bending modulus of steel is 3 times bigger than that of aluminium, the linear moment of inertia of a steel profile can be 3 times smaller and still generates the same bending resistance.

Wind and Water Tightness

Despite the fact that the system is very slim, it contains an integrated central sealing and invisible water drainage system. This results in a high wind and water tightness.

- 450 Pa for fixed parts and wings; class 8A of EN12208
- 300 Pa for doors, class 7A of EN 12208.

Visibility of edge sealing of insulating glass

Standard triple or double insulation glazing cannot be applied in the SL30-ISO-PLUS® profile system because this system makes the side seal of the insulation glass often visible (a standard edge sealing is often bigger than the support of the glass behind the flange plus the height of the rubber).

Together with the glass suppliers Saint Gobain and AGC we have found a solution to this problem whereby not only the side seal is smaller but also the dimension variation in the glass is reduced. In the most extreme situations, when all tolerances are “negative” for visibility of the edge seal, the edge seal has only a visibility of a few millimetres. maximum.

CE Marking

The system is tested and CE certified in all prescribed ways and in conformity with the European product standard EN 14351-1.





3.2. EXCELLENT THERMAL INSULATION

In the SL30-ISO-PLUS® system, the internal and external profiles are thermally separated and have a good thermal insulation with matching low insulation values.

The thermal insulation of a window or a door must be calculated in accordance with EN 10077-1 and -2. The total thermal insulation of a window or a door is determined by the insulation value of the profile and the insulation glass and is calculated with the following formula:

$$U\text{-window} = \%gl * Ugl + \%fr * Ufr + Lg * \text{¥}gl$$

In which:

U-window insulation value total window or door

%gl surface of the glazed part as a percentage of the total surface

Ugl insulation value of the glass

%fr surface of the profile expressed as a percentage of the total surface

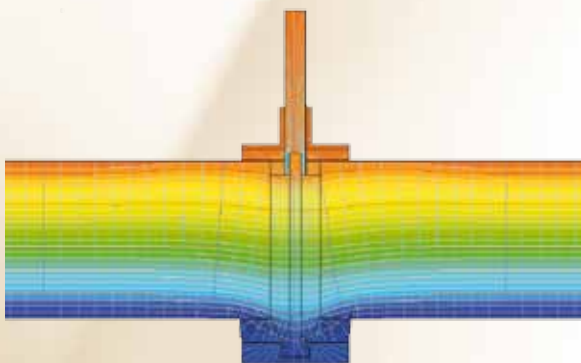
Ufr insulation value of the profile

Lg total circumference of the glass / total surface

¥gl indicating the heat loss for edge-sealing the glass.

Ufr - Thermal insulation profile system SL30-ISO-PLUS®

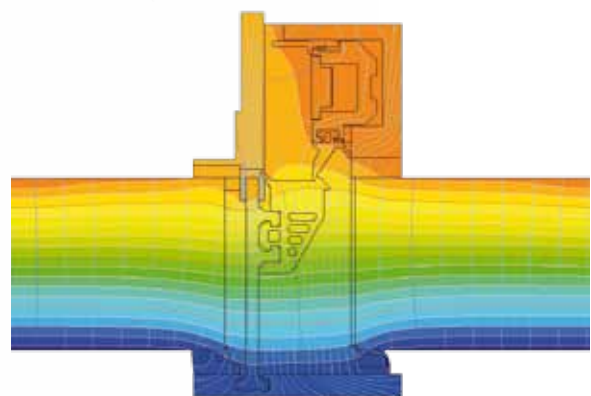
The SL30-ISO-PLUS® profile series have the following values for thermal insulation U-fr:



SL30-ISO-PLUS® fixed glazing: **Ufr = 2,18 W/m2K**

(in conformity with EN 10077-2)

Please note: as to thermal insulation, it is comparable to Ufr=1.35 W/m2K for a profile with a sightline width of 60 mm with a Ugl=0.5 W/m2K *



SL30-ISO-PLUS® tilt-and-turn window: **U**

-fr = 2,24 W/m2K (in conformity with EN 10077-2)

Please note: as to thermal insulation, it is almost comparable to Ufr=1.35 W/m2K for a profile with a sightline width of 100 mm with an Ugl = 0.5 W/m2K *

* When comparing these values with other profile systems, please note that Ufr is expressed in Watt per m2.

SL30-ISO-PLUS® is generally 50% slimmer than a common system. This means that SL30-ISO-PLUS® insulates much better than a system with the same Ufr but with a broader sightline.

The above values for thermal insulation are calculated in accordance with the current European standards, the EN-ISO 10077-1 and EN-ISO 10077-2.

Ugl - Thermal insulation of glass

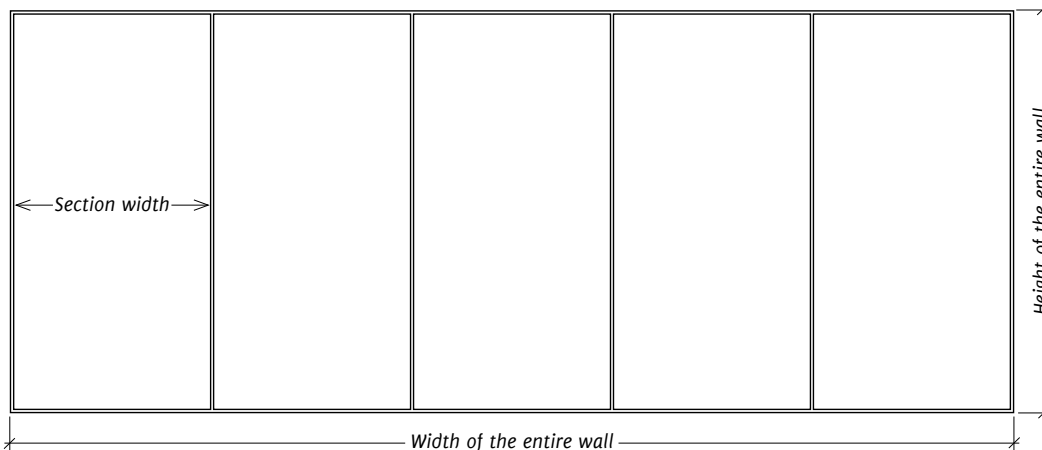
SL30-ISO-PLUS® is specially designed for using triple glazing. These glass panels contain two air cavities and can attain extreme low insulation values of Ugl= 0.5 W/m2.

