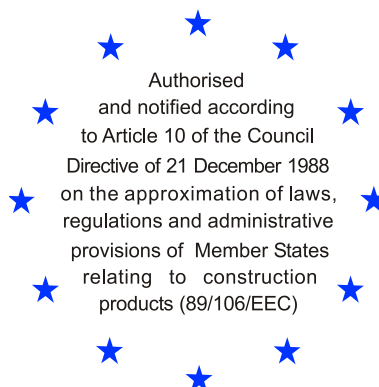


SITAC
Box 553
SE 371 23 Karlskrona
SWEDEN

Tfn.: +46-(0)10-516 63 00
Fax: +46-(0)455-206 88
E-mail: info@sitac.se



European Technical Approval ETA-12/0266

Handelsnamn
Trade name

Punktinfästa glassystem för fasad, tak eller skärmtak med Pauli + Sohn punktfästen
Bolted Glazing Kit for use as façade, roof or canopy with Pauli + Sohn point fixings

Innehavare
Holder of approval

Pauli + Sohn GmbH
Industristraße 20
51597 Morsbach-Lichtenberg

Produktbeskrivning och avsedd användning
Generic type and use of construction product

Punktinfästa glassystem
Bolted glazing kit

Giltighetstid
Validity:
från
from
t o m
to

2012-10-09
09.10.2012
2017-10-08
08.10.2017

Tillverkningsställe
Manufacturing plant

Pauli + Sohn GmbH
Industristraße 20, 51597 Morsbach-Lichtenberg

Godkännandet innehåller
This Approval contains

39 Sidor inklusive bilagor
39 Pages including annexes

I LEGAL BASES AND GENERAL CONDITIONS

- 1 This European Technical Approval is issued by SITAC in accordance with:
 - Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products¹, modified by Council Directive 93/68/EEC² and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council³;
 - Common Procedural Rules for Requesting, Preparing and the Granting of European Technical Approvals set out in the Annex to Commission Decision 94/23/EC⁴;
- 2 SITAC is authorized to check whether the provisions of this European Technical Approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European Technical Approval and for their fitness for the intended use remains with the holder of the European Technical Approval.
- 3 This European Technical Approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those /indicated on page 1/ laid down in the context/ of this European Technical Approval.
- 4 This European Technical Approval may be withdrawn by SITAC, in particular pursuant to information by the Commission according to Article 5(1) of Council Directive 89/106/EEC.
- 5 Reproduction of this European Technical Approval including transmission by electronic means shall be in full. However, partial reproduction can be made with the written consent of SITAC. In this case partial reproduction has to be designated as such. Texts and drawings of advertising brochures shall not contradict or misuse the European Technical Approval.
- 6 The European Technical Approval is issued by the approval body in English. This version corresponds fully to the version circulated within EOTA. Translations into other languages have to be designated as such.

1 Official Journal of the European Communities N° L 40, 11.2.1989, p. 12

2 Official Journal of the European Communities N° L 220, 30.8.1993, p. 1

3 Official Journal of the European Union N° L 284, 31.10.2003, p. 25

4 Official Journal of the European Communities N° L 17, 20.1.1994, p. 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of products and intended use

1.1 Definition of the construction product (kit)

The Bolted Glazing Kit for use as façade, roof or canopy with Pauli + Sohn point fixings is composed of glass products and point fixings.

The glass panes are linked to the substructure with point fixings which are mounted in cylindrical or countersunk boreholes in the glass panes on site.

1.2 Intended use

This ETA covers a bolted glazing kit for use as facade, roof, canopy or for internal space-enclosing glazing. The glazing is to be installed at any angle between vertical and 2° above horizontal. They are excluded from use to stiffen other components or as safety elements to prevent from falling.

