

Technical Evaluation 2/11-1448*V1

Cancels and replaces Technical Evaluation 2/11-1448

Point-fixed fittings and spiders for Structural Bolted Glazing window walls

*Vitrage Extérieur Attaché
Structural Bolted Glazing
Punktgehaltene
Fassenderglasung*

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Committee responsible for drawing up Technical Evaluations
(order of 21 March 2012)

Specialised Group No. 2

Constructions, Façades and Lightweight Partition Walls

Examined for registration on 4 July 2012



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Specialised Group no. 2, "Constructions, Facades and Lightweight Partition Walls", of the Committee responsible for drawing up Technical Evaluations on 10 April 2012 examined SADEV's procedure presented by the company SADEV. Based on this procedure, it has drawn up the following Technical Evaluation which replaces Technical Evaluation 2/11-1448. This Evaluation has been drawn up for uses in European France.

1. Brief definition

1.1 Brief description

Point-fixed pass-through devices and support fittings for single glazing in an internal or external frame that is usually metal for producing vertical or inclined window walls.

The system, designed only for single (monolithic or laminated) and flat glazing, is made up of pass-through fixing devices and lugs fastening onto the frame of the building.

1.2 Identification

The fixings and fastenings bear the indelible marking SADEV.

The manufacturer's logo and SADEV's logo are marked indelibly on the glass panels.

2. EVALUATION

2.1 Accepted area of use

Vertical or inclined window walls in premises whose destination means that the possibility of water ingress is accepted in the meaning of *CSTB Specification 3574* and for which deformation of the glazing of 1/100th of the free edge between point-fixed fastenings under loading at service limit state (SLS) is also accepted. Limited to works for which it will have been justified through a calculation report or experimentally from the design of glass products and for which the glazing panels are connected to the frame independently of each other.

2.2 Assessment of the system

2.2.1 Fitness for purpose

Environmental and health data

No FDES (*Fiche de Données Environnementales et Sanitaires* - Environmental and Health Data Sheet) exists for this product (procedure). Note that FDES do not come under the fitness for purpose examination for the product (procedure).

Safety under climatic loads and weight of glazing

Window walls are not involved in the stability of the building which is incumbent on the framework of the latter.

Deformations of the edges of the glass panels at service limit state (DTU wind rules P 06.002) are limited to 1/100th of the distance between the point-fixed fastenings.

For glass panels that are 19 mm thick and include six pass-through fastenings and if cantilevered the radius of curvature at ultimate limit state on intermediaries supports must be determined by testing, on a case-by-case basis, according to *CSTB Specification 3574*.

The constraint limitations to the right of the fixing points, the play provided for in the fittings and the arrangements for immobilising the latter mean that it can be considered that the correct stability of the window walls is provided under the action of climatic and wind stresses and on the other hand if there is accidental failure of a glass unit.

Stability in an earthquake zone

According to PS 92 rules, the meeting of E1 earthquake-resistant requirements must be assessed on a case-by-case basis. Requirement E2 is not *a priori* met. According to the decree of 22 October 2010, the area of use is limited to zone 1 for size I, II, III and IV building categories and zone 2 for size I and II building categories.

Safety under impacts

Meeting safety requirements regarding the risk of falling can be ensured through a case-by-case check and furthermore for monolithic glass panels by combining a residual protection according to NF standard P 01-012

Fire safety

Must be assessed under the same conditions as those for glass facades with single glass panels of the same type.

Heat insulation

Heat regulations may only be followed in a very limited number of cases because of the use of single glazing.

Foreseeable condensation consequences should be assessed in the same way as for works of the same type made up of single glazing panels implemented in a traditional way.

Sealing

Sealing between the glass panels depends on the efficiency of the mastic. Any damage to this barrier will be the source of ingress which should be taken into account with regard to the purpose of the premises concerned.

2.2.2 Durability – Maintenance

The nature of the materials used means that risks of corrosion are limited.

2.3 Manufacture and checking

The provisions put in place by the manufacturers are appropriate for ensuring consistency in quality.

2.4 Implementation

Implementation, carried out by companies who have requested technical support from the company SADEV, requires precautions to be taken, particularly for:

- adjusting the fittings ,
- controlling the tightening torque applied to the point-fixed fittings ,
- respecting the width of the seals between the glass panels.

Damaged glass panels can be replaced individually.

3. Technical Specifications

3.1 Common Technical Specifications

3.1.1 Design conditions

The common Technical Specifications are made up by section 3 of *CSTB Specifications 3574*, "Structural Bolted Glazing (VEA - *Vitrages Extérieurs Attachés*)" which is the subject of a Technical Evaluation – General conditions for design, manufacture and implementation" particularly for:

- the choice and design of glass products,
- the design of fastening devices and spiders,
- meeting safety requirements,
- the acceptable loads per arm of the fittings are such that:
 - deformations under loading at SLS are less than 1 mm for forces applied parallel and perpendicular to the glass panels,
 - when they are weighted, they do not cause the yield point of the spider's material to be exceeded.
 - local deformations of the fittings under load combinations that are not weighted must be less than 1 mm.
 - deformations in the plane of the window walls, due to differential movement of the frames and expansion of the glass products should not generate compression or pulling in the mastics between the glass panels greater than those that are acceptable as given in DTU 44.1 (Sealing of facade joints using mastic – NF standard P 85-210, February 2002) and be compatible with the system's anticipated gaps.

3.1.2 Manufacturing conditions

See *CSTB Specifications 3574*, Section 4.

3.1.3 Implementation conditions

See *CSTB Specifications 3574*, Section 5.

3.2 Special Technical Specifications

3.2.1 Design conditions

The maximum weight of the glass panels will be respected.

For glass panels in a non-rectangular format, sizing may be affected based on the defined rectangle, failing which an experimental check should be made.

3.2.2 Manufacturing and inspection conditions

The glass panels are inspected according to the provisions defined in the technical file and according to SADEV's specifications.

The manufacturer is obliged to carry out an inspection of the manufacture of the point-fixed fittings and the fastenings.

3.2.3 Implementation conditions

SADEV window walls or windows may only be implemented in structures specially designed for this purpose:

- The deformation of the frames under non-weighted load combinations must meet NF standard EN 13 834 criteria for facade works and the 1/200th criterion for window works.
- For windows with a small incline, the total deformations of the glass panels, the secondary frame and the carrier frame under non-weighted load combinations must not cause a negative incline.
- Local deformations of the frames to the right of the fittings under non-weighted load combinations must be less than 1 mm.

Conclusions

Overall Assessment

The use of the SADEV procedure in the agreed area of use has been assessed favourably.

Validity

Up to 30 April 2016.

For Specialised Group no. 2
Chairman
M. KRIMM

4. Additional remarks from the Specialised Group

This 3rd revision includes the following modifications:

- Update of paragraph 4.1 (glass products) and table 14 (list of glass fabricators)

At the time of the 2nd revision, the following modifications had been done:

- The inclusion of rectangular-shaped laminated glass panels, 15mm thick, cylindrical holes for the internal component and 6 mm-thick, cylindrical holes for the external component.
- Addition of R1106 point-fixed fittings .
- Addition of R1038 point-fixed fittings .
- Addition of S3006 fittings .

SADEV'S Structural Bolted Glazing window wall and window system, like most systems of this type, impose great accuracy in the frame and require special precautions to be taken when implementing for the positioning and adjustment of the spiders, the tightening of the nuts and respecting the widths of the seals.

The sealing between the glass panels is performed using a single band of silicon mastic. Any damage to this sealing barrier which can be foreseen will be the cause of water ingress, so it should be ensured that this can be considered to be of low impact with regards to the purpose of the premises and, particularly in the case of windows, dependant on the materials likely to get damp. In addition, maintenance of the sealing trims should be provided for.

Even though the glass products are not supplied by SADEV, this Technical Evaluation is only valid insofar as the supplier of the glass products undertakes to comply with the specifications defined by SADEV and presented in § 4 of the Technical File and validate it with a specific marketing.

A calculation report for the glass panels must be drawn up on a case-by-case basis and be validated by SADEV.

Reporter from Specialised Group no. 2
M. COSSAVELLA

Technical File

drawn up by the applicant

A. Description

1. Principal and category

Point-fixed glass fittings and spiders for supporting single glazing in a usually metal internal or external frame for producing vertical or inclined window walls.

2. Materials

2.1 Glass products

The glass panels are manufactured with the following flat glass products:

- clear or extra-clear glass, complying with NF standard EN 572,
- coloured glass, complying with NF standard EN 572,
- enamelled glass with silkscreen printing complying with NF standard EN 12150,
- reflective glass with pyrolytic layer, complying with NF standard EN 1096,
- laminated glass, complying with NF standard EN 12543-2, with PVC insert.

These glasses must be quenched in accordance with NF standard EN 12150 and Heat Soak-treated according to NF standard EN 14179, with a minimum superficial compression stress of 90 MPa.

2.2 Fixing devices

The swivel fittings, manufactured by SADEV and with its brand, are made up of the elements shown in *tables 1 to 7 at the end of the Technical File*.

2.3 Spiders

Made up of 1 to 4 arms intended to receive the glass panel's point-fixed fitting devices, the SADEV-brand spiders may be:

- Made of X5 Cr Ni Mo 19-11-2 cast stainless steel according to NF standard EN 10213-4 for the S3000, S3006 and SP3100, brushed finish (see *figures 8, 11 and 13*).
- Made of X5 Cr Ni Mo 19-11-2 cast stainless steel according to NF standard EN 10213-4 for the S3001 and SP3101, electro-polished finish (see *figures 9 and 14*).
- Made of X2 Cr Ni Mo 17-12-2 folded stainless steel sheet according to NF standard EN 10088-3 for the S3003, brushed finish (see *figure 10*).
- Made of Al Si 5 Mg cast aluminium according to NF standard EN 1706 AC for the S3007, sanded finish (see *figure 12*).

2.4 Products for sealing between glass panels

Category 25E SNJF silicon mastic for sealing between glass panels, compatible with the peripheral sealing strips and, if necessary, with laminated glass panels with PVC inserts, applied on the backing seal in accordance with DTU 44.1:

- Backing seal made of Structural Bolted Glazing 4235 silicon strip, for glass panel thicknesses from 12 to 18 mm.
- Backing seal made of Structural Bolted Glazing 4110 silicon strip, for a glass panel thickness greater than 18 mm.

2.5 Peripheral sealing strips

Extruded silicon bellows seals, a SADEV part, made up on one of the two longitudinal edges of flexible lips forming receiving grooves from the edge(s) of the glass panels and intended to provide draught proofing between the glass panels and adjacent structural work or between glass panels in an outside or inside corner.

- Connecting strips with the masonry:
 - Structural Bolted Glazing 1015S for glass panels with a thickness of 10 to 15 mm,
 - Structural Bolted Glazing 2030D for glass panels with a thickness of 20 to 30 mm,
- Strips for connecting at a corner:
 - Structural Bolted Glazing 1015D for glass panels with a thickness of 10 to 15 mm,
 - Structural Bolted Glazing 2030D for glass panels with a thickness of 20 to 30 mm,

3. Elements

3.1 Glass panels

The rectangular-shaped glass panels may be:

- either monolithic from 6 to 19 mm with cylindrical holes or 8 to 19 mm with counter-sunk holes,
- or laminated with 4 PVC inserts with an internal and external component 6 to 15 mm thick with cylindrical holes. With counter-sunk holes, the minimum thickness of the external component becomes 8 mm.

The differences in thickness between the two laminated glass panel components are limited to 4 mm.

The maximum H/L ratio is 7.

These glass panels generally include, at each corner and potentially halfway along the longest side, drill holes whose dimensions are indicated in *table 8 at the end of the Technical File*.

3.2 Point-fixed fittings

The rotational range in the swivel fitting cage of the part that includes the spherical-headed threaded rod is $\pm 20^\circ$ maximum.

The nominal distance between the internal side of the glass panels and the reference plane making up the support surface of the fittings is 45 mm ± 5 mm.

See *table 9 at the end of the Technical File*.

- R1006, R1106, R1008 and R1038 point-fixed fittings enable blind assembly.
- For fitting on and external frame, and in order to guarantee better sealing, the locknut is replaced by:
 - a grooved nut made of X2 Cr Ni Mo 17-12-2 stainless steel according to NF standard EN 10088-3, \varnothing 50 mm for R1101 and R1106 swivel fittings or \varnothing 60 mm for other swivel fittings.
 - and a silicon cover.
- In the event where the Option Monti tightening nut is chosen, the useful tightening length is 23 mm maximum; with the Option 3025 nut, this length is reduced to 20 mm.

3.3 Spiders

These are made up of from one to four arms and enable the point-fixed fastenings to be connected to the frame in the various possible configurations: glass wall corners, horizontal and vertical edges, window frames, etc.

The central drilling hole is intended for a pin, bolt or screw of a suitable diameter for fixing onto the frame to pass through.

The organisation of the through holes for cylindrical or oblong pass-through fixing rods enables:

- the suspension or support of the glass panels by two upper or lower fixings respectively, made up of a fixed point and a point that expands horizontally,
- The absorption of the sizing differences of ± 3.5 mm connected with the tolerances or heat expansion of the glass panels,
- the absorption of differential movement between glass panels and frame resulting either in wind effects, or temperature effects, by the three points.