The insulation value of the edge sealing (¥gl value) is also very important. Synthetic glazing blocks and edge sealers are becoming very popular as they have lower insulation values than aluminium glazing blocks.

Uw - Resulting insulation value of a framed glazed wall

Calculation of thermal insulation value of glass wall consisting of 5 glass panels. Calculation in conformity with EN 10077-1 and -2.

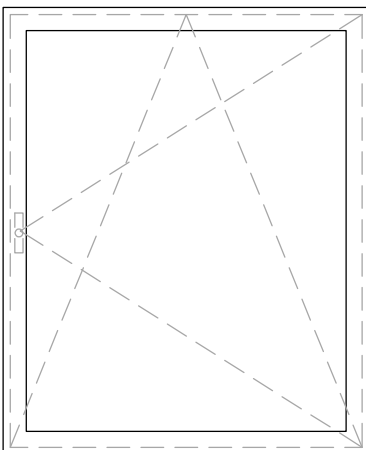
Glass wall with steel sections constructed with SL30-ISO-PLUS® profiles



Resulting Uw (W/m²K) for different widths and heights of the glass panes

| glass width (mm) | number of sections | total width (mm) | Ugl = 0,5 W/m ² K | | Ugl = 0,7 W/m ² K | |
|------------------|--------------------|------------------|------------------------------|---------|------------------------------|---------|
| | | | glass height 2500 mm | 3000 mm | glass height 2500 mm | 3000 mm |
| 600 | 5 | 3000 | 0,82 | 0,81 | 1,01 | 0,99 |
| 800 | 5 | 4000 | 0,77 | 0,75 | 0,95 | 0,94 |
| 1000 | 5 | 5000 | 0,73 | 0,72 | 0,92 | 0,91 |

Uw - Resulting insulation value of a tilt and turn window



Resulting Uw (W/m²K) for different widths and heights of tilt-and-turn windows

| glass width (mm) | Ugl = 0,5 W/m ² K | | Ugl = 0,7 W/m ² K | |
|------------------|------------------------------|---------|------------------------------|---------|
| | glass height 1000 mm | 1500 mm | glass height 1000 mm | 1500 mm |
| 600 | 1,31 | 1,21 | 1,46 | 1,36 |
| 800 | 1,18 | 1,08 | 1,34 | 1,24 |
| 1000 | 1,11 | 1,01 | 1,27 | 1,17 |





3.3. RANGE OF APPLICATIONS FOR SL30-ISO-PLUS®

The following range of application applies to the patented SL30-ISO-PLUS® system:

Maximum dimensions

- fixed parts: maximum height of 3.3 m
- tilt-and-turn windows: maximum width and height: 1000 mm and 1500 mm respectively.

Glazing

- interior glazing.

Glass thickness

The SL30-ISO-PLUS® profile system can easily hold glass up to a thickness of 55 mm. But as we are also the producer of the profiles, we can accommodate glass with almost all gauges in consultation with the client.

Please note: the glass in the tilt-and-turn window can have a thickness of 44 mm at the most (for the SL30-ISO-PLUS® glued wing).

Moveable parts

- turning inward:
 - tilt-and-turn window
 - side-hung or bottom-turn window,
- turning outward:
 - door
 - side-turn or top-hung window.

Please contact us if you wish to order items that do not come within the above range of applications. We always can continue the development of the SL30-ISO-PLUS® system on the basis of your wishes.

NB: SL30-ISO-PLUS® is still developing and other possibilities are added every month.



3.4. SL30-ISO-PLUS® TEXT OF THE TECHNICAL SPECIFICATIONS

Supplier: MHB bv

Type: profile system MHB SL30-ISO-PLUS® with invisible water discharge

Windtightness and watertightness: 450 Pa for fixed parts and wings; class 8A of EN12208. 300 Pa for doors; class 7A of EN 12208

Material: bare steel or stainless steel

Dimensions: see the plans (see range of applications)

Partitioning: see the plans (client-specific partitioning of the glass front is possible)

steel SL30-ISO-PLUS® profile, built-in depth 100 mm (see also the details)

Surface treatment: sandblasting, powder-coating and enamelling: zinc epoxy powder primer 40 µm, primer 30 µm, final colour layer thickness 40 µm

Colour: RAL colour according to the colour card

Glazing: triple or double isolationglass, as desired by the architect, fixed with steel glazing beads of 12 mm high, choosing from 3 options (see par.3.6.)