The provisions made in this European Technical Approval are based on an assumed working life of the bolted glazing kit of 25 years, provided that the conditions laid down in sections 4.2 / 5.1 / 5.2 for the packaging / transport / storage / installation / use / maintenance / repair are met. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

2 Characteristics of products and methods of verification

2.1 Characteristics of the product

2.1.1 Bolted glazing kit

Every pane of glass has at least three cylindrical or countersunk boreholes in which point fixings of stainless steel are attached for connection to the substructure. The maximum angle in the triangle between the three attachments must not exceed 120 degrees. Requirements for edge distance of boreholes and joint widths are given in Annex 1 and Annex 6. The geometry of the countersunk boreholes is given in Annex 4.

2.1.2 Glass

Possible glass thicknesses for the different glass types are presented in Annex 2. The glass panes for facades have dimensions up to 3000 mm x 5600 mm. Possible glass sizes for canopies and roofs are presented in Annex 6.

General requirements:

- The glass type has to be chosen following the respective national provisions for the intended use (Annex 3).
- Glass panes have to be plane and all edges have to be polished.
- The basic glass to be used for the manufacture of the glass products is float glass of soda lime silicate glass according to EN 572-2.

Possible glass types for facade:

- 1) Thermally toughened safety glass (ESG) according to EN 12150-1 and national provisions.
- 2) Heat strengthened glass (TVG) according to EN 1863-1 and national provisions.
- 3) Heat soaked thermally toughened safety glass (ESG-H) according to EN 14179-1 and according to additional national provisions.
- 4) Laminated glass (VSG) according to EN 14449 and respective national provisions. The glass pane is made up of single glass referred to in paragraph 1) to 3) above which are laminated together with an interlayer film of at least 0,76 mm thick Polyvinyl-Butyral (PVB) or 1,52mm thick SentryGlas® SGP5000.

Possible glass types for roof or canopy:

Laminated glass (VSG) according to EN 14449 and respective national provisions. The glass pane is made up of single heat strengthened glass referred to in paragraph 2) above which are laminated together with an interlayer film of at least 1,52 mm thick Polyvinyl-Butyral (PVB). Alternatively the glass pane is made up of single thermally toughened safety glass referred to in paragraph 1) above which are laminated together with an interlayer film of at least 1,52 mm thick SentryGlas® SGP5000.

One side of the heat treated glass panes may be enamelled either partially or printed on the entire surface.

National provisions for Germany regarding glass types and interlayer are presented in Annex 3.

2.1.3 Point fixings

The point fixings consist of either plate or countersunk fixings and a threaded screw. The point fixings are either fixed or articulated.

- The metal parts of the clamps are made of stainless steel with material No 1.4404 or 1.4301 according to EN 10088-1.
- Sleeves are made from Polyoximethylen (POM-C) according to EN ISO 1043-1. Detailed material specification is deposited at SITAC.
- Spacers are made from EPDM. Detailed material specification is deposited at SITAC.

Detailed description of the point fixings is presented in Annex 4 and deposited at SITAC.

Plate fixings

	Ø 45 mm	Ø 60 mm	Ø 80 mm
Fixed	750245VAM12	750260VAM12 750260VAM16	750280VAM16
Articulated	751245VAM12	751260VAM12 751260VAM16	751280VAM16

The plate fixings are to be used in facade, roof, canopy or for internal space-enclosing glazing. The glazing is to be installed at any angle between vertical and 2° above horizontal.

Countersunk fixings

	Ø 45 mm	Ø 60 mm	Ø 80 mm
Fixed	750345VAM12	750360VAM12 750360VAM16	750380VAM16
Articulated	751345VAM12	751360VAM12 751360VAM16	751380VAM16

The countersunk fixings are to be used in facade or for internal space-enclosing vertical glazing. The glazing is to be installed either vertically or up to a maximum angle of 10° from vertical.

2.2 Methods of verification

The product characteristics methods of verification and assessment criteria which are relevant for the fitness of the bolted glazing kit for the intended use referred to in 1.2 are given in Table 2.1.