Table 10 below shows the main characteristics of the fittings (see *figures 8 to 14*).

For an M14 rod, the arm(s)¹ are made up of:

- either a 17 mm cylindrical hole,
- or a 17 x 24 mm or 17 x 28 mm vertical or horizontal oblong hole,
- or a 24 mm or 28 mm cylindrical hole,

For an M16 rod, the arm(s) are made up of:

- either a 19 mm cylindrical hole,
- or a 19 x 28 mm vertical or horizontal oblong hole.

¹ The S3000, S3001, S3006, S3007, S3100 and S3101 spiders with 1, 2 or 3 arms are equipped with inserts.

On the central hub of the spiders, there is a hole for an installation bolt, as well as two or four predrilled holes intended for the installation of anti-rotation pins with a diameter of 6 mm.

An alternative to pins enabling the transfer of rotational forces is possible with model S 3006 (see figure 16). This patented system also enables additional horizontal and vertical adjustment.

3.4 Sizing

3.4.1 Actions and combinations of SLS and ULS loads

Actions and combinations of SLS and ULS loads are determined from *CSTB Specifications 3574*.

3.4.2 Glass products

The determination or checking of the thickness of glass products, with regard to acceptable deformations under wind effects (deflection between supports or radius of curvature on intermediary support) and with regard to the constraints, will be performed according to the method defined in appendix 1 of the document "General terms and conditions of design, manufacture and implementation of structural bolted glazing" – *CSTB specifications 3574*.

The acceptable radii of curvature are given in *table 11 at the end of the Technical File*.

The calculation reports are validated by SADEV.

3.4.3 Point-fixed fittings

Their resistances are greater than the limits fixed for the loads of the glass panels and fittings (see § 3.4.4 Fittings).

3.4.4 Spiders

For standard or non-standard spiders, it is checked using calculation (for folded lugs) or by testing (for perforated and/or cast lugs) that:

- Deformations at SLS are:
 - 1 mm parallel to the glass panel plane,
 - 1 mm perpendicular to the glass panel plane,
- Constraints at ULS are less than the metal's yield point.
- For the S3003-10 spider, there is cause to check:

$$\frac{\text{Parallel loads (ULS)}}{920} + \frac{\text{Perpendicular loads (ULS)}}{186} \leq 1$$

The maximum acceptable resistances at ULS on 1 spider arm, whilst meeting the deformation and constraint criteria previously mentioned, are given in *table 12 at the end of the Technical File*.

The design of the connection between the spider and the frame (bolt, pins, etc.) should be performed according to current rules in force.

3.5 Heat insulation

The coefficient U for heat transmission of the SADEV window wall is given by the formulae:

$$U = U_g + N \cdot \chi / A \text{ (W / m}^2\text{.K)},$$

U_g = Coefficient per unit surface area at the current part of the glass panel in W/m².K.

N = Number of pass-through fixings.

χ = 0.020 W/K for glass from 8 to 15 mm,

χ = 0.025 W/K for glass with a thickness greater than 15 mm,

A = Surface area of the glass panel in m².

4. Manufacture

4.1 Glass products

Sadev identifies and approves glass fabrication companies in the procedures of Sadev (machining, heat treating, laminating). The list of approved companies is in table 14.

This list is subject to update and is available upon request. All new companies are subject to an initial control visit by the CSTB which allows the validation of the working methods/conformity with the directives in paragraph 4.1 and the specifications in CSTB 3574-V2 of Jan 2012.

4.1.1 Identification

Hardened glasses are identified according to their origin by a discrete and indelible stamp made up of the glass manufacturer's logo and the SADEV logo.

4.1.2 General manufacturing process

This is as follows:

- the glass products are cut,

- edges are fashioned with an industrial flat seal,
- the glass panels are washed,
- holes are drilled and countersunk on a multi-spindle drill, and the panels are tempered flat.

The glass panels are subject to Heat Soak treatment after hardening in accordance with standard EN 14179.

4.1.3 Tolerances

Manufacturing tolerances are as follows:

Length and width of the glass panels: + 0/- 2 mm,

Centre distance of the holes: ± 0.5 mm,

Alignment with the edges: + 0.5/- 0.0 mm,

Diameter of the holes +0.5/-0.0 mm,

Counter-sinking depth: + 0/- 0.5 mm,

Lamination components gap: ± 1 mm.

4.1.4 Checks

- Checks during manufacture:
 - quality and dimensions of the glass panels:
 - positioning of the holes,
 - diameter of the holes,
 - quality of countersinking,
 - inspection of the hardening furnaces.
- Checks on finished products:
 - after the Heat Soak test, measurement of surface tensions using a refractometer, along the sampling plane defined in *CSTB Specifications 3574* (minimum value of 90 MPa)
 - positioning of the lamination components:
 - no bubbling of the PVC.

4.2 Point-fixed fittings

4.2.1 Identification

The point-fixed fittings are identified with an indelible SADEV marking.

4.2.2 General manufacturing process

The parts of the point-fixed fittings are obtained by machining on a digital control machine.

The swivel fitting rods are stamped using a 60-tonne press.

4.2.3 Checks

Check of the threading of the rings and plugs.

- Sizing check (swivel fitting cage, nut, aluminium ring, and rod):
 - interior: max/min plug,
 - depth: depth gauge,
 - exterior: micrometer,
 - tapping: max/min threaded plug,
 - threading: max/min threaded ring.

4.3 Fittings

4.3.1 Identification

The fittings are identified by an indelible SADEV marking.

4.3.2 General manufacturing process

Cast fittings (S3000, S3006, S3100)

These fittings are obtained by lost-wax moulding at ISO 9001-2000 certified manufacturers designated by SADEV. The finish is obtained by brushing.

Cast fittings (S3001, S3101)

These fittings are obtained by lost-wax moulding at ISO 9001-2000 certified manufacturers designated by SADEV. The finish is obtained by shot-blasting and electro-polishing.

Cast fittings (S3007)

These fittings are obtained by shell moulding at ISO 9001-2000 certified manufacturers designated by SADEV. The finish is obtained by shot-blasting.

Cut folded fittings (S3003)

These fittings are obtained by laser cutting then folding of the arms. The finish is obtained by brushing.

For all fittings except S3003

The various drilling positions are obtained by deploying a specific insert.

For all fittings

The pin hole repeats are obtained by machining on a digital control machine.

4.33 Inspection

The size and visual inspection is carried out according to SADEV's internal procedure.

5. Implementation

5.1 Frame

SADEV's procedure is intended to produce vertical window walls and windows, in front of an internal or external frame, the glass components of which are fixed independently from each other on the aforementioned frame.

The requirements that apply to this frame are as follows:

- Deformability compliant with the requirements of the current regulations in force and with the Structural Bolted Glazing Technical Specifications, taking account of the weight of the window wall.
- Positioning tolerances of the screw, bolt or pin axes for fixing the fastening lug: ± 1 mm.
- Minimum support surface for the spiders is 60 x 60 mm.
- The connection device between the spider and frame must enable 3-dimensional adjustment to ± 5 mm.

5.2 General process

- Laser positioning and adjustment of the spiders on the frame.
- Counter drilling in the frame, using pre-drilled holes in the spiders, housings for the anti-rotation pins.
- Installation of these pins,
- Assembly on the glass panels:
 - of the cylindrical-conical aluminium ring,
 - of the stainless-steel screw or swivel fitting, with fixing rod,
 - of the polyacetal washer,
 - of the stainless-steel flat nut.
- The tightening of this assembly, using a dynamometric key and with a tightening torque of 10 N.m; immobilisation of the flat nut is obtained by the application of LOCTITE THREADLOCKER 2701 between the thread of the swivel fitting body and the tapping of the nut.
- Installation of the nuts, washers and inserts by distinguishing the fixed points and the expanding points, according to one of the A to H assembly methods proposed in figures 17 to 18.
- Installation at the expanding points of a cross-strut with a width greater than 0.5 mm compared to the thickness of the arms of the fittings.
- Erection of the glass panels thus equipped on the spiders.
- Adjustment of the flatness and verticality of the window wall by screwing-unscrewing the nuts on both sides of the spider.
- Tightening of the DIN 934 nuts on the DIN 127 single coil spring lock washer.

5.3 Sealing

5.31 Between glass panels (see figure 18)

The seals between the glass panels, with a nominal width of 12 mm, are filled with 25E SNJF silicon mastic potentially on a silicon-strip backing seal (see table 13 at the end of the Technical File).

The compatibility of the mastic with the PVC laminates must be verified.

5.32 Edge of the window wall (see figure 19)

- Joins with the structural work

A seal with a width of 30 mm \pm 10 mm is provided for between the glass panel edges and the adjacent structural work. This seal is filled using a fixed extruded silicon bellows strip, on the one hand by bonding using silicon mastic on the glass panels and on the other hand by continuous screwed strap onto the structural work.
- Joints between window walls

For window walls that make up a corner which is projecting or which opens inwards, or in front of an expansion joint, the connection between the edges of the window walls is provided by a bellows strip of the same type as before and also subject to bonding using silicon mastic onto the edges of the glass panels.

5.33 Sealing of the point-fixed fittings

- For R1001, R1101 and R1008 fixings, this is provided by 2 O-rings: 1 on the external diameter of the aluminium ring and 1 on the external diameter of the swivel fitting body (see figures 1,2 and 4).
- For R1003 and R1006 fixings, a band of Dow Corning DC791 neutral silicon mastic is applied to the inside and outside of the aluminium ring.

5.4 Maintenance – Repair

- Cleaning

Wash in clean water which potentially has a surface-active agent added.

For layered glass, periodic cleaning is necessary with thorough rinsing.
- Replacement

A damaged glass panel can be replaced with a glass panel of the same format.

In the event that a laminated glass component is damaged, the project owner or the occupant must carry out a replacement as soon as possible. If appropriate, until the said unit is installed, parking below the glass panel must be prevented by any suitable means.

B. Experimental results

- Test for determining sealing of a Structural Bolted Glazing fixing with silicon bellows (CSTB Report CL01-105),
- Structural Bolted Glazing fixing sealing test (CSTB Report CL04-030),
- Test for determining mechanical resistance under traction of the Structural Bolted Glazing fixings (CSTB Report CL04-023).
- Test for determining mechanical resistance under bending on the axes of the Structural Bolted Glazing fixings (CSTB Report CL04-023).
- Structural Bolted Glazing fixing fatigue test (CSTB Report CL04-042),
- Test for determining mechanical resistance to loads parallel and perpendicular to the glass panel plane on S3001, S3002, S3003 (10mm), S3005, S3007, S3009 and S3101 fittings (CSTB Report CL03-108).
- Test for determining mechanical resistance to loads parallel and perpendicular to the glass panel plane on S3001-short spider (CSTB Report CL03-006).
- Test for determining mechanical resistance to loads parallel and perpendicular to the glass panel plane on two arms of the S3100 spider (CSTB Report CL06-26002971).
- Test for determining mechanical resistance to loads parallel and perpendicular to the glass panel plane on the S3000 spider (CSTB Report CL05-007*01-Mod).
- Test for determining mechanical resistance under traction of the R1106 swivel fitting (DEM-005899-1 Report).
- Test for determining acceptable radii of curvature (CSTB Reports CLC08-26014705/A, CLC08-26014705/B and CLC10-2626360).
- Test for determining mechanical resistance to loads parallel and perpendicular to the glass panel plane on the S3006 spider (CSTB Report CLC10-26027676).

C. References

C.1 Environmental and Health Data²

The SADEV product (or procedure) is not subject to a FDES (*Fiche de Données Environnementales et Sanitaires* - Environmental and Health Data Sheet).

The data from FDESs is intended to be used for calculating the environmental impact of works in which the products (or procedures) specified are likely to be integrated.

C.2 Other references

All of the products relating to the SADEV procedure concern an area of around 25,000 m².

² Not examined by the Specialised Group within the scope of this Evaluation.