Weatherseal: continuous EPDM rubber profile in frame

Hinges, locks and handles: side-hung windows are produced with lift-off hinges and lockable window handles. Tilt-and-turn windows are produced with the MHB tilt-and-turn system with lockable window handles. Doors are produced with lift-off hinges, MHB three-point lock and crank-operated night latch bolt and MHB door handle. The passive door of the double door is equipped with 2 edge bolts

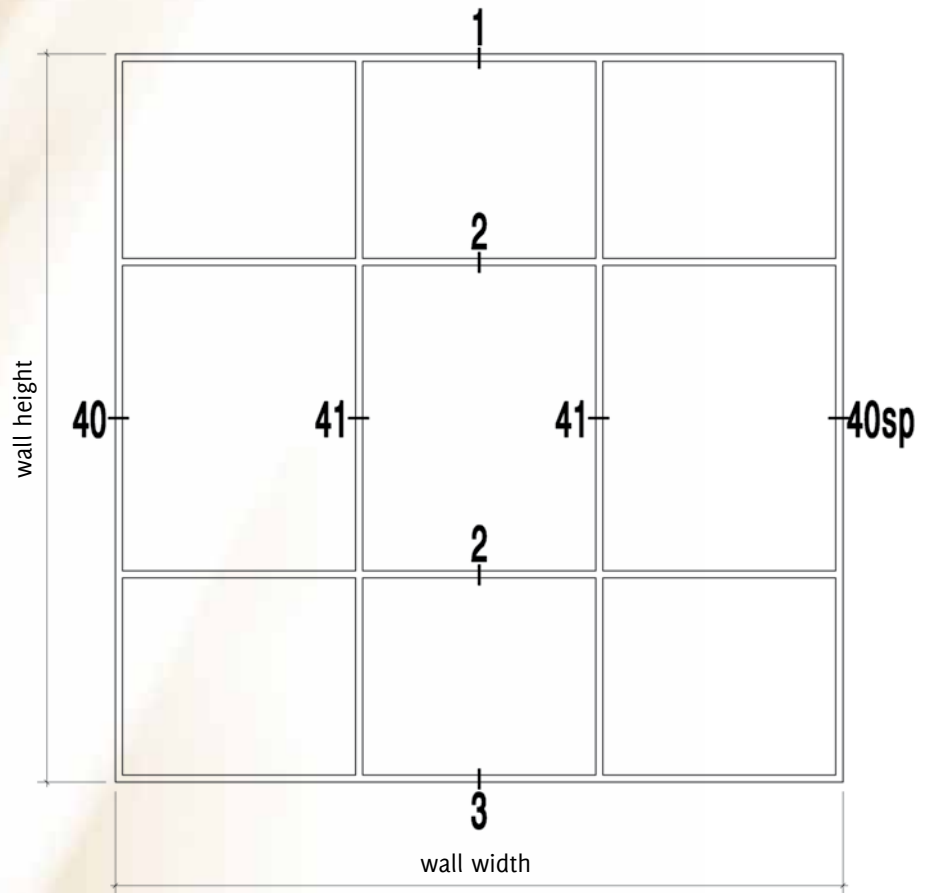
Range of application: Please see above section 3.3.



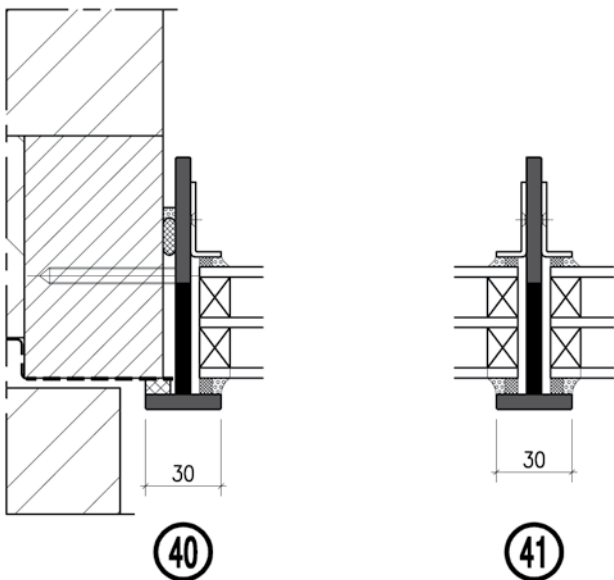
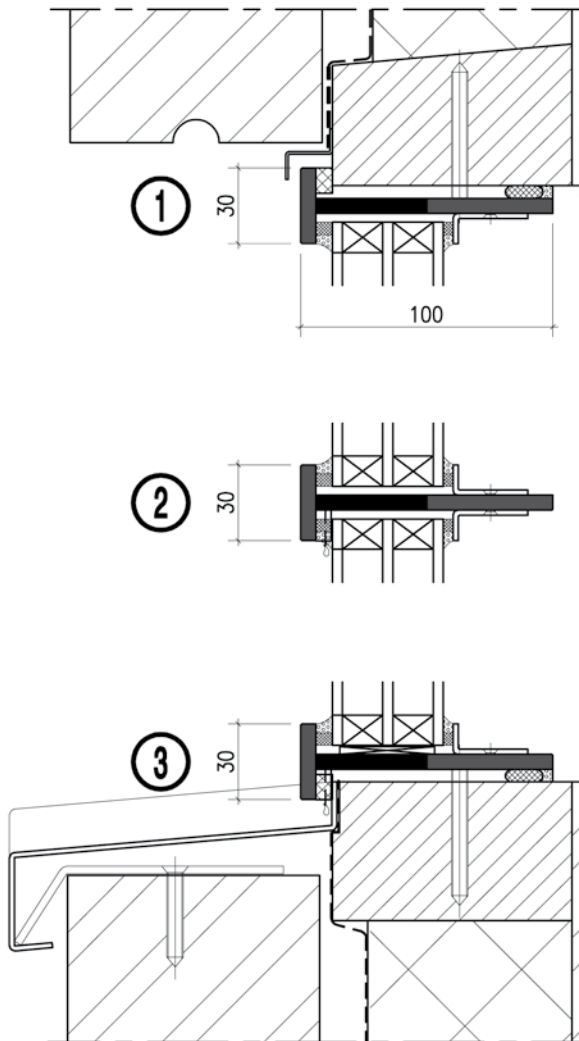