Table 2.1 Product characteristics and methods of verification and assessment

No	Product characteristic	Performance
Essential Requirement (ER 1): Mechanical resistance and stability		
1		Not relevant
Essential Requirement (ER 2): Safety in case of fire		
2	Reaction to fire	Not applicable on the kit. Note: A European reference fire scenario has not been laid down for façades. In some Member States, the classification of the bolted glazing kit according to EN 13501-1:2002 might not be sufficient for the use in façades. An additional assessment of the bolted glazing kit according to national provisions (e.g. on the basis of a large scale test) might be necessary to comply with Member State regulations, until the existing European classification system has been completed.
Essential Requirement (ER 3): Hygiene, health and environment		
3	Release of dangerous substances	No dangerous substances. Note: In addition to the specific clauses relating to dangerous substances contained in this European Technical Approval, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Directive, these requirements need also to be complied with, when and where they apply.
4	Air permeability	NPD
5	Watertightness	NPD
Essential Requirement (ER 4): Safety in use		
6	Kit: Load bearing capacity	The load bearing capacity of the bolted glazing kit and its anchorage to the substructure shall be calculated case by case, using a structural design calculation. The regulations of the respective Member State in which the bolted glazing kit shall be used. The residual load capacity of canopies or roofs has been verified (Annex 6).
7	Kit: Impact resistance	NPD

Essential Requirement (ER 5): Protection against noise		
8	Airborne sound insulation	NPD
Essential Requirement (ER 6): Energy economy and heat retention		
9	Thermal conductivity	NPD
General aspects relating to fitness for use		
10	Durability	In compliance with national provisions.

The characteristics of the components of the assembled system, methods of verification and assessment criteria which are relevant for the fitness of bolted glazing kit for the intended use are given in Table 2.2 and Table 2.3.

Table 2.2 Characteristics of glass and methods of verification and assessment

No	Product characteristic	Performance
Essential Requirement (ER 2): Safety in case of fire		
1	Reaction to fire	NPD
2	External fire performance	NPD
Essential Requirement (ER 4): Safety in use		
3	Glass: curve radius	NPD
General aspects relating to fitness for use		
4	Durability	The glass products comply with respective specification.

Table 2.3 Characteristics of point fixings and methods of verification and assessment

No	Product characteristic	Performance
Essential Requirement (ER 2): Safety in case of fire		
1	Reaction to fire	According to Commission Decision 96/603/EC, amended by EC decision 2000/605/EC, the point fixings will be classified in category A1.
Essential Requirement (ER 3): Hygiene, health and environment		
2	Point fixing: watertightness	Watertightness of the point fixings has been verified.
Essential Requirement (ER 4): Safety in use		
3	Point fixing: Strength resistance in traction, compression and flexion	Design values of strength resistance for the point fixings are given in Annex 5.
General aspects relating to fitness for use		
4	Durability	EN 1993-1-4 and EN 10088-3 for stainless steel parts. Point fixings must be chosen according to provisions for each individual kit (works).

3 Evaluation and attestation of conformity and CE marking

3.1 System of attestation of conformity

The system of attestation of conformity laid down in the decision 2003/656/EC of the European Commission shall be applied to the Bolted glazing kit.

This system of attestation of conformity is defined as follows:

System 2+: Declaration of conformity of the product by the manufacturer on the basis of:

- a) Tasks for the manufacturer:
 - 1) initial type-testing of the product;
 - 2) factory production control;
- b) Tasks for the approved body:
 - 1) initial inspection of factory and of factory production control;
 - 2) continuous surveillance, assessment and approval of factory production control.

Note: Approved bodies are also referred to as "notified bodies".

3.2 Responsibilities

3.2.1 Tasks for the manufacturer

3.2.1.1 Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall insure that the product is in conformity with this European Technical Approval.

The manufacturer may only use constituent materials stated in the technical documentation of this European Technical Approval.

The factory production control shall be in accordance with the Control plan which is part of the technical documentation of this European Technical Approval. The "control plan" is laid down in the context of the factory production control system operated by the manufacturer and deposited within SITAC.⁵

The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan.

3.2.1.2 Other tasks for the manufacturer

The manufacturer shall, on the basis of a contract, involve a body (bodies) which is (are) approved for the tasks referred to in section 3.1 in the field of bolted glazing kit in order to undertake the actions laid down in section 3.2.2. For this purpose, the "control plan" referred to in sections 3.2.1.1 and 3.2.2 shall be handed over by the manufacturer to the approved body or bodies involved.