Tables and figures from the Technical File

Table 1 – Composition of the R 1001 swivel fitting fixing (figure 1)

R1001 (see figure 1)		
Designation	Material	Reference point
Swivel fitting body	X2 stainless steel Cr Ni Mo 17-12-2 according to NF standard EN100 88-3	1
M14 or M16 swivel fitting axis with spherical end Ø20 mm	X4 stainless steel Cr Ni Mo 16-5-1 according to NF standard EN100 88-3	2
Conical ring glass panel support height 7 mm	Anodised aluminium AW1050A according to NF standard EN 573-3	3
Contact washer, 1mm thick	White polyacetal or black polyethylene, hardness Rockwell M90	4
Locknut Ø60 mm – thickness 5 mm	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN100 88-3	5
M14 or M16 nut according to DIN 934	A4	6
Washer Ø14 or 16 according to NFE 25-513	A4	7
Single coil spring lock washer Ø14 or 16 according to DIN127	A4	8
M14 or M16 nut according to DIN 934	A4	9
3025 Option M14 or M16	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN100 88-3	10
Monti Option M14 or M16	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN10088-3	11
Cross-brace external Ø 16.5 or 18.5 mm – internal Ø 14 or 16 mm	Stainless steel X8 Cr Ni S 18-9 according to NF standard EN10088-3	E

Table 2 – Composition of the R 1101 swivel fitting fixing (figure 2)

R1101 (see figure 2)		
Designation	Material	Reference point
Swivel fitting body	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN10088-3	1
M14 or M16 swivel fitting axis with spherical end Ø20 mm	X4 stainless steel Cr Ni Mo 16-5-1 according to NF standard EN10088-3	2
Conical ring glass panel support height 7 mm	Anodised aluminium AW1050A according to NF standard EN 573-3	3
Contact washer, 1mm thick	White polyacetal or black polyethylene, hardness Rockwell M90	4
Locknut Ø50 mm – thickness 5 mm	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN10088-3	5
M14 or M16 nut according to DIN 934	A4	6
Washer Ø14 or 16 according to NFE 25-513	A4	7
Single coil spring lock washer Ø14 or 16 according to DIN127	A4	8
M14 or M16 nut according to DIN 934	A4	9
3025 Option M14 or M16	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN10088-3	10
Monti Option M14 or M16	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN10088-3	11
Cross-brace external Ø 16.5 or 18.5 mm – internal Ø 14 or 16 mm	Stainless steel X8 Cr Ni S 18-9 according to NF standard EN10088-3	E

Table 3 – Composition of the R 1003 swivel fitting fixing (figure 3)

R1003 (see figure 3)		
Designation	Material	Reference point
Swivel fitting body	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN10088-3	1
M14 or M16 swivel fitting axis with spherical end Ø20 mm	X4 stainless steel Cr Ni Mo 16-5-1 according to NF standard EN10088-3	2
Cylindrical ring glass panel support height determined by the formula ⁽¹⁾	Anodised aluminium AW1050A according to NF standard EN 573-3	3
Contact washer, 1mm thick	White polyacetal or black polyethylene, hardness Rockwell M90	4
Locknut Ø60 mm – thickness 5 mm	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN10088-3	5
M14 or M16 nut according to DIN 934	A4	6
Washer Ø14 or 16 according to NFE 25-513	A4	7
Single coil spring lock washer Ø14 or 16 according to DIN127	A4	8
M14 or M16 nut according to DIN 934	A4	9
3025 Option M14 or M16	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN10088-3	10
Monti Option M14 or M16	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN10088-3	11
Cross-brace external Ø 16.5 or 18.5 mm – internal Ø 14 or 16 mm	Stainless steel X8 Cr Ni S 18-9 according to NF standard EN10088-3	E

(1) $V-4 < H \leq V-1$ where V is the thickness in millimetres of the glass panel and H is the height in millimetres of the glass panel support ring.

Table 4 – Composition of the R 1008 swivel fitting fixing (figure 4)

R1008 (see figure 4)		
Designation	Material	Reference point
Swivel fitting body	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN10088-3	1
M14 or M16 swivel fitting axis with spherical end Ø20 mm	X4 stainless steel Cr Ni Mo 16-5-1 according to NF standard EN10088-3	2
Conical ring glass panel support height 7 mm	Anodised aluminium AW1050A according to NF standard EN 573-3	3
Contact washer, 1mm thick	White polyacetal or black polyethylene, hardness Rockwell M90	4
Locknut Ø60 mm – thickness 5 mm	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN10088-3	5
M14 or M16 nut according to DIN 934	A4	6
Washer Ø14 or 16 according to NFE 25-513	A4	9
Single coil spring lock washer Ø14 or 16 according to DIN127	A4	10
Plug Ø10 mm	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN10088-3	7
Swivel fitting bearing	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN10088-3	8
M14 or M16 nut according to DIN 934	A4	11
3025 Option M14 or M16	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN10088-3	12
Monti Option M14 or M16	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN10088-3	13
Cross-brace external Ø 16.5 or 18.5 mm – internal Ø 14 or 16 mm	Stainless steel X8 Cr Ni S 18-9 according to NF standard EN10088-3	E

Table 5 – Composition of the R 1006 swivel fitting fixing (figure 5)

R1006 (see figure 5)		
Designation	Material	Reference point
Swivel fitting body	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN10088-3	1
M14 or M16 swivel fitting axis with spherical end Ø 20 mm	X4 stainless steel Cr Ni Mo 16-5-1 according to NF standard EN10088-3	2
Cylindrical ring glass panel support height determined by the formula ⁽¹⁾	Anodised aluminium AW1050A according to NF standard EN 573-3	3
Contact washer, 1mm thick	White polyacetal or black polyethylene, hardness Rockwell M90	4
Locknut Ø60 mm – thickness 5mm	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN10088-3	5
M14 or M16 nut according to DIN 934	A4	6
Washer Ø14 or 16 according to NFE 25-513	A4	7
Single coil spring lock washer Ø14 or 16 according to DIN127	A4	8
M14 or M16 nut according to DIN 934	A4	9
3025 Option M14 or M16	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN10088-3	10
Monti Option M14 or M16	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN10088-3	11
Cross-brace external Ø 16.5 or 18.5mm – internal Ø 14 or 16mm	Stainless steel X8 Cr Ni S 18-9 according to NF standard EN10088-3	E

(1) $V-4 < H \leq V-1$ where V is the thickness in millimetres of the glass panel and H is the height in millimetres of the glass panel support ring.

Table 6 – Composition of the R 1038 swivel fitting fixing (figure 6)

R1038 (see figure 6)		
Designation	Material	Reference point
Swivel fitting body	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN10088-3	1
M14 or M16 swivel fitting axis with spherical end Ø 20 mm	X4 stainless steel Cr Ni Mo 16-5-1 according to NF standard EN10088-3	2
Cylindrical ring glass panel support of a height defined by the formula ⁽¹⁾	Anodised aluminium AW1050A according to NF standard EN 573-3	3
Contact washer, 1mm thick	White polyacetal or black polyethylene, hardness Rockwell M90	4
Locknut Ø60 mm – thickness 5mm	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN10088-3	5
M14 or M16 nut according to DIN 934	A4	6
Washer Ø14 or 16 according to NFE 25-513	A4	7
Single coil spring lock washer Ø14 or 16 according to DIN127	A4	8
Plug Ø10mm	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN10088-3	9
Bearing Ø60	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN10088-3	10
M14 or M16 nut according to DIN 934	A4	11
3025 Option M14 or M16	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN10088-3	12
Monti Option M14 or M16	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN10088-3	13
Cross-brace external Ø 16.5 or 18.5mm – internal Ø 14 or 16mm	Stainless steel X8 Cr Ni S 18-9 according to NF standard EN10088-3	E

(1) $V-4 < H \leq V-1$ where V is the thickness in millimetres of the glass panel and H is the height in millimetres of the glass panel support ring.

Table 7 – Composition of the R 1106 swivel fitting fixing (figure 7)

R1106 (see figure 7)		
Designation	Material	Reference point
Swivel fitting body	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN10088-3	1
M14 or M16 swivel fitting axis with spherical end Ø 20 mm	X4 stainless steel Cr Ni Mo 16-5-1 according to NF standard EN10088-3	2
Cylindrical ring glass panel support of a height defined by the formula ⁽¹⁾	Anodised aluminium AW1050A according to NF standard EN 573-3	3
Contact washer, 1mm thick	White polyacetal or black polyethylene, hardness Rockwell M90	4
Locknut Ø50 mm – thickness 5mm	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN10088-3	5
M14 or M16 nut according to DIN 934	A4	6
Washer Ø14 or 16 according to NFE 25-513	A4	7
Single coil spring lock washer Ø14 or 16 according to DIN127	A4	8
M14 or M16 nut according to DIN 934	A4	9
3025 Option M14 or M16	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN10088-3	10
Monti Option M14 or M16	Stainless steel X2 Cr Ni Mo 17-12-2 according to NF standard EN10088-3	11
Cross-brace external Ø 16.5 or 18.5mm – internal Ø 14 or 16mm	Stainless steel X8 Cr Ni S 18-9 according to NF standard EN10088-3	E

(1) $V-4 < H \leq V-1$ where V is the thickness in millimetres of the glass panel and H is the height in millimetres of the glass panel support ring

Table 8 - Dimensions of the glass panel drill holes (see figure 15)

Fixing	Drilling	
	External glass	Internal glass (if laminated glass)
R1001 R1008	Hole Ø36 mm counter-sunk at 45° over 5 mm (Ø46 mm on the outside)	Hole Ø41 mm
R1003 R1006 R1038	Hole Ø36 mm	Hole Ø41 mm
R1101	Hole Ø31 mm counter-sunk at 45° over 4.5 mm (Ø40 mm on the outside)	Hole Ø36 mm
R1106	Hole Ø30 mm	Hole Ø36 mm
All right-angled edges have a 1 mm bevelled edge		

Tableau 9 - Maximum acceptable resistances at ULS parallel to the glass panel plane (in daN) according to the lever arm (swivel fitting axis in the spider's support plane)

		45 mm	60 mm
1.4418 X4CrNiMo 16-5-1	M14	464	207
	M16	674	342

Table 10 - Main features of the spiders

Type	Thickness of the spider (mm)	Height of the cross-strut (mm)	Nominal distance along X and Y for the holes in relation to the edge of the glass panels (mm)	Centre distance of the holes (mm)	Nature	Ø of central drilling (mm)
S3000	12 ±0,2	12.5	96	204	Cast stainless steel	16.5
S3001	12 ±0,2	12.5	96	204	Cast stainless steel	12.5
S3003	10 ±0,2	10.5	96	204	Folded stainless steel	16
S3006	12 ±0,2	12.5	96	204	Cast stainless steel	12.5
S3007	21 ±0,2	21.5	96	204	Cast aluminium	12.5
S3100	12 ±0,2	12.5	96	204	Cast stainless steel	16x25
S3101	12 ±0,2	12.5	96	204	Cast stainless steel	16x25

Table 11 - Acceptable radii of curvature for clear glass panels

Thickness (mm)	Acceptable radius of curvature (m)	
	R1003 fixing	R1001 fixing
6	3.014	-
8	4.570	4.738
10	6.909	8.904
12	9.042	9.428
15	-	13.478

Table 12 - Maximum acceptable resistance to ULS

Spider	Maximum acceptable resistance to ULS per arm (yield point) in daN	
	Loads parallel to the glass panel planes	Loads perpendicular to the glass panel planes
S3000	398	300
S3001	241	155
S3003-10	820	136
S3006	303	104
S3007	199	198
S3100	410	184
S3101	497	128

Table 13 - Sealing between glass panels

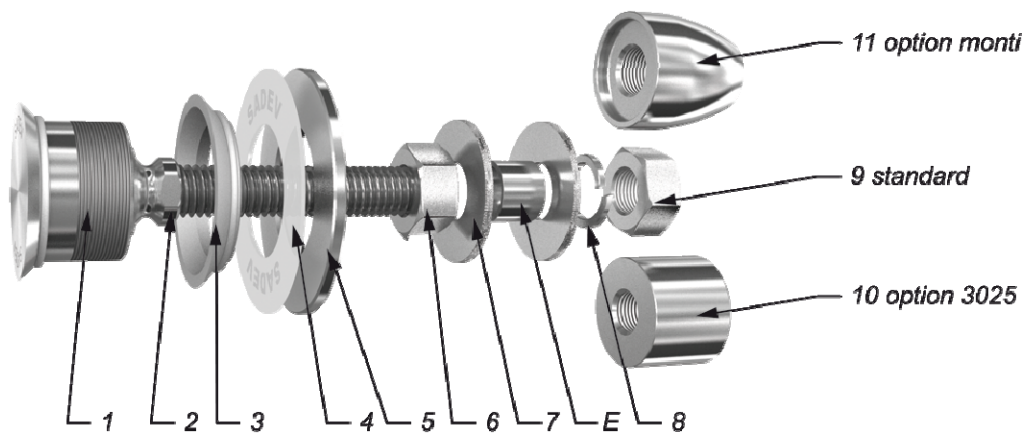
Glass panel	Thickness in mm	Seal base	Mastic trim l (mm) x e (mm)
8 10	8 10	Temporary backing seal	12 x 6 min 12 x 6 min
12 6.6.4 15 6.8.4 8.8.4 6.10.4	12 13.5 15 15.5 17.5 17.5	Structural Bolted Glazing 4235 (e = 6 mm)	12 x 6 12 x 7.5 12 x 9 12 x 9.5 12 x 11.5 12 x 11.5
19 8.10.4 8.12.4 10.10.4 10.12.4	19 19.5 21.5 21.5 23.5	Structural Bolted Glazing 4110 (e = 12 mm) placed on the inside	12 x 7 12 x 7.5 12 x 9.5 12 x 9.5 12 x 11.5
12.12.4 12.15.4 15.15.4	25.5 28.5 31.5	Structural Bolted Glazing 4110 (e = 12 mm) centred in the thickness of the glass panel	(12 x 6.75) x 2 (12 x 8.25) x 2 (12 x 9.75) x 2