3.5. SL30-ISO-PLUS® DRAWINGS AND DETAILS

SL30-ISO-PLUS® FRAMED GLAZED WALL



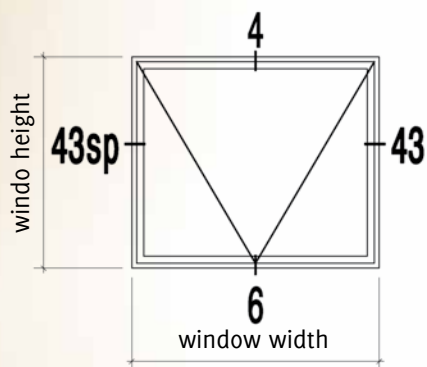
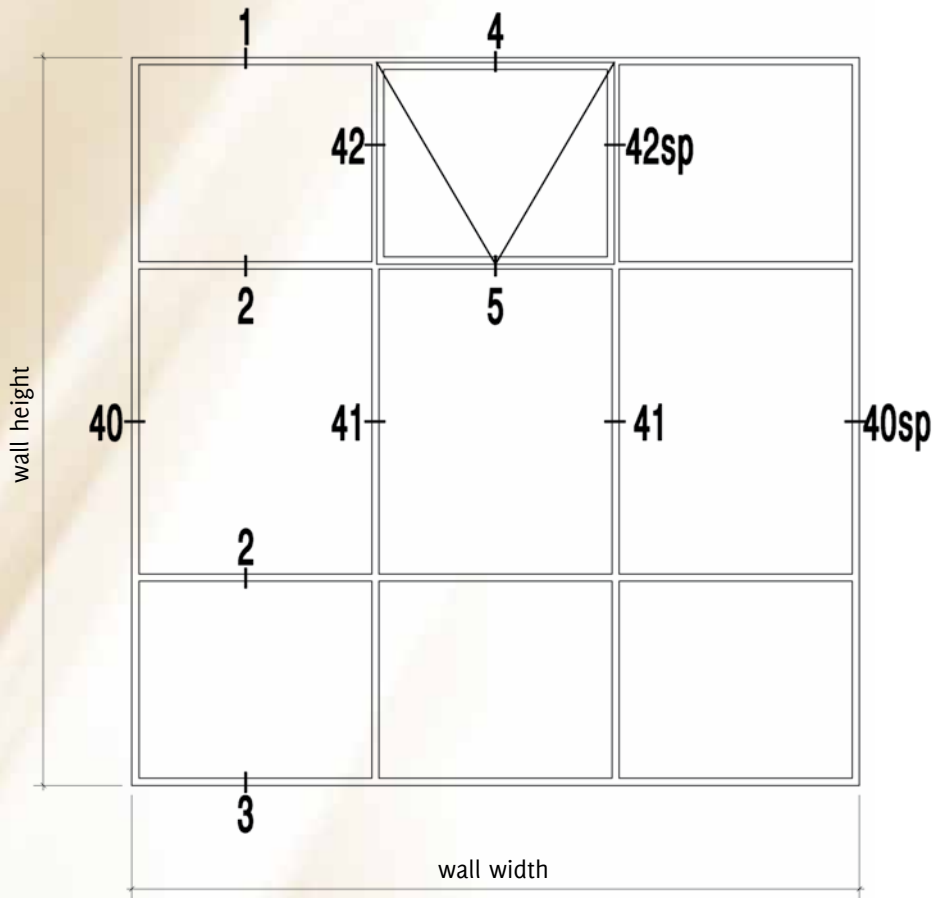
SL30-ISO-PLUS® FRAMED GLAZED WALL - DETAILS



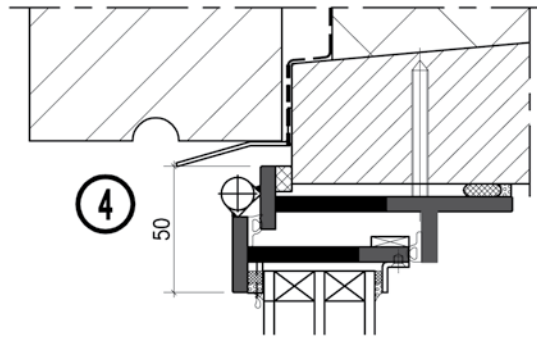
Details for glass retention see section 3.6.