⁵ The "control plan" is a confidential part of the European Technical Approval and only handed over to the approved body or bodies involved in the procedure of attestation of conformity. See section 3.2.2.

3.2.2 Tasks for the approved bodies

The approved body (bodies) shall perform the

- initial inspection of factory and of factory production control,
- continuous surveillance, assessment and approval of factory production control,

in accordance with the provisions laid down in the “control plan”.

The approved body (bodies) shall retain the essential points of its (their) actions referred to above and state the results obtained and conclusions drawn in (a) written report (reports).

The approved certification body involved by the manufacturer shall issue an EC certificate of conformity of the factory production control stating the conformity with the provisions of this European Technical Approval.

In cases where the provisions of the European Technical Approval and its "control plan" are no longer fulfilled the certification body shall withdraw the certificate of conformity and inform SITAC without delay.

3.3 CE marking

The CE marking shall be affixed on the packaging and accompanying commercial document. The letters “CE” shall be followed by the identification number of the approved certification body, where relevant, and be accompanied by the following additional information:

- the name and address of the producer (legal entity responsible for the manufacture),
- the last two digits of the year in which the CE marking was affixed,
- the number of the EC certificate for the factory production control,
- the number of the European Technical Approval

4 Assumptions under which the fitness of the product for the intended use was favourably assessed

4.1 Manufacturing

The glass panes and the point fixings are to be manufactured in accordance with the definitions given in section 2.1.

The European Technical Approval is issued for the product on the basis of agreed data/information, deposited with SITAC, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to SITAC before the changes are introduced. SITAC will decide whether or not such changes affect the ETA and consequently the validity of the CE marking on the basis of the ETA and if so whether further assessment or alterations to the ETA, shall be necessary.

4.2 Installation

Prior to the installation all components must be checked for defects. Damaged components should be exchanged without delay.

The application has to be carried out according to the manufacturer's instructions, see Annex 7. The installation should only be carried out by professionals who have been instructed for this kind of work by the manufacturer. Contact between glass and metal must be avoided permanently.

The conformity of the installed Bolted Glazing Kit with the provisions of the ETA is attested by the executing assembler.

5 Indications to the manufacturer

5.1 Packaging, transport and storage

The manufacturer shall take suitable precautions during packing, transport and storage to ensure that the elements are protected against damage by, e.g. breakage, scratching, splitting or contamination.

Transportation of the glass elements is only to be carried out using suitable methods and equipment so as to exclude any damage to the glass edges. Storage on construction sites must ensure protection to edges of the glass panes.

5.2 Use, maintenance, repair

Cleaning of the facade shall be carried out according to the manufacturer's recommendations.

Damaged glass panes or damaged point fixings have to be replaced immediately. In the case of replacing a damaged or destroyed glass pane only components in accordance with the provisions of this ETA shall be used. The installation shall be in compliance with this ETA.

5.3 Design

The design of the Bolted glazing kit has to follow all national provisions for the intended field of application concerning e.g. glass type and end use conditions.

All members not included in this ETA, as specified in chapter 1, have to be verified separately according to European and/or national standards.

The design of the substructure has to secure a restraint-free support of the glass pane. No additional loads are to be applied on the glazing pane due to e.g. deformations of the substructure.