Table 14 – List of main glass panel manufacturers approved by SADEV

SITE FABRICANT	ADRESSE
Machining / Toughening / Heat Soaking Treatment / Lamination	
AGC AIV	ZI – 13 rue COLBERT - 35300 FOUGERES
AGC IVB	ZI – Route d'ARCIS - 10170 MERY SUR SEINE
AGC SIGLAVER	30 rue Pied de Fond - 79061 NIORT Cedex 9
³ AGC VERTAL IDF	ZA Les Portes de la Forêt - 11 allée du Clos des Charmes 77615 MARNE LA VALLEE Cedex 3
AGC VERTAL SUD-EST	25 rue du Lyonnais - 69800 SAINT-PRIEST
MIROITERIE DE CHARTREUSE	ZA du Parvis - 38507 VOIRON
SGGS ALP'VERRE	8 rue des Terrasses - 74960 CRAN GEVRIER
SGGS DUTTLENHEIM (TECHNIVERRE 67)	ZI – rue Denis PAPIN - 67120 DUTTLENHEIM
⁴Machining	
AGC VERTAL NORD-EST	ZA de Wisches - 67130 WISCHES
COPROVER (MIR CASTRAISE)	20 rue Henri REGNAULT - 81100 CASTRES
DESCHANET Michel SA	ZAC d'Augny - 57685 AUGNY
DIFFUVER	ZI de l'Etang - 42210 MARCLOPT
FRANCAISE DU VERRE	107-109 rue de Picpus - 75012 PARIS
AMS (MIR DE L'OUEST)	ZI ACTI SUD – rue René COTTY - 85000 LA ROCHE SUR YON
MIROITERIE JOSSERAND	2086 avenue de Trevoux - 01000 SAINT- DENIS-LES-BOURGS
SGGS PARIS NORMANDIE	ZI CAEN OUEST - 14651 CARPIQUET Cedex
WEHR MUNDOLSHEIM	10 rue Thomas EDISON - 67450 MUNDOLSHEIM
WEHR ETUPES	ZI Technoland - 25461 ETUPES Cedex
MIROITERIE DE L'OUEST	ZI Chef de Baie - 14040 LA ROCHELLE
MIROITERIE DE CHARTREUSE	ZA Bievres Dauphine - 38690 COLOMBE

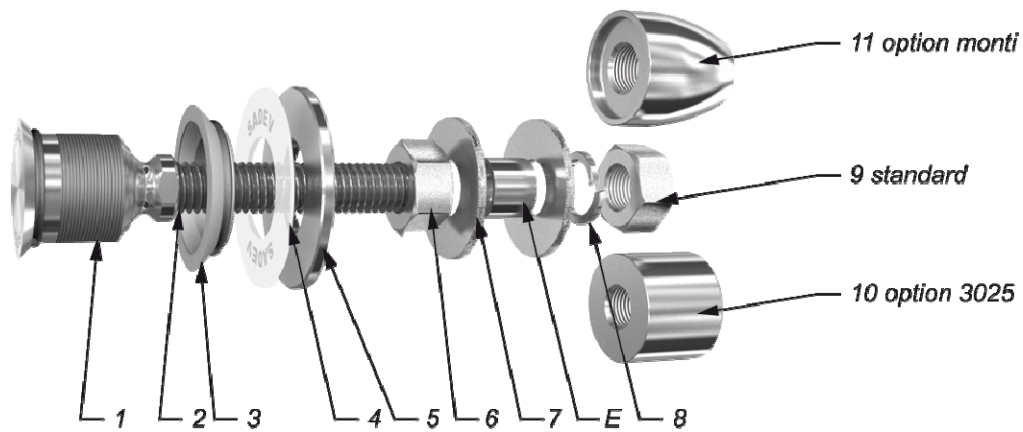
³ Machining/Toughening/Heat Soak Test process for monolithic glass only.

⁴ The toughening process, the Heat Soaking Treatment and lamination must be carried out in one of the centres mentioned in the first part of the above table "Machining / Toughening / Heat Soaking Treatment / Lamination".



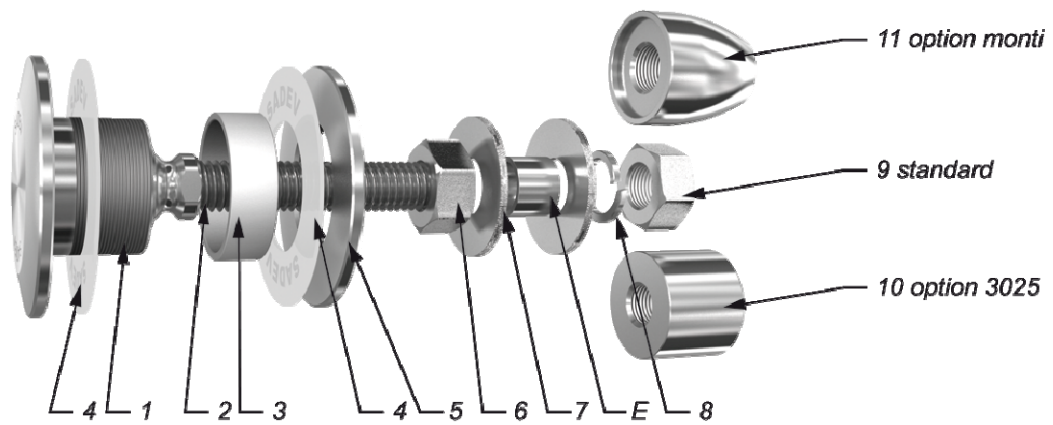
Rep	No.	Designation	Material
1	1	Swivel fitting body	X2 Cr Ni Mo 17.12.2 according to EN 10088-3
2	1	Swivel fitting axis	X4 Cr Ni Mo 16.5.1 according to EN 10088-3
3	1	Glass panel support ring	AW-1050A according to EN 573-3/Al 99.5%
4	1	Contact washer	White polyacetal/white polyethylene
5	1	Locknut Ø 60	X2 Cr Ni Mo 17.12.2 according to EN 10088-3
6	1	Nut DIN 934	A4
7	2	Washer	A4
8	1	Washer DIN 127	A4
9	1	Nut DIN 934	A4
10	1	3025 Option	X2 Cr Ni Mo 17.12.2 according to EN 10088-3
11	1	Monti Option	X2 Cr Ni Mo 17.12.2 according to EN 10088-3

Figure 1 - R1001 - Point-fixed fitting



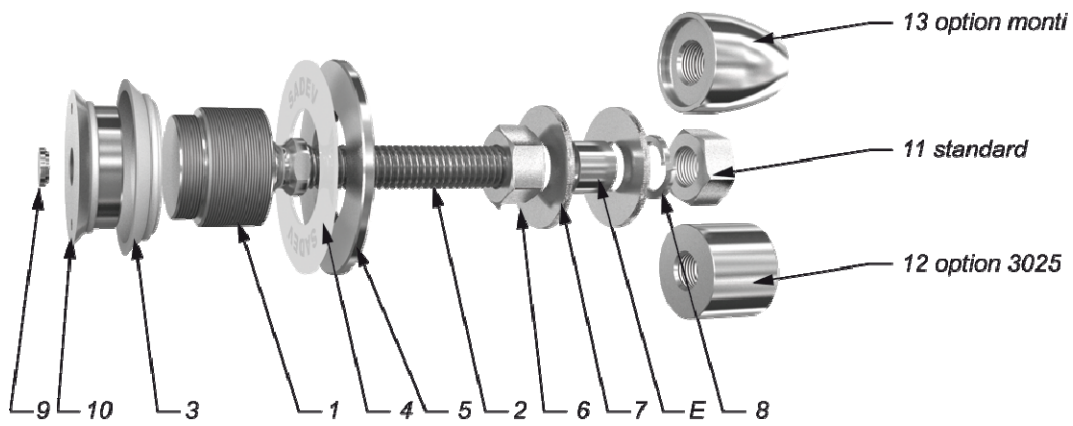
Rep	No.	Designation	Material
1	1	Swivel fitting body	X2 Cr Ni Mo 17.12.2 according to EN 10088-3
2	1	Swivel fitting axis	X4 Cr Ni Mo 16.5.1 according to EN 10088-3
3	1	Glass panel support ring	AW-1050A according to EN 573-3/AI 99.5%
4	1	Contact washer	White polyacetal/white polyethylene
5	1	Locknut Ø 50	X2 Cr Ni Mo 17.12.2 according to EN 10088-3
6	1	Nut DIN 934	A4
7	2	Washer	A4
8	1	Washer DIN 127	A4
9	1	Nut DIN 934	A4
10	1	3025 Option	X2 Cr Ni Mo 17.12.2 according to EN 10088-3
11	1	Monti Option	X2 Cr Ni Mo 17.12.2 according to EN 10088-3

Figure 2 - R1101 - Point-fixed fitting



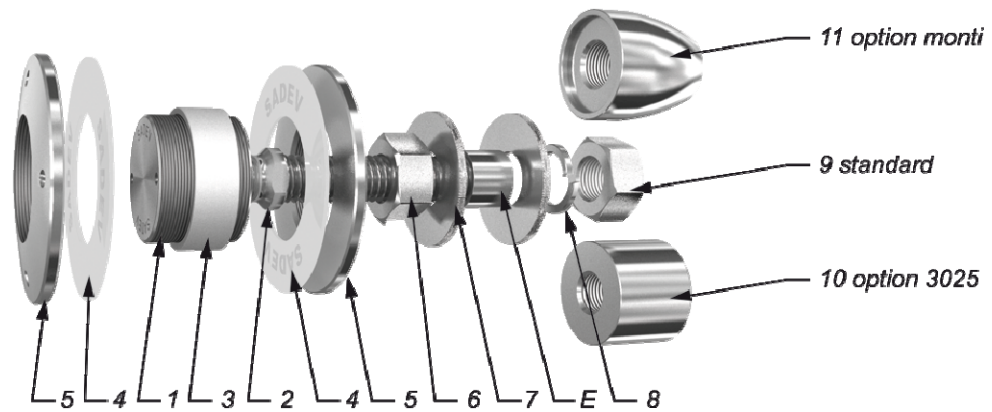
Rep	No.	Designation	Material
1	1	Swivel fitting body	X2 Cr Ni Mo 17.12.2 according to EN 10088-3
2	1	Swivel fitting axis	X4 Cr Ni Mo 16.5.1 according to EN 10088-3
3	1	Glass panel support ring	AW-1050A according to EN 573-3/Al 99.5%
4	2	Contact washer	White polyacetal/white polyethylene
5	1	Locknut Ø 60	X2 Cr Ni Mo 17.12.2 according to EN 10088-3
6	1	Nut DIN 934	A4
7	2	Washer	A4
8	1	Washer DIN 127	A4
9	1	Nut DIN 934	A4
10	1	3025 Option	X2 Cr Ni Mo 17.12.2 according to EN 10088-3
11	1	Monti Option	X2 Cr Ni Mo 17.12.2 according to EN 10088-3

Figure 3 - R1003 - Point-fixed fitting



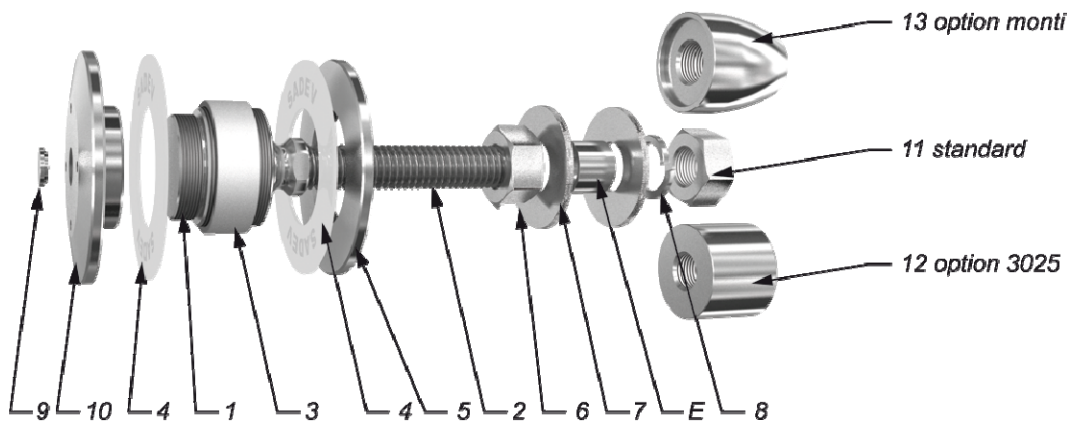
Rep	No.	Designation	Material
1	1	Swivel fitting body	X2 Cr Ni Mo 17.12.2 according to EN 10088-3
2	1	Swivel fitting axis	X4 Cr Ni Mo 16.5.1 according to EN 10088-3
3	1	Glass panel support ring	AW-1050A according to EN 573-3/AI 99.5%
4	1	Contact washer	White polyacetal/white polyethylene
5	1	Locknut Ø 60	X2 Cr Ni Mo 17.12.2 according to EN 10088-3
6	1	Nut DIN 934	A4
7	2	Washer	A4
8	1	Washer DIN 127	A4
9	1	Plug	X2 Cr Ni Mo 17.12.2 according to EN 10088-3
10	1	Bearing	X2 Cr Ni Mo 17.12.2 according to EN 10088-3
11	1	Nut DIN 934	A4
12	1	3025 Option	X2 Cr Ni Mo 17.12.2 according to EN 10088-3
13	1	Monti Option	X2 Cr Ni Mo 17.12.2 according to EN 10088-3