SL30-ISO-PLUS® CANTILEVER WINDOW



SL30-ISO-PLUS® CANTILEVER WINDOW - DETAILS

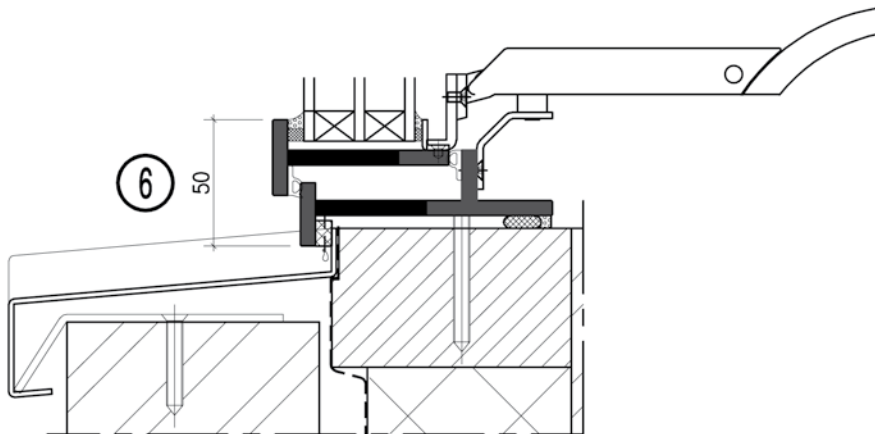


4

50

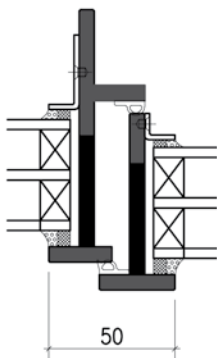
5

50



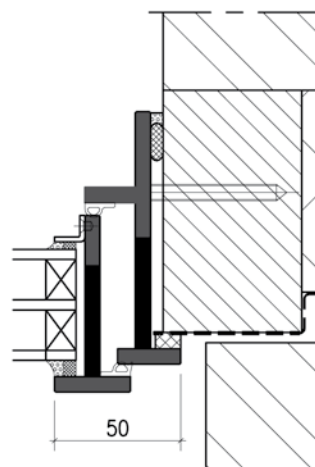
6

50



42

50



43

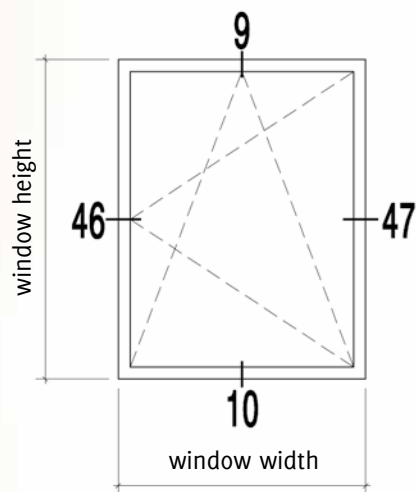
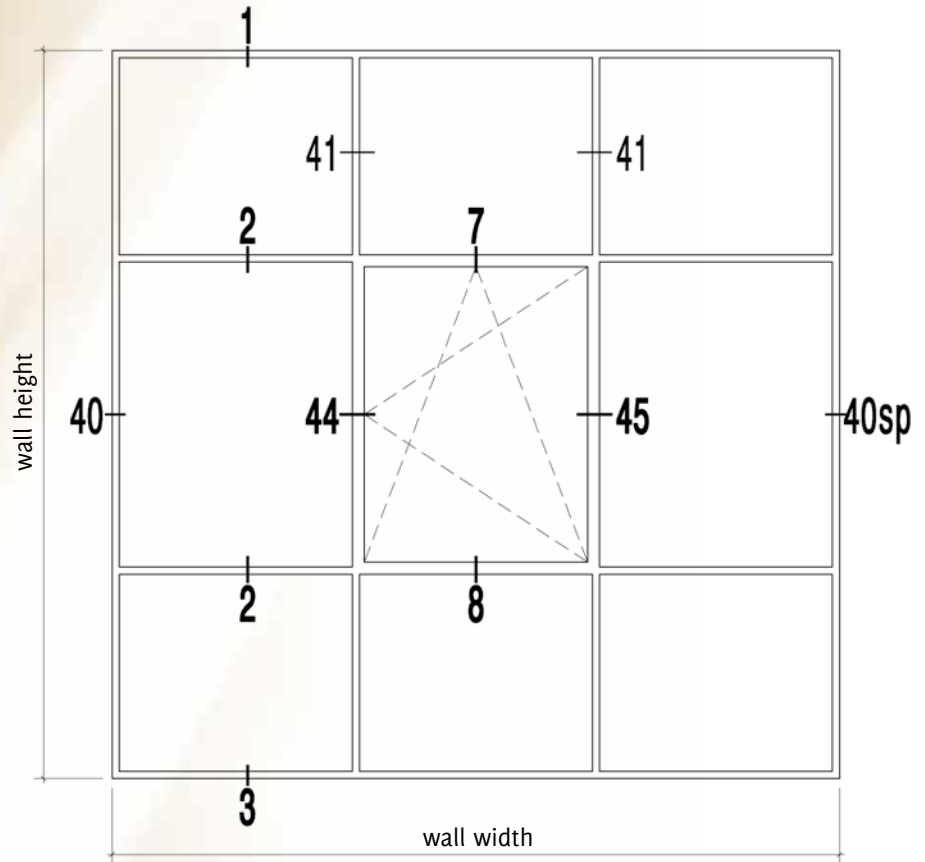
50

See page 35 for details 1 - 2 - 3 - 40 - 41. Details for glass retention see section 3.6.