On behalf of SITAC

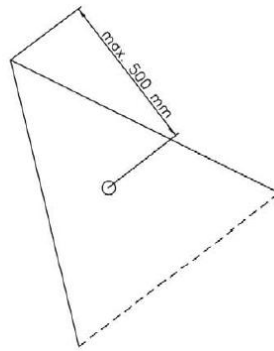
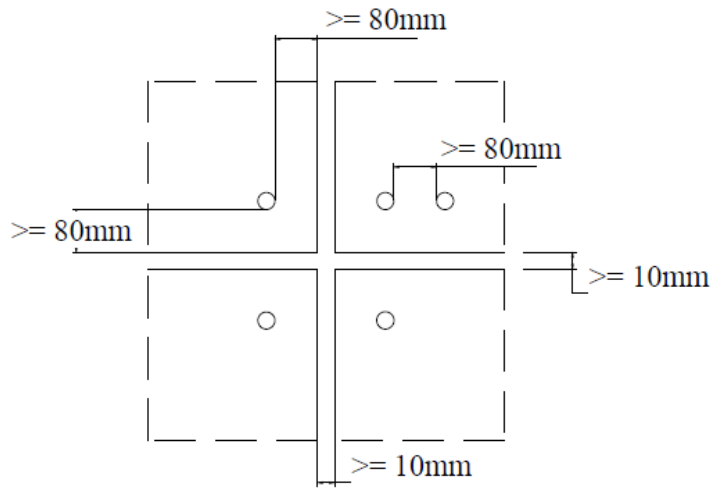
Borås, 09 October 2012



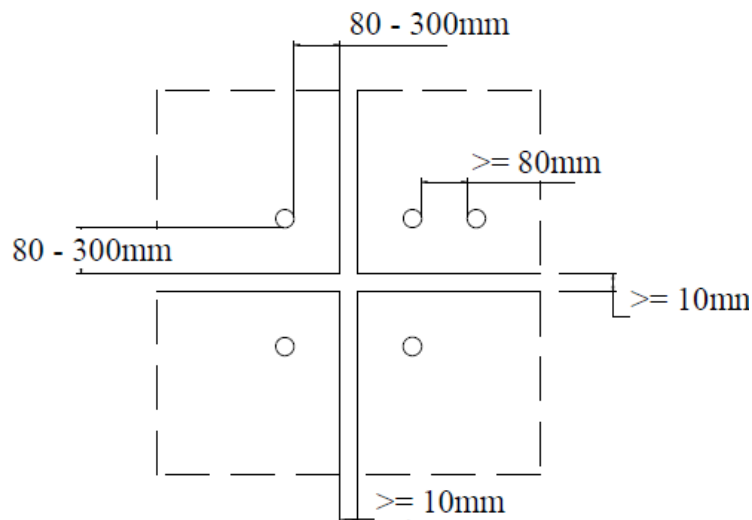
Lennart Månsson

ANNEX 1 – Edge distance of boreholes and joint widths

for façades:



for canopies and roofs:



ANNEX 2 – Glass types and glass thickness

Possible thickness of individual glass panes:

ESG	4 mm	5 mm	6 mm	8 mm	10 mm	12 mm	15 mm
ESG-H	4 mm	5 mm	6 mm	8 mm	10 mm	12 mm	15 mm
TVG	4 mm	5 mm	6 mm	8 mm	10 mm	12 mm	-
VSG	2x4 mm	2x5 mm	2x6 mm	2x8 mm	2x10 mm	2x12 mm	2x15 mm

Possible types of glass and glass thicknesses for facades in this ETA:

ESG-H monolithic	-	-	-	8 mm	10 mm	12 mm	15 mm
VSG from ESG-H	2x4 mm	2x5 mm	2x6 mm	2x8 mm	2x10 mm	2x12 mm	2x15 mm
VSG from ESG	2x4 mm	2x5 mm	2x6 mm	2x8 mm	2x10 mm	2x12 mm	2x15 mm
VSG from TVG	2x4 mm	2x5 mm	2x6 mm	2x8 mm	2x10 mm	2x12 mm	-

Possible types of glass and glass thicknesses for roof or canopy in this ETA:

VSG made of TVG with PVB interlayer	-	-	2x6 mm	2x8 mm	2x10 mm	2x12 mm	-
VSG made of ESG with SentryGlas® SGP5000 interlayer	-	2x5 mm	-	-	-	-	-

ANNEX 3 – National provisions for glass

Germany:

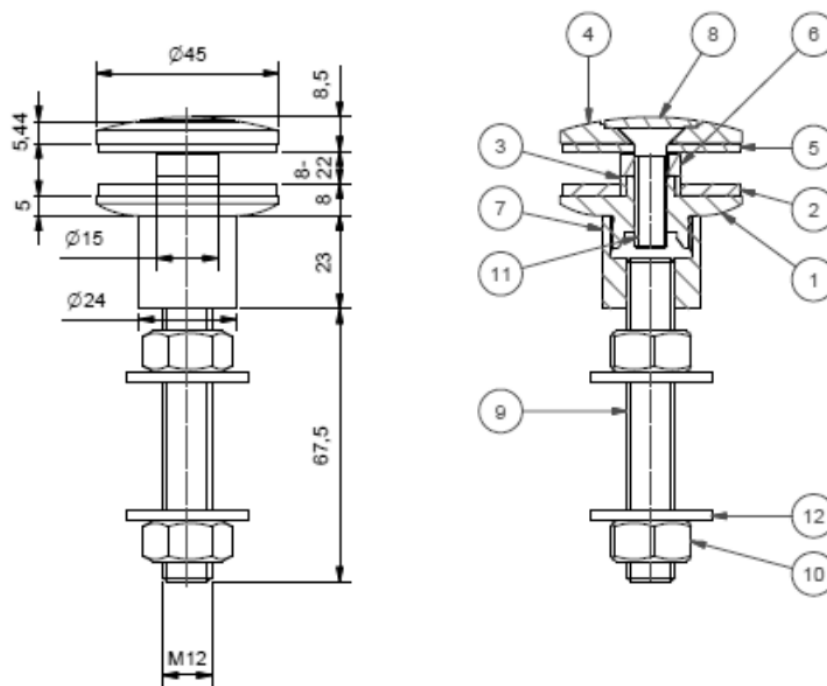
The Glass type is to be chosen depending on the intended application according to the German regulations “Technische Regeln für die Bemessung und die Ausführung punktförmig gelagerter Verglasungen (TRPV) – Schlussfassung August 2006“.

- Basic soda lime silicate glass (Float glass): e.g. Floatglass according to ”Bauregelliste A Teil 1 No. 11.10”.
- Thermally toughened soda lime silicate safety glass : e.g. ESG according to ”Bauregelliste A Teil 1 No. 11.12”.
- Heat soaked thermally toughened soda lime silicate safety glass : e.g. ESG-H according to ”Bauregelliste A Teil 1 No. 11.13”.
- Heat strengthened soda lime silicate glass: e.g. TVG according to technical approval.
- Laminated safety glass : e.g. VSG according to ”Bauregelliste A Teil 1 No. 11.14”.
- Laminated safety glass made of SentryGlas® SGP5000 according to technical approval.