Figure 4 - R1008 - Point-fixed fitting



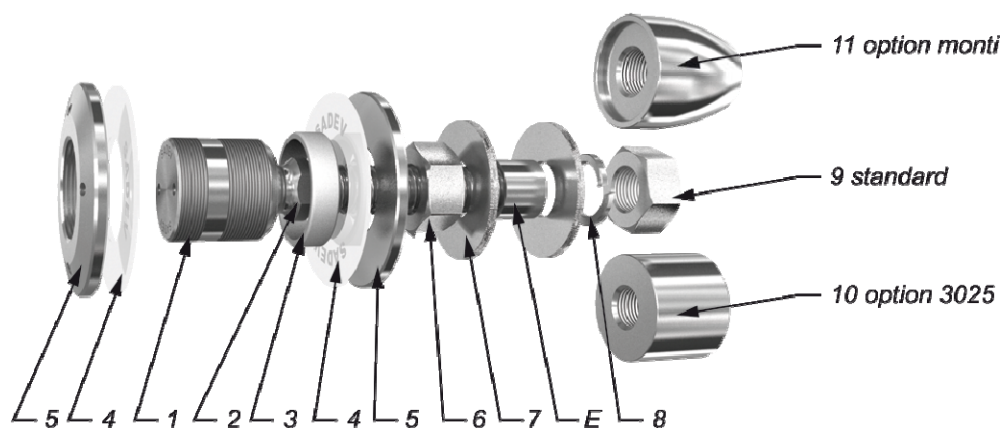
Rep	No.	Designation	Material
1	1	Swivel fitting body	X2 Cr Ni Mo 17.12.2 according to EN 10088-3
2	1	Swivel fitting axis	X4 Cr Ni Mo 16.5.1 according to EN 10088-3
3	1	Glass panel support ring	AW-1050A according to EN 573-3/AI 99.5%
4	2	Contact washer	White polyacetal/white polyethylene
5	2	Locknut Ø 60	X2 Cr Ni Mo 17.12.2 according to EN 10088-3
6	1	Nut DIN 934	A4
7	2	Washer	A4
8	1	Washer DIN 127	A4
9	1	Nut DIN 934	A4
10	1	3025 Option	X2 Cr Ni Mo 17.12.2 according to EN 10088-3
11	1	Monti Option	X2 Cr Ni Mo 17.12.2 according to EN 10088-3

Figure 5 - R1006 - Point-fixed fitting



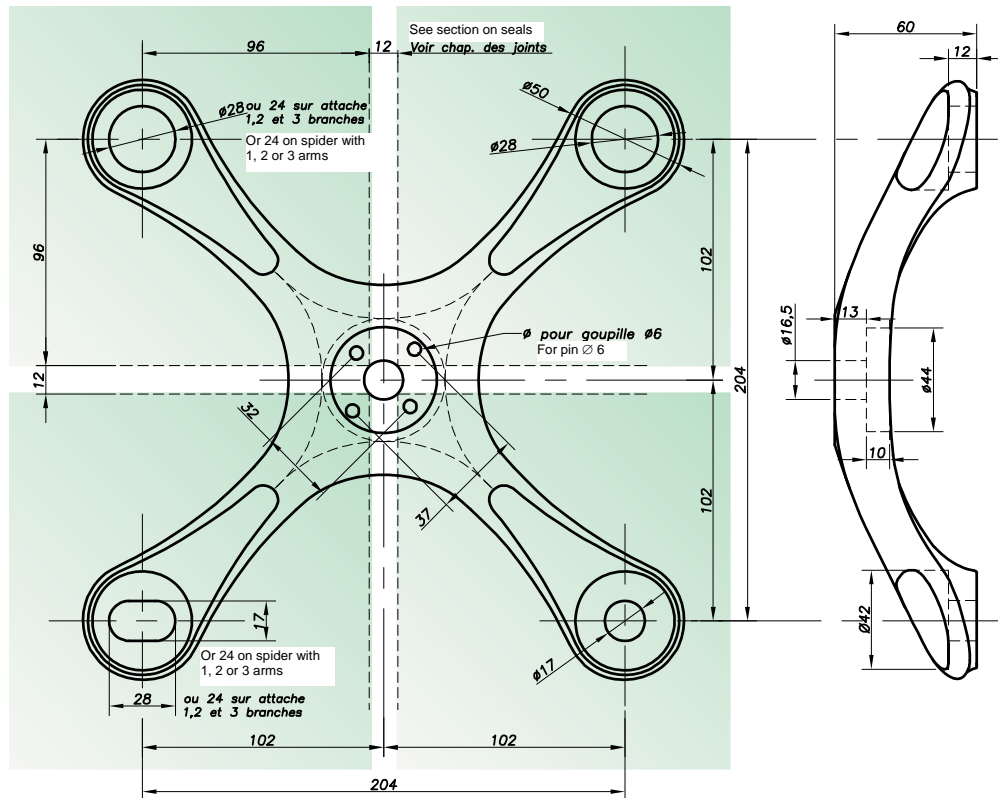
Rep	No.	Designation	Material
1	1	Swivel fitting body	X2 Cr Ni Mo 17.12.2 according to EN 10088-3
2	1	Swivel fitting axis	X4 Cr Ni Mo 16.5.1 according to EN 10088-3
3	1	Glass panel support ring	AW-1050A according to EN 573-3/Al 99.5%
4	2	Contact washer	White polyacetal/white polyethylene
5	1	Locknut Ø 60	X2 Cr Ni Mo 17.12.2 according to EN 10088-3
6	1	Nut DIN 934	A4
7	2	Washer	A4
8	1	Washer DIN 127	A4
9	1	Plug	X2 Cr Ni Mo 17.12.2 according to EN 10088-3
10	1	Bearing	X2 Cr Ni Mo 17.12.2 according to EN 10088-3
11	1	Nut DIN 934	A4
12	1	3025 Option	X2 Cr Ni Mo 17.12.2 according to EN 10088-3
13	1	Monti Option	X2 Cr Ni Mo 17.12.2 according to EN 10088-3

Figure 6 - R1038 - Point-fixed fitting



Rep	No.	Designation	Material
1	1	Swivel fitting body	X2 Cr Ni Mo 17.12.2 according to EN 10088-3
2	1	Swivel fitting axis	X4 Cr Ni Mo 16.5.1 according to EN 10088-3
3	1	Glass panel support ring	AW-1050A according to EN 573-3/Al 99.5%
4	2	Contact washer	White polyacetal/white polyethylene
5	1	Locknut Ø 50	X2 Cr Ni Mo 17.12.2 according to EN 10088-3
6	1	Nut DIN 934	A4
7	2	Washer	A4
8	1	Washer DIN 127	A4
9	1	Nut DIN 934	A4
10	1	3025 Option	X2 Cr Ni Mo 17.12.2 according to EN 10088-3
11	1	Monti Option	X2 Cr Ni Mo 17.12.2 according to EN 10088-3

Figure 7 - R1106 - Point-fixed fitting



View from glass side

Vue coté verre

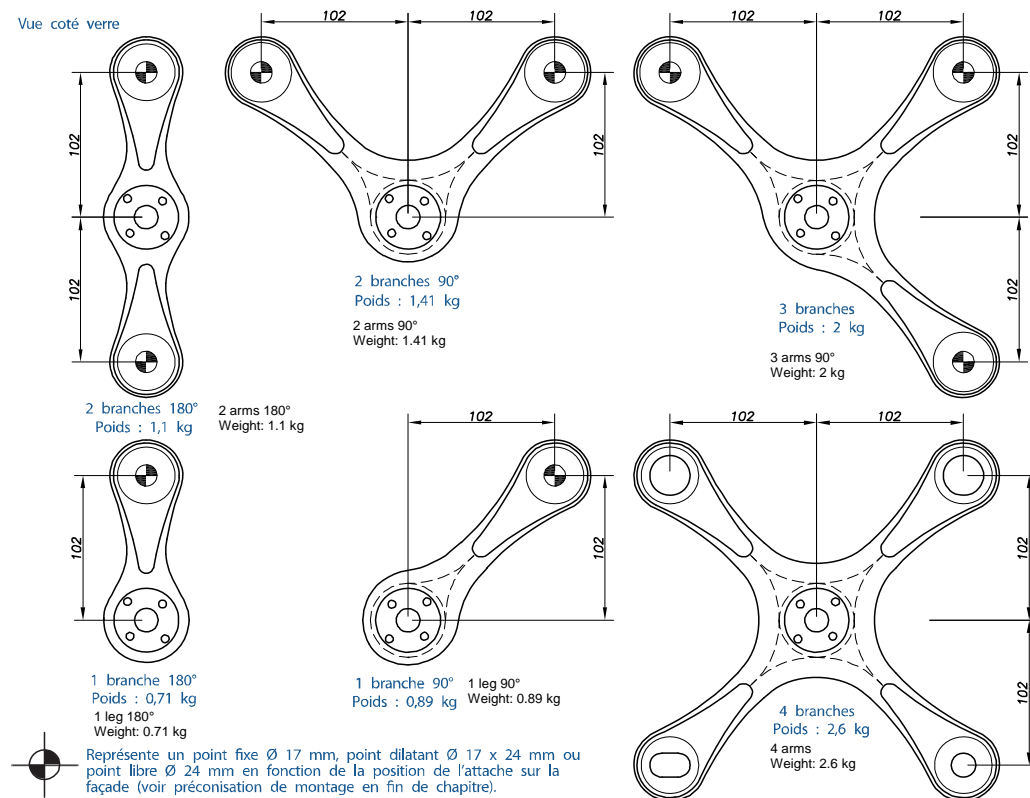
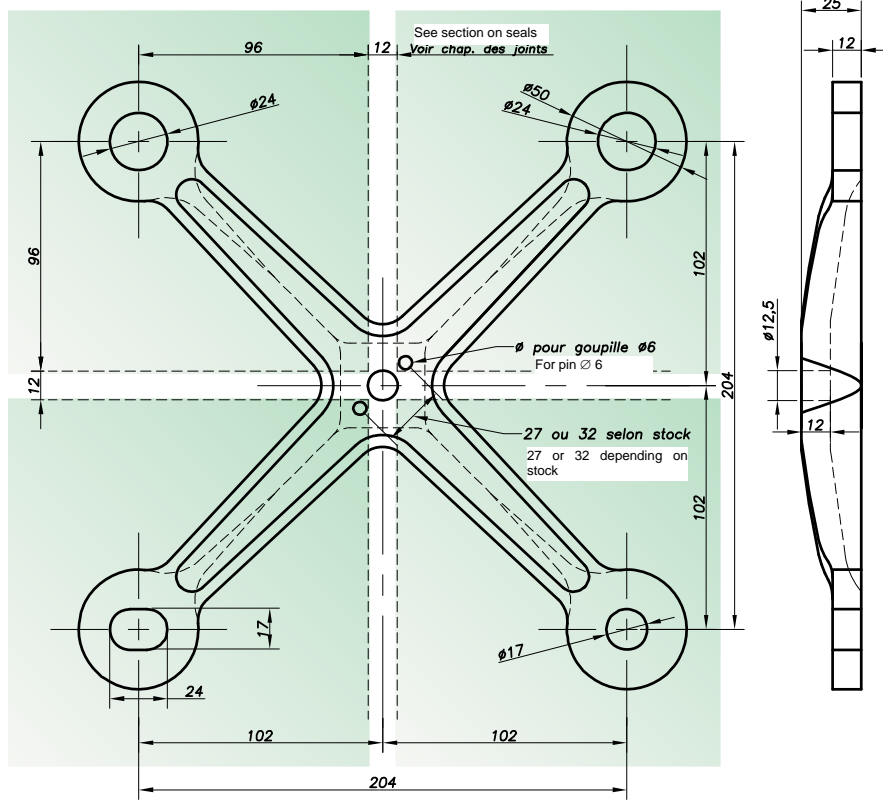