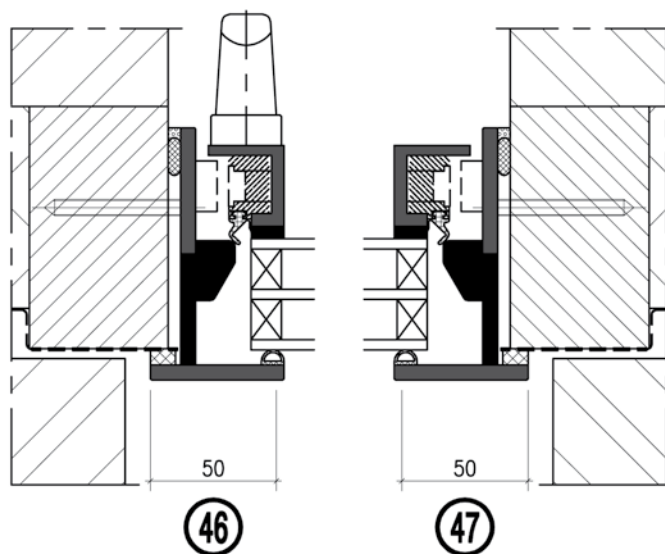
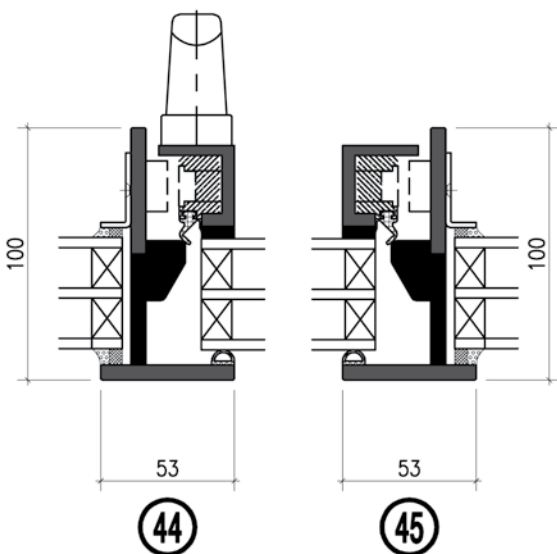
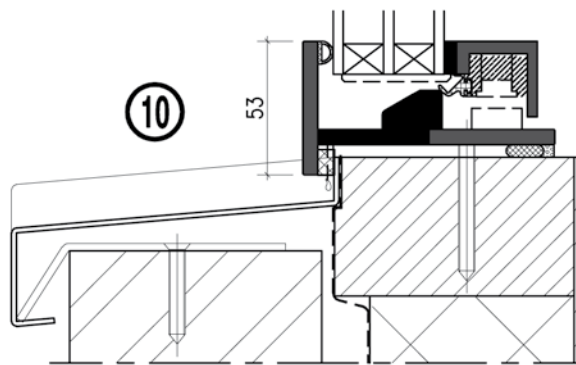
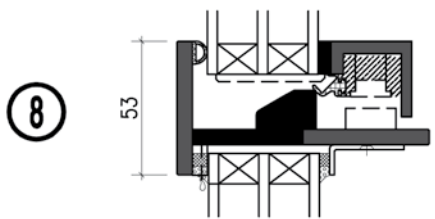
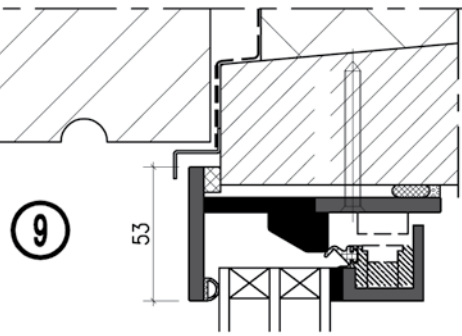
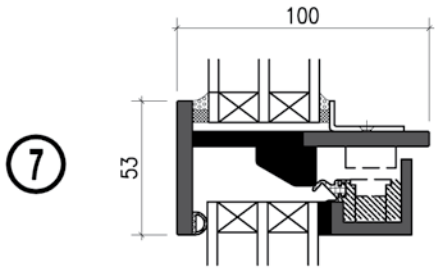




SL30-ISO-PLUS® TILT AND TURN WINDOW



SL30-ISO-PLUS® TILT AND TURN WINDOW - DETAILS

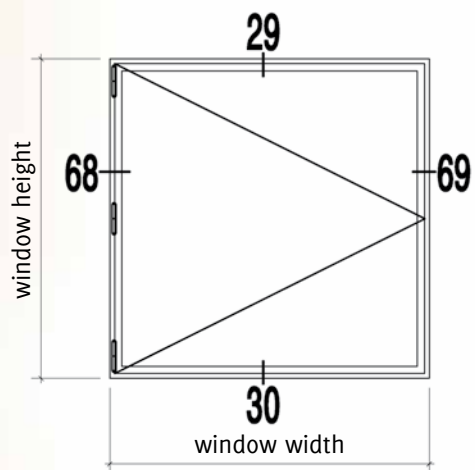
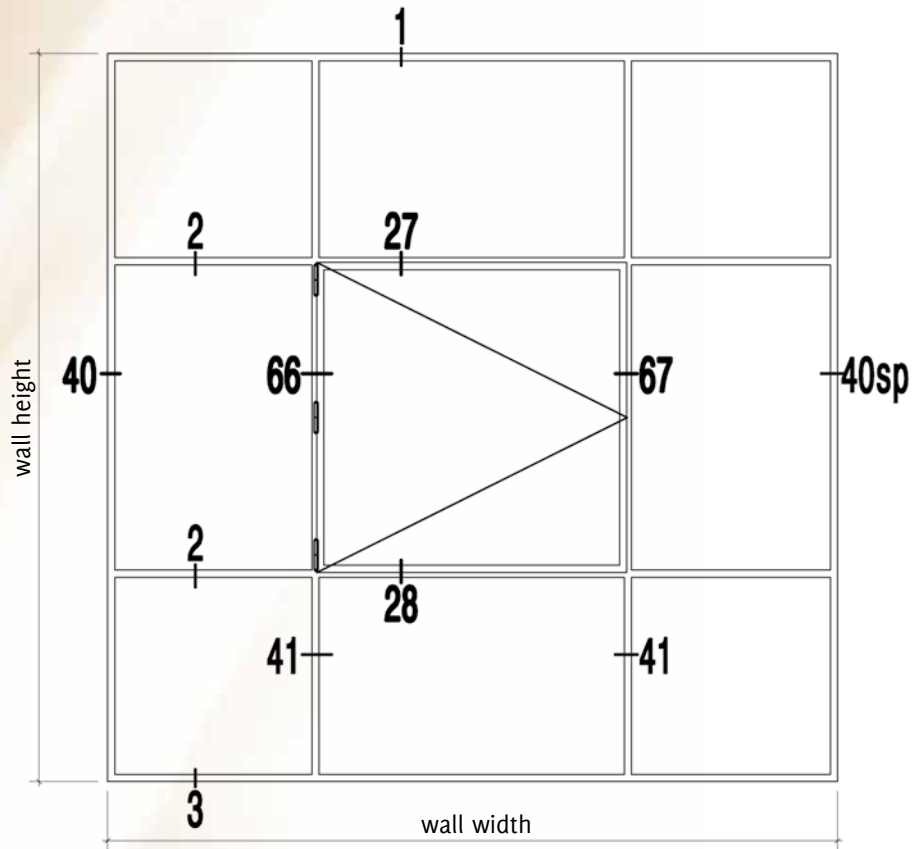


See page 35 for details 1 - 2 - 3 - 40 - 41. Details for glass retention see section 3.6.