ANNEX 4 – Point fixings

Plate fixture – fixed, raised head

Item-No. 750245VAM12

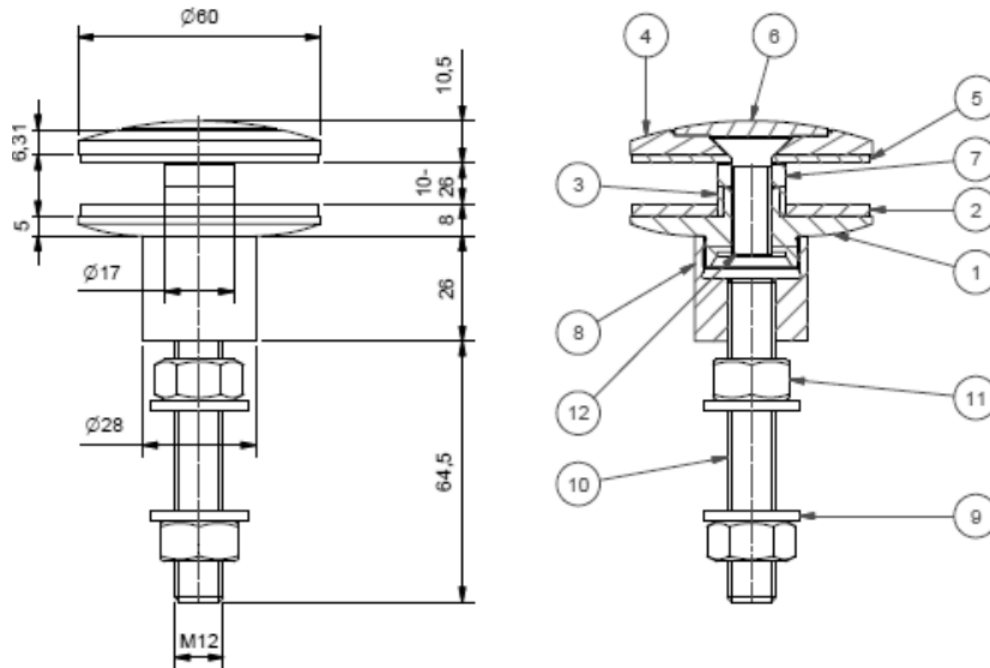


point fixture material 1.4401

glass bore Ø18

12	2	751245-11VA	washer Ø30xØ13x2,5mm
11	1	S7991A4D8x30	countersink screw with hex DIN 7991 - M8x30 - A4
10	2	S934A4D12	hex nut DIN 934 - M12 - A4
9	1	S913A4D12x80	threaded bolt DIN 913 - M12 x 80 - A4
8	1	751245-1VA	cover cap Ø23mm
7	1	750245-10VA-M12	ridged adapter
6	1	751245-4POM	POM sleeve for front plate Ø15xØ8,2x6mm
5	1	751245-3EPDM	EPDM washer for front plate Ø44xØ8x2mm
4	1	751245-2VA	fixture front plate Ø45 mm
3	1	751245-5POM	POM sleeve for back plate Ø15xØ12x5mm
2	1	751245-6EPDM	EPDM washer for back plate Ø44xØ15x3mm
1	1	751245-8VA	fixture back plate Ø45mm, articulating
position	quantity	item-no.	description