Figure 8 – S3000 - Spider



View from glass side

Vue coté verre

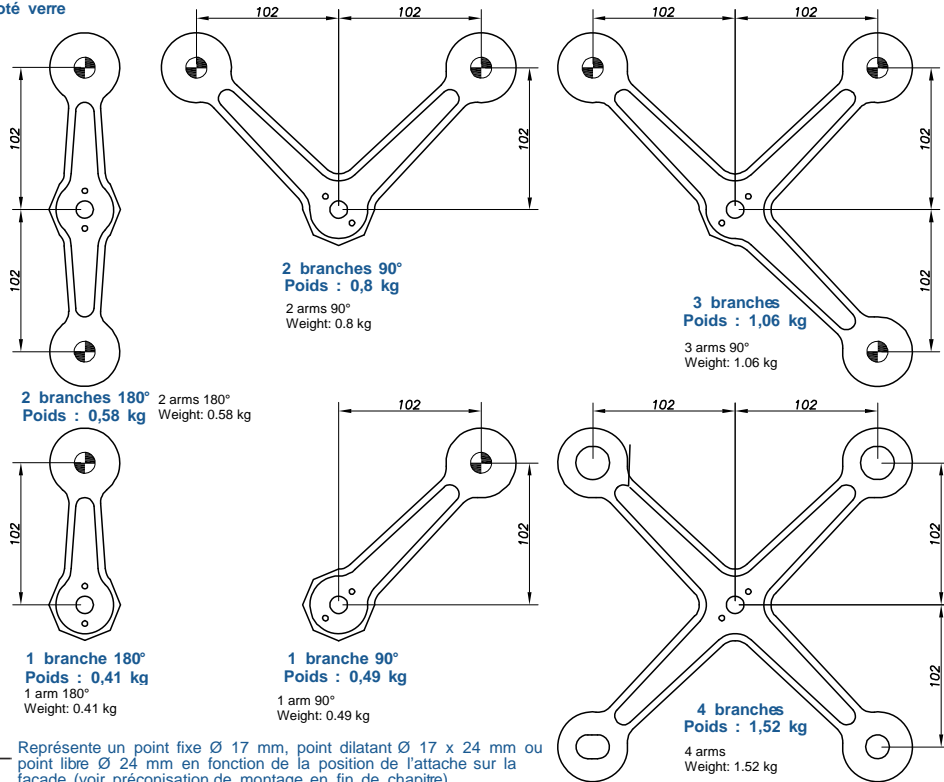
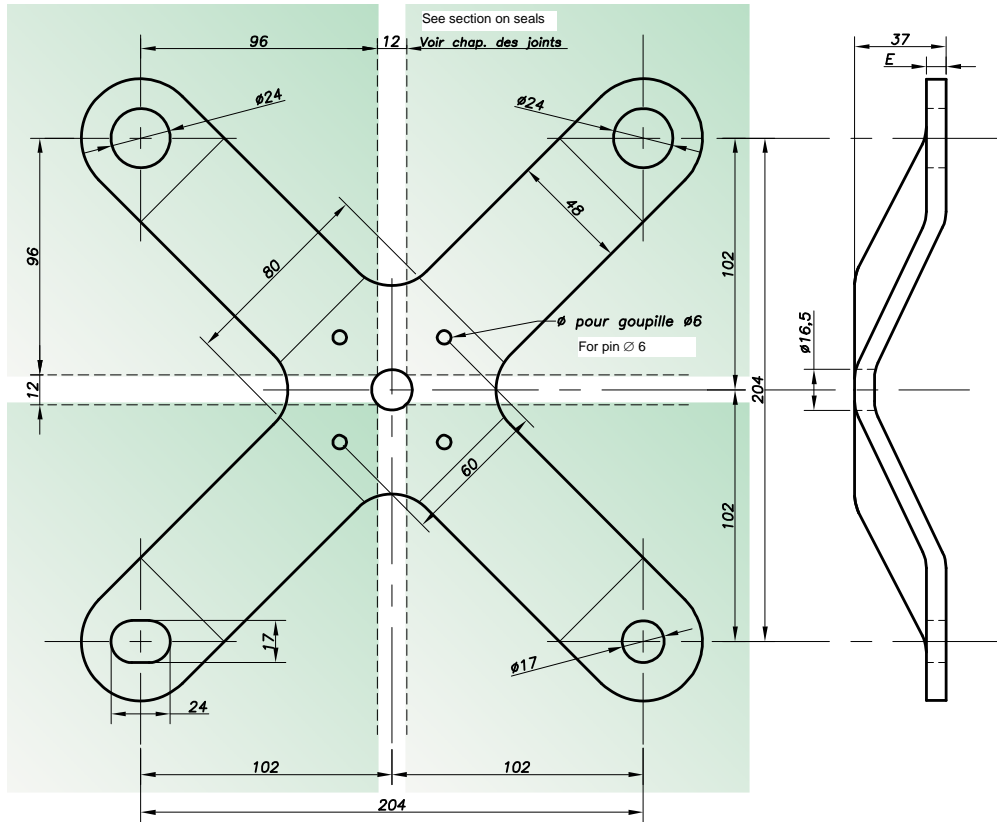


Figure 9 – S3001 - Spider



View from glass side
Vue coté verre

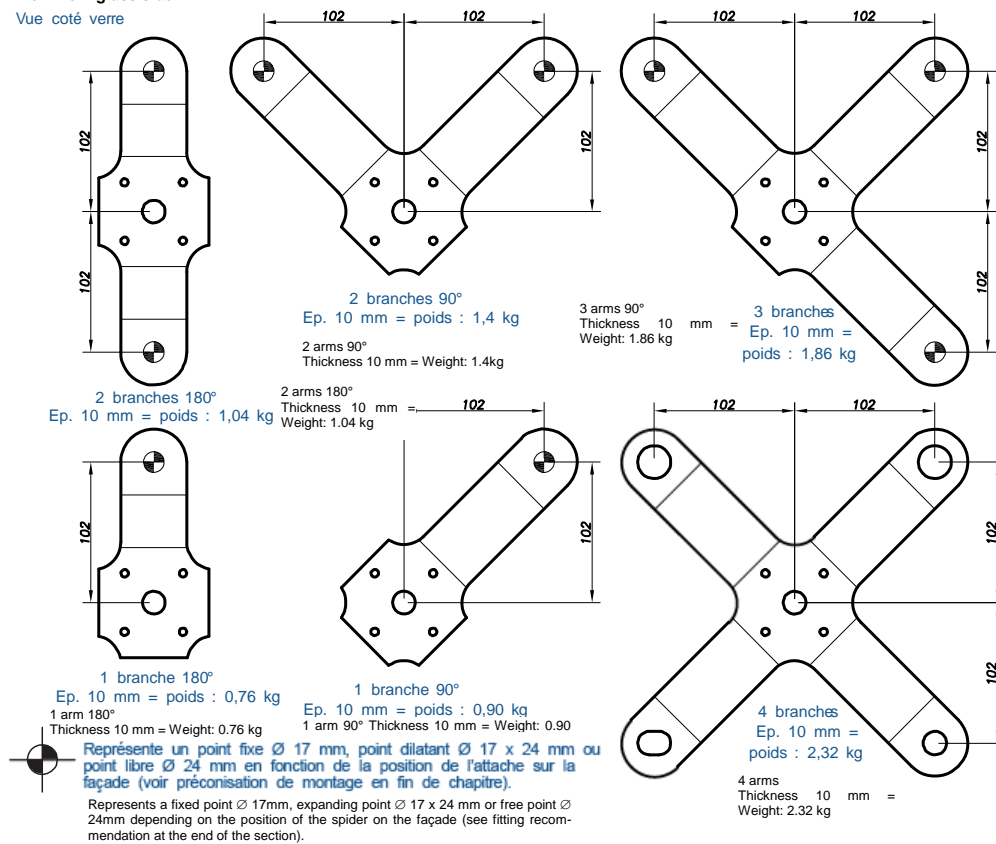
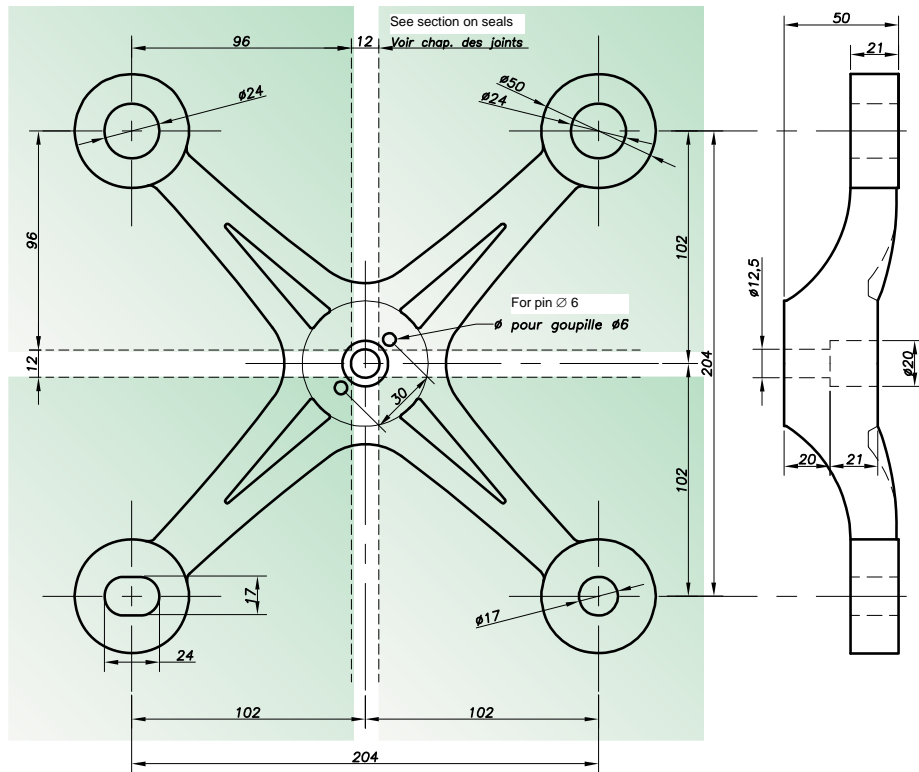
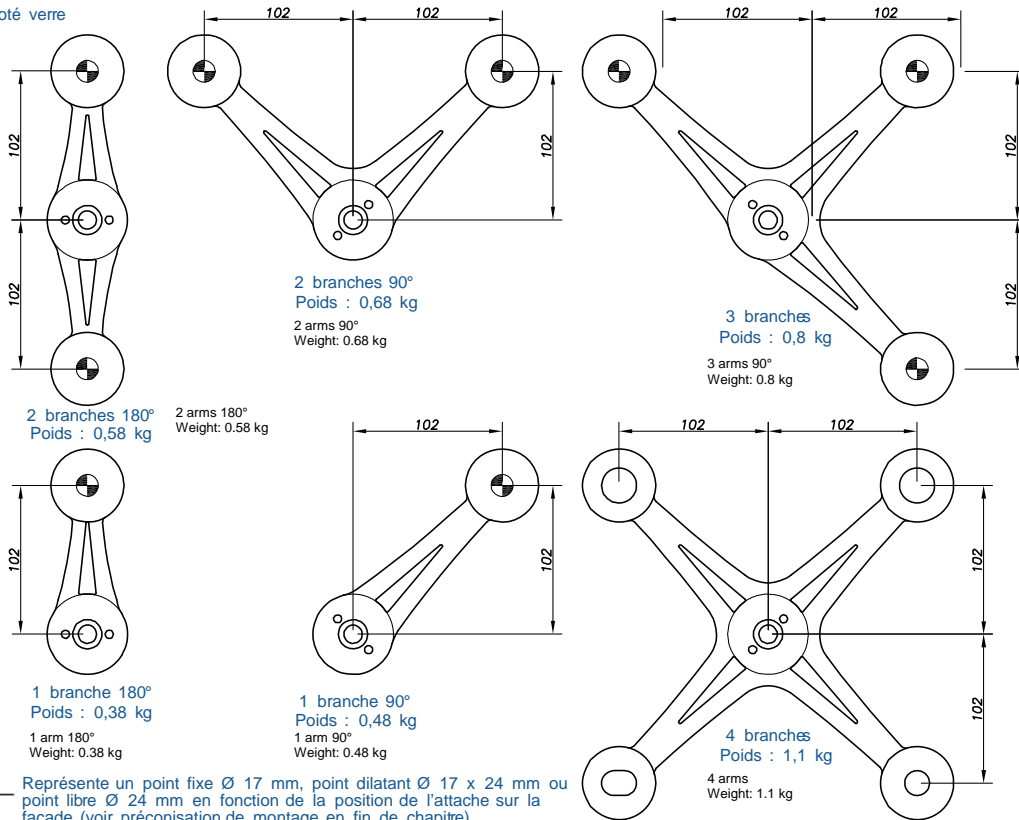


Figure 10 – S3003 - Spider



View from glass side

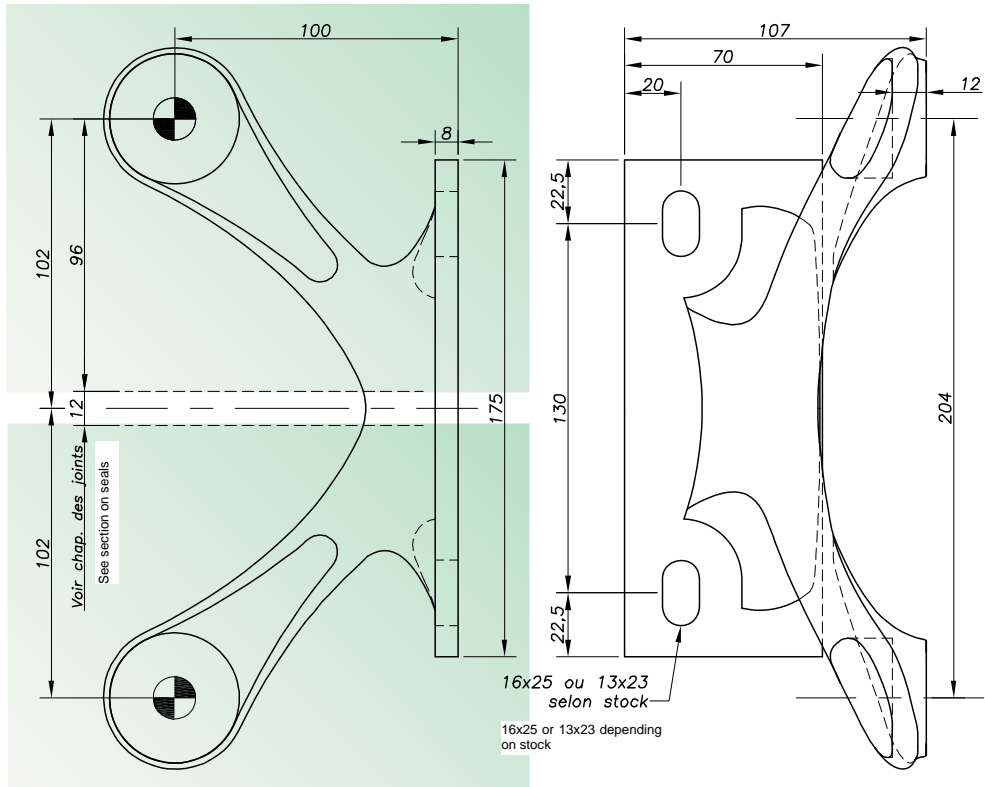
Vue coté verre



Représente un point fixe Ø 17mm, point dilatant Ø 17 x 24 mm ou point libre Ø 24 mm en fonction de la position de l'attache sur la façade (voir préconisation de montage en fin de chapitre).