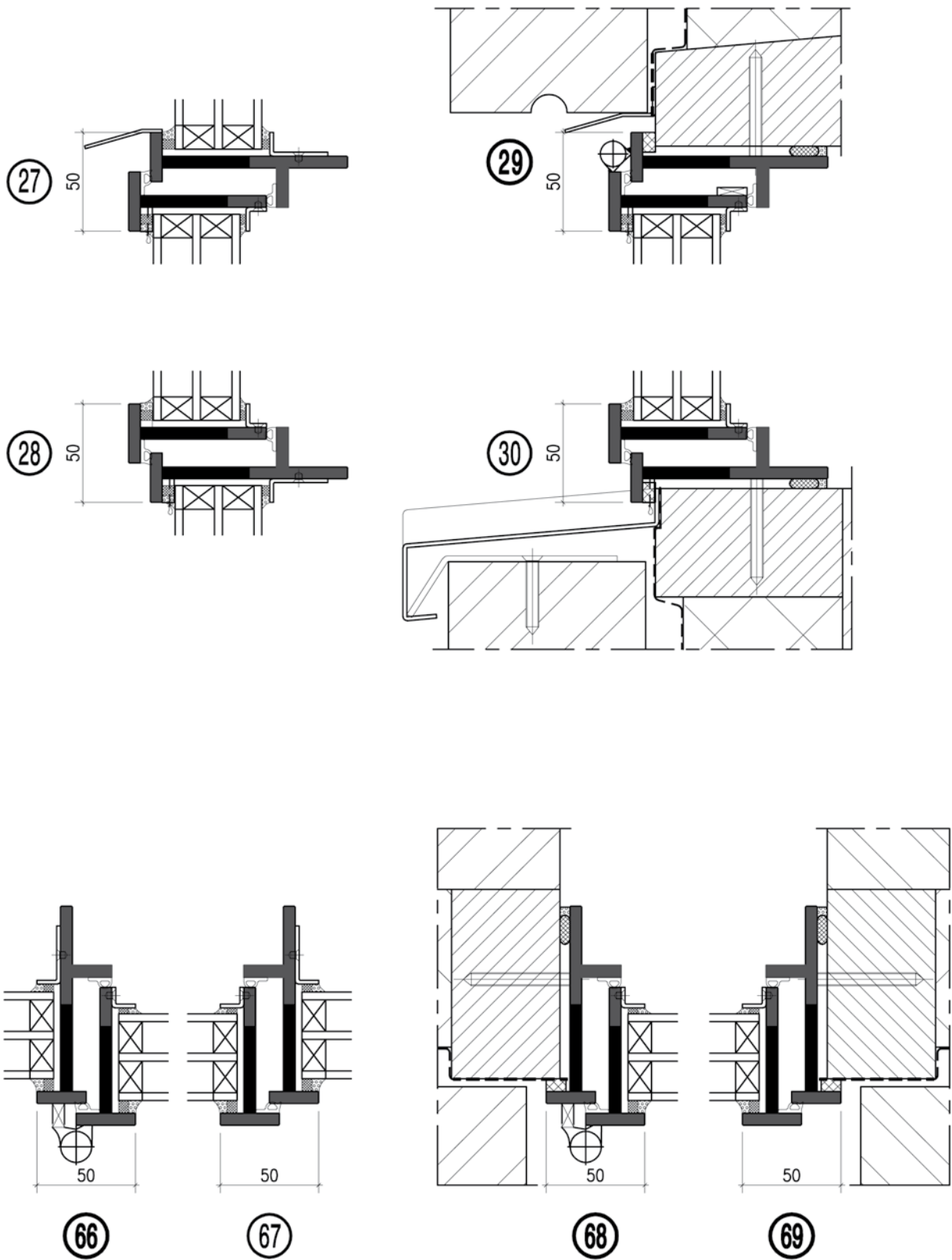




SL30-ISO-PLUS® SINGLE TURNING WINDOW

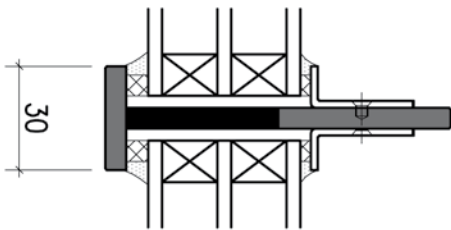


SL30-ISO-PLUS® SINGLE TURNING WINDOW - DETAILS

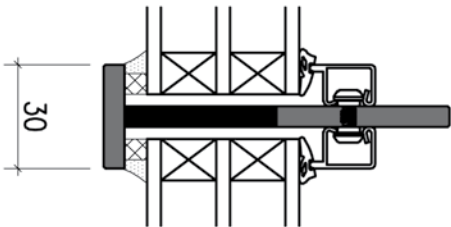


See page 35 for details 1 - 2 - 3 - 40 - 41. Details for glass retention see section 3.6.