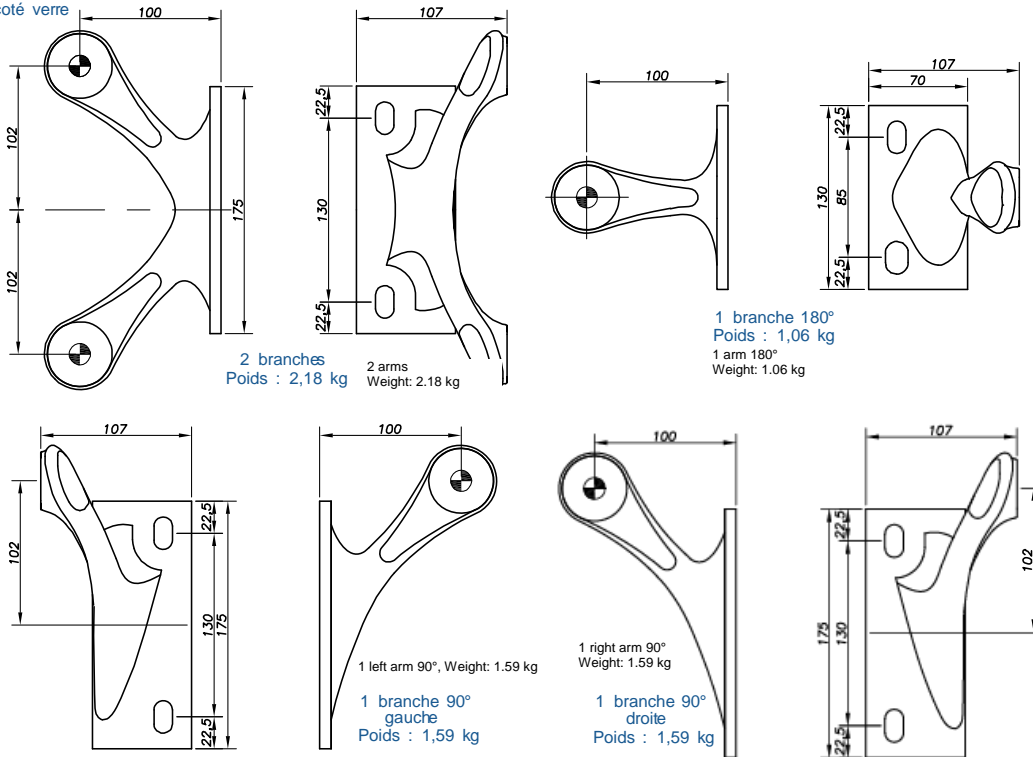
Represents a fixed point Ø 17mm, expanding point Ø 17 x 24 mm or free point Ø 24mm depending on the position of the spider on the façade (see fitting recommendation at the end of the section).

Figure 12 – S3007 - Spider



View from glass side

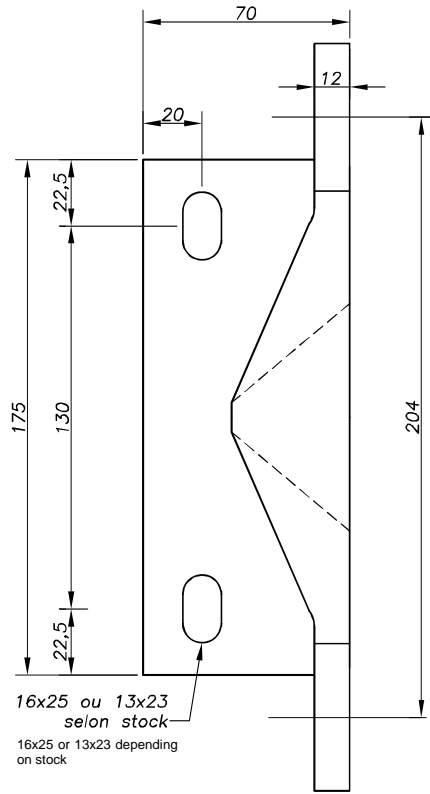
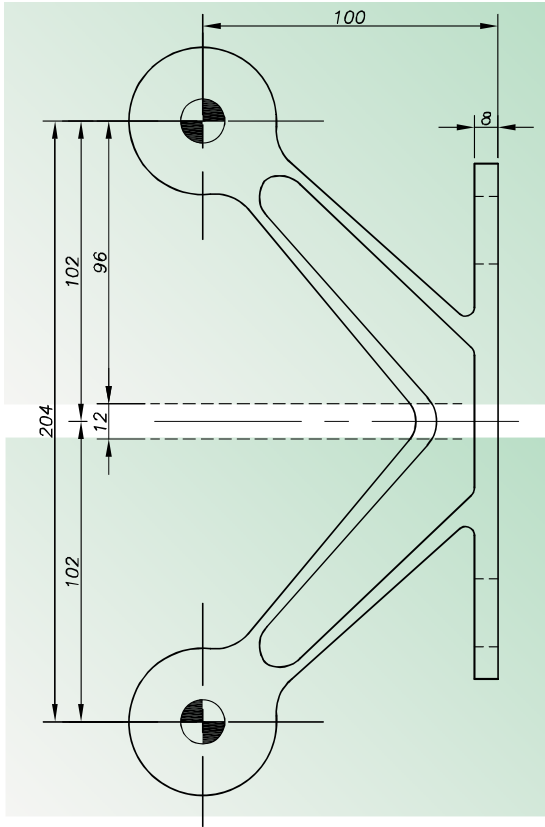
Vue coté verre



Représente un point fixe Ø 17 mm, point dilatant Ø 17 x 24 mm ou point libre Ø 24 mm en fonction de la position de l'attache sur la façade (voir préconisation de montage en fin de chapitre).

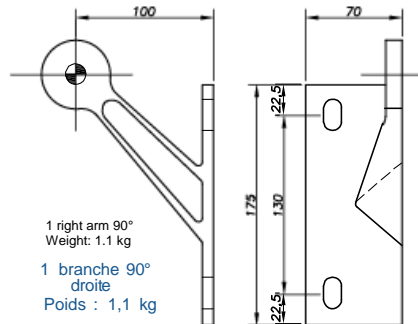
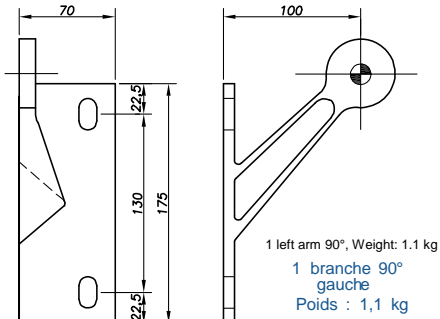
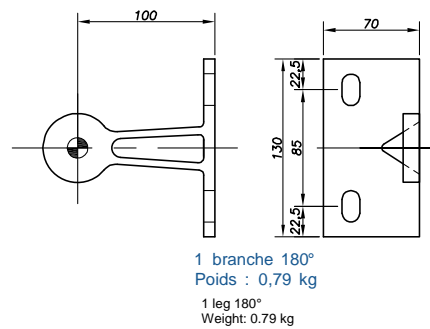
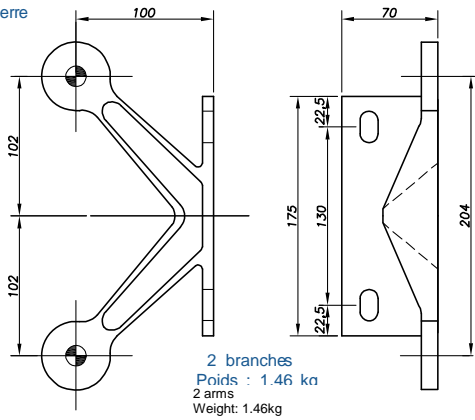
Represents a fixed point Ø 17mm, expanding point Ø 17 x 24 mm or free point Ø 24mm depending on the position of the spider on the façade (see fitting recommendation at the end of the section).

Figure 13 – S3100 - Spider



View from glass side

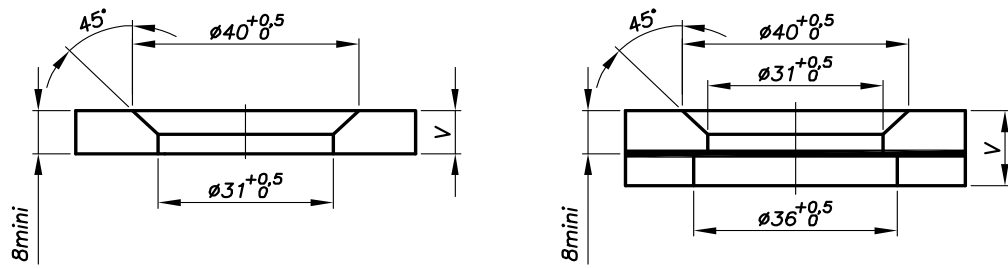
Vue coté verre



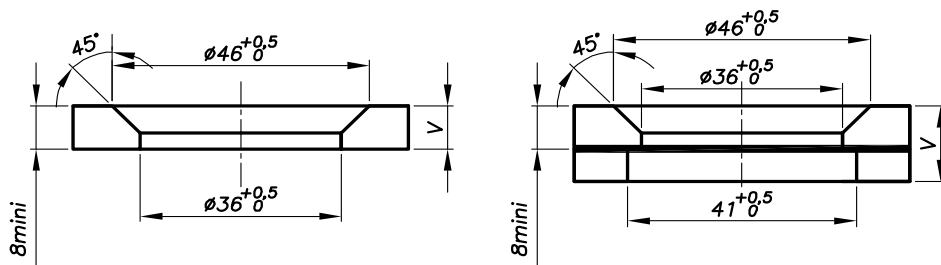
Représente un point fixe Ø 17 mm, point dilatat Ø 17 x 24 mm ou point libre Ø 24 mm en fonction de la position de l'attache sur la façade (voir préconisation de montage en fin de chapitre).

Represents a fixed point Ø 17mm, expanding point Ø 17 x 24 mm or free point Ø 24mm depending on the position of the spider on the façade (see fitting recommendation at the end of the section).