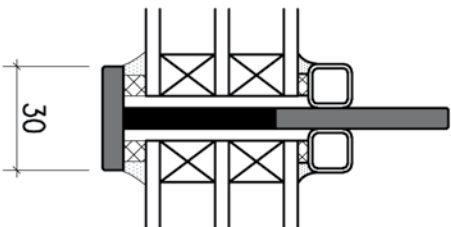
3.6. DETAILS FOR GLASS RETENTION SL30-ISO-PLUS®



Glazingbead cornershaped



glazingbead U-shaped



MGL glazingbeadsystem
(U-shaped with welded corners)





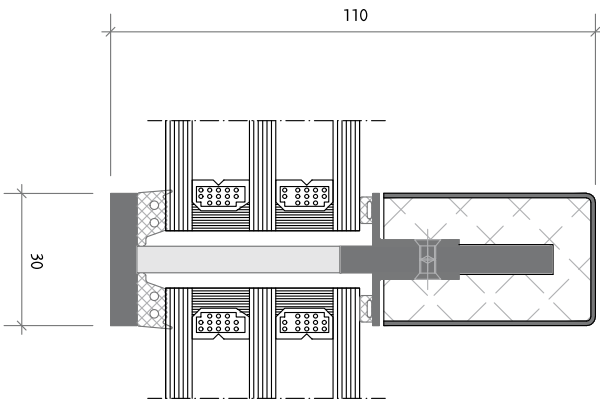
4. RECENT DEVELOPMENT SL30-ISO-ULTRA®



All experience gathered with developing SL30-ISO® and SL30-ISO-PLUS® is used to develop the steel window profile with the best thermal isolation to be found on the market; the result is a profile with super thermal insulation qualities made from 100% recycled steel and which is slim and strong at the same time.

This system will probably be on the market in the second half of 2011. The details of this profile system are so optimized that it can reach ultra-thermal insulation. All other qualities are equal to those of the SL30-ISO-PLUS®.



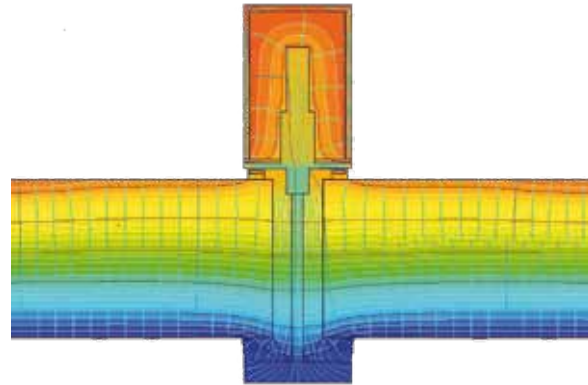


* When comparing these Ufr-values with other profile systems, please note that Ufr is expressed in Watt per m2. As SL30-ISO-PLUS® is generally 50% slimmer than common systems, the insulation values in SL30-ISO-PLUS® are much better than in systems with comparable Ufr but with a broader sightline.



Ufr=1,82 W/m2K

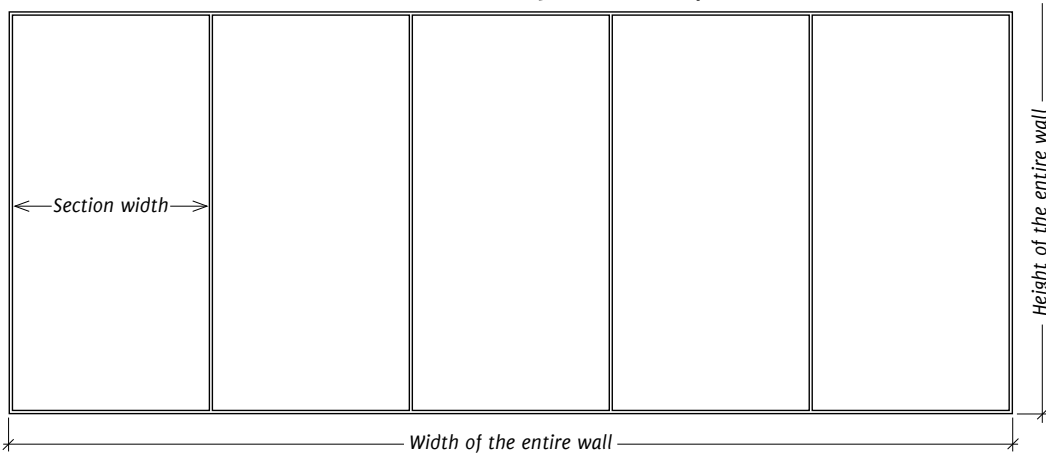
This means that with a value of 1.8 W/m2K, the matching Ufr is ultra-low in this profile and can reach a thermal insulation comparable to Ufr=1.15 W/m2K for a profile with a sightline width of 60 mm with Ugl=0.5 W/m2K *



Uw - Resulting insulation value of a framed glazed wall

Calculation of thermal insulation value of glass wall consisting of 5 glass panels.
Calculation in conformity with EN 10077-1 and -2.

Glass wall with steel sections constructed with SL30-ISO-ULTRA® profiles



Resulting total Uw with different glass widths and heights

| glass width (mm) | number of sections | total width (mm) | Ugl = 0,5 W/m2K | | Ugl = 0,7 W/m2K | |
|------------------|--------------------|------------------|----------------------|---------|----------------------|---------|
| | | | glass height 2500 mm | 3000 mm | glass height 2500 mm | 3000 mm |
| 600 | 5 | 3000 | 0,79 | 0,78 | 0,98 | 0,96 |
| 800 | 5 | 4000 | 0,74 | 0,73 | 0,93 | 0,91 |
| 1000 | 5 | 5000 | 0,71 | 0,70 | 0,90 | 0,88 |

MHB bv ■ Postbus 6 ■ 6674 ZG Herveld
Onderstalstraat 3 ■ 6674 ME Herveld
Tel. +31 (0)488 45 19 51 ■ Fax +31 (0)488 45 20 22
Internet: www.mhb.nl ■ E-mail: info@mhb.nl



WWW.MHB.NL