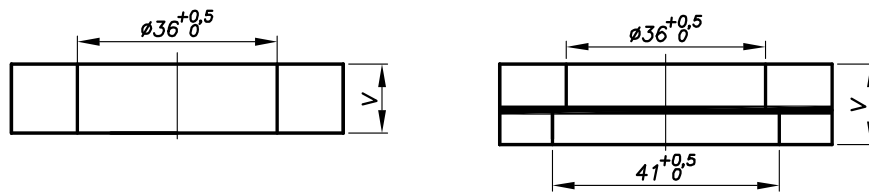
Figure 14 – S3101 - Spider



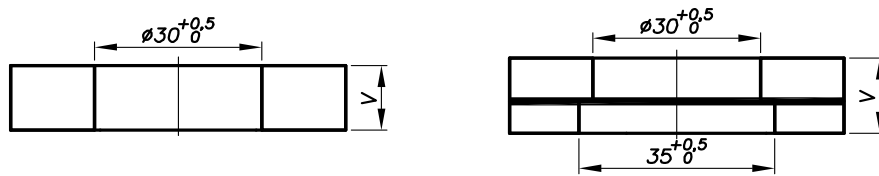
R1101



R1001, R1008

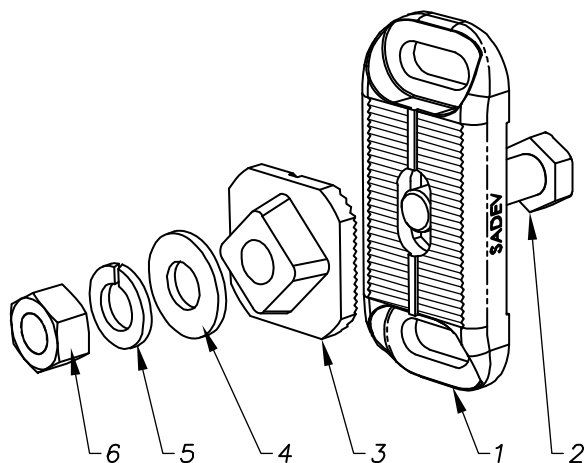


R1003, R1006, R1038



R1106

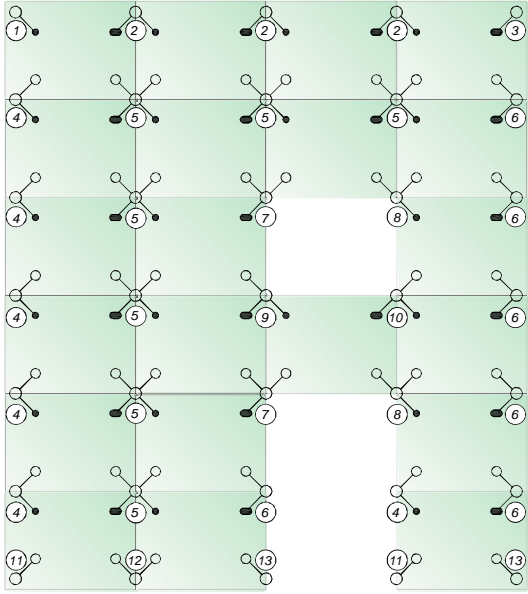
Figure 15 – Glass panel drilling plane



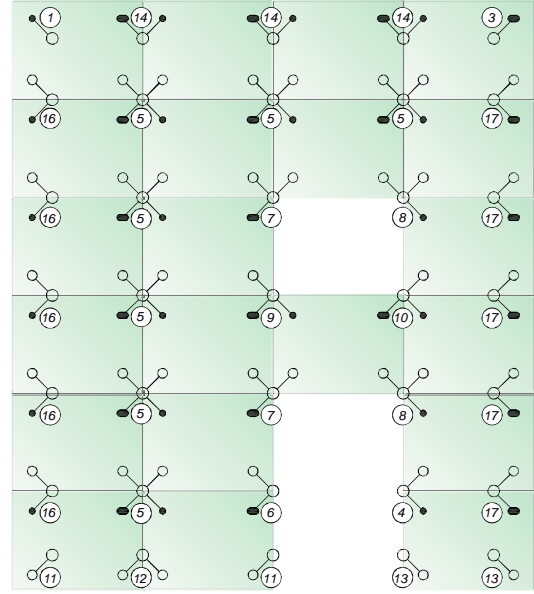
Rep	No.	Designation	Material
1	1	Omega	X5 Cr Ni Mo 19-11-2 according to NF standard EN 10213-4
2	1	Screw	A4
3	1	Anti-rotation plate	X5 Cr Ni Mo 19-11-2 according to NF standard EN 10213-4
4	1	Washer	A4
5	1	Washer DIN 127	A4
6	1	Nut DIN 934	A4

Figure 16 – Omega casting kit

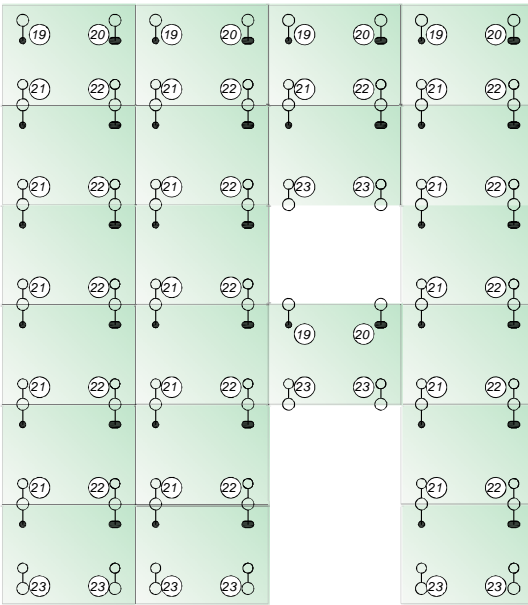
Montage - A Fitting - A



Montage - B Fitting - B



Montage - C Fitting - C



Montage - D Fitting - D

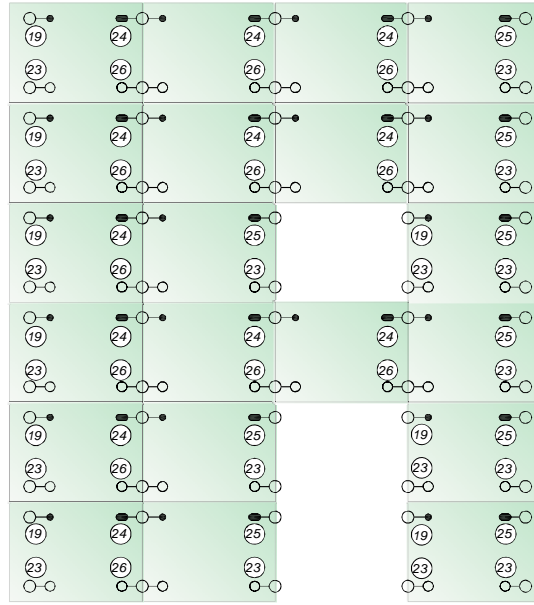
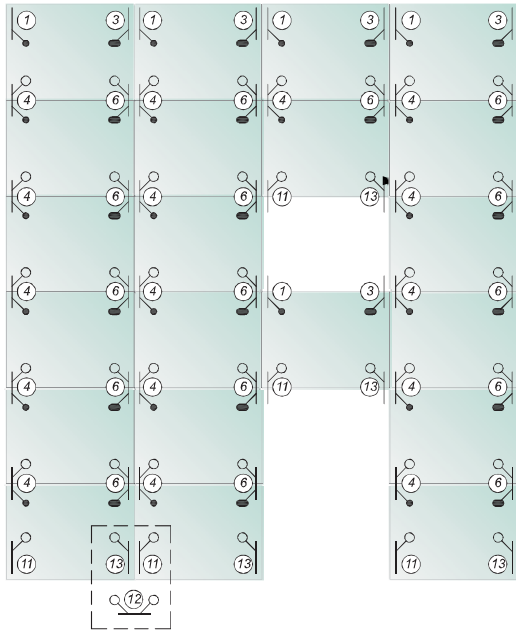
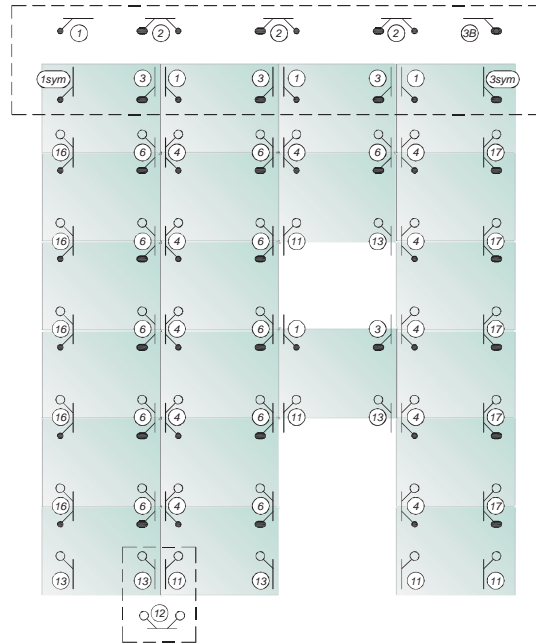


Figure 17 – A and D fitting proposals

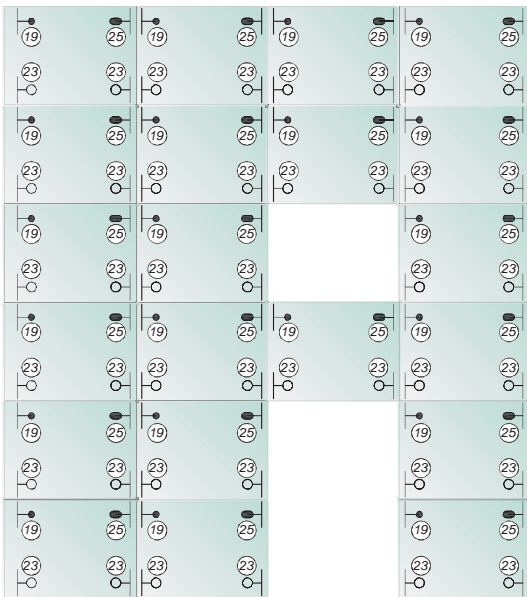
Montage - E Fitting - E



Montage - F Fitting - F



Montage - G Fitting - G



Montage - H Fitting - H

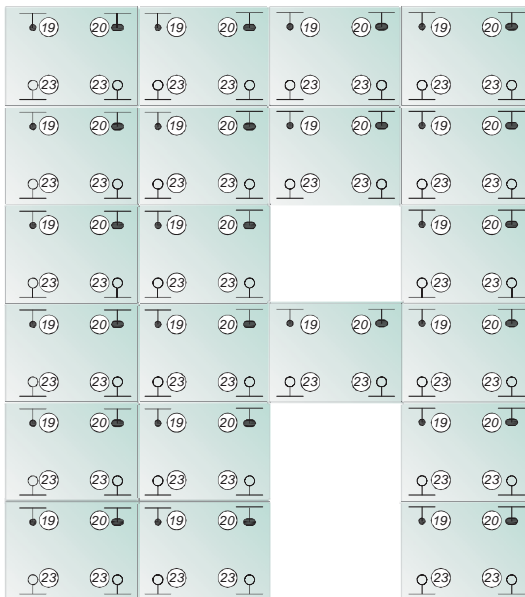
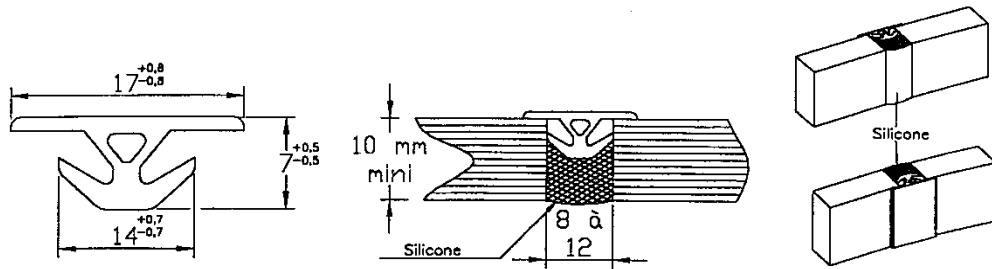


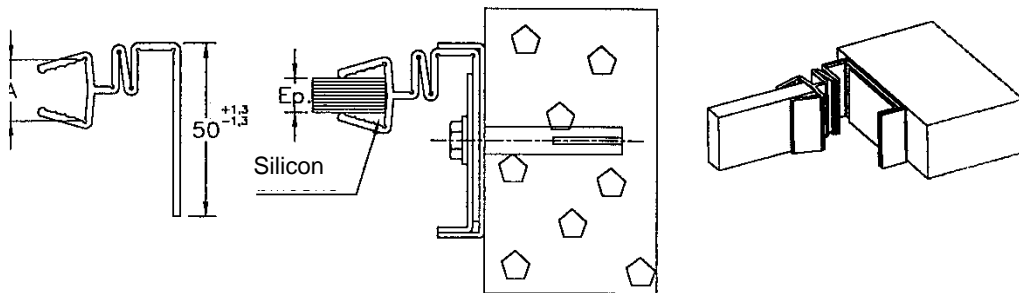
Figure 18 – E to H fitting proposals

REF: VEA4235



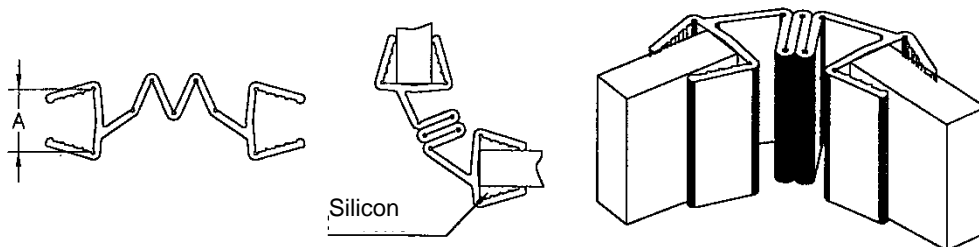
Structural bolted glazing 1015S seal for glass thickness from 10 to 15 mm
 Structural bolted glazing 2030S seal for glass thickness from 20 to 30 mm

$A = 17^{+0.8}_{-0.8}$
 $A = 32^{+1}_{-1}$



Structural bolted glazing 1015D seal for glass thickness from 10 to 15 mm
 Structural bolted glazing 2030D seal for glass thickness from 20 to 30 mm

$A = 17^{+0.8}_{-0.8}$
 $A = 32^{+1}_{-1}$



REF: VEA4110

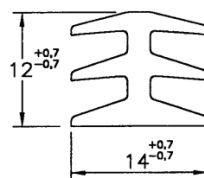


Figure 19 – Products for sealing between glass panels.