Plate fixture – fixed, raised head
Item-No. 750260VAM12

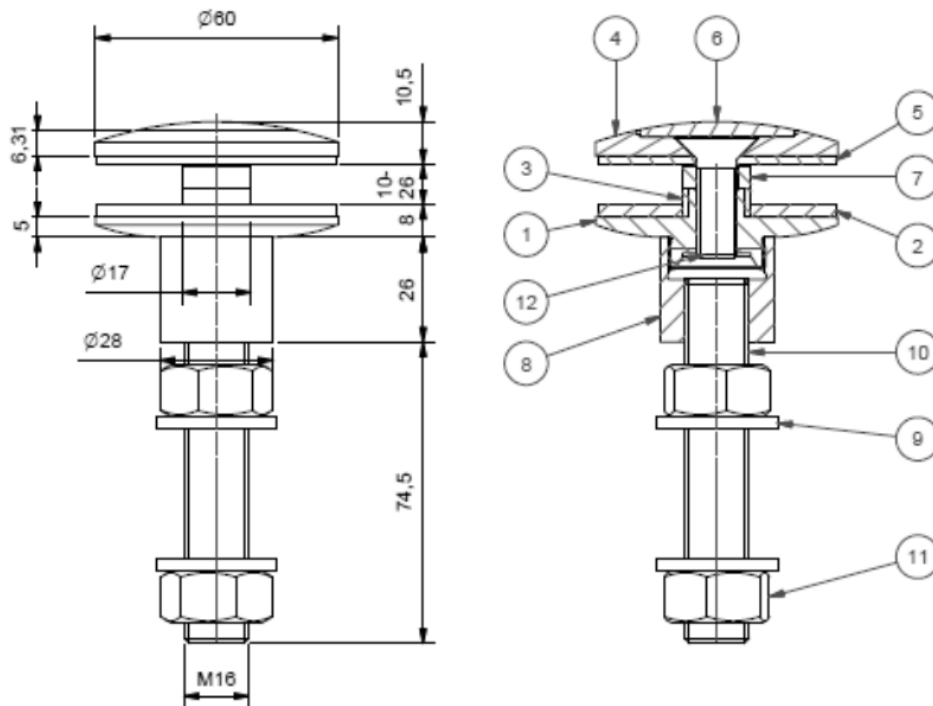


glass bore $\varnothing 22$

point fixture material 1.4401

12	1	S7991A4D10x30	countersink screw with hex DIN 7991 - M10x30 - A4
11	2	S934A4D12	hex nut DIN 934 - M12 - A4
10	1	S913A4D12x80	threaded bolt DIN 913 - M12 x 80 - A4
9	2	S125A4D13A	washer DIN 125 - A 13
8	1	750260-10VA-M12	ridged bolt
7	1	751260-4POM	POM sleeve for front plate
6	1	751260-1VA	cover cap $\varnothing 38\text{mm}$
5	1	751260-3EPDM	EPDM washer for front plate
4	1	751260-2VA	fixture front plate D= 60 mm
3	1	751260-5POM	POM sleeve for back plate
2	1	751260-6EPDM	EPDM washer for back plate
1	1	751260-8VA	fixture back plate ,articulating D=60 mm
position	quantity	item-no.	description

Plate fixture – fixed, raised head
Item-No. 750260VAM16

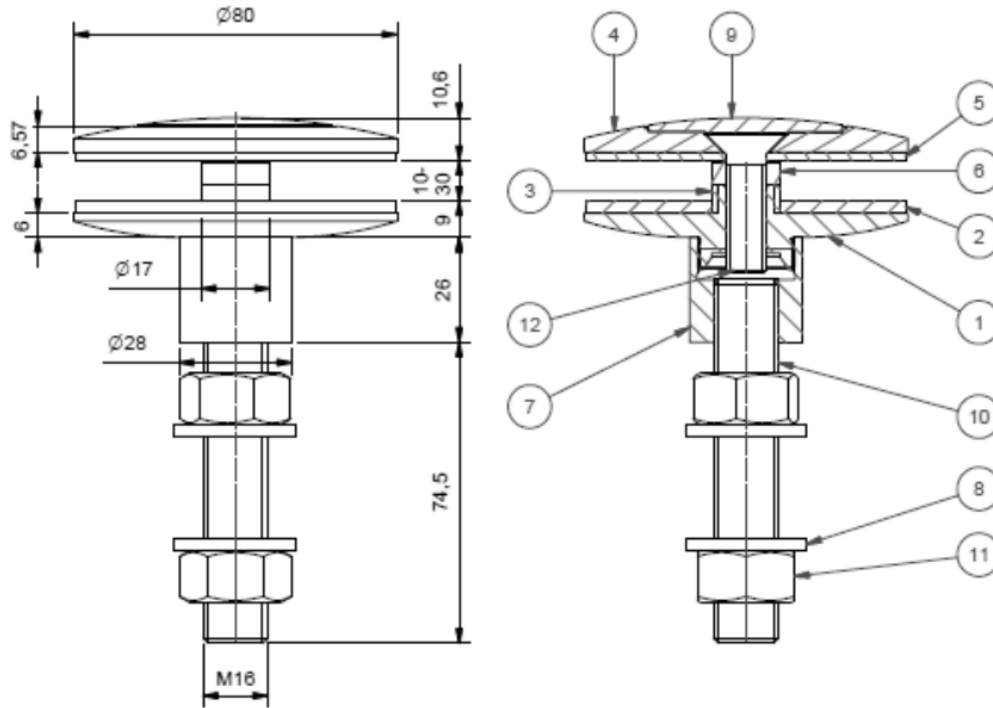


point fixture material 1.4401

glass bore Ø22

12	1	S7991A4D10x30	countersink screw with hex DIN 7991 - M10x30 - A4
11	2	S934A4D16	hex nut DIN 934 - M16 - A4
10	1	S913A4D16x90	threaded bolt DIN 913 - M16 x 90 - A4
9	2	S125A4D17A	washer DIN 125 - A 17 - A4
8	1	750260-10VA-M16	ridged adapter
7	1	751260-4POM	POM sleeve for front plate
6	1	751260-1VA	cover cap Ø38mm
5	1	751260-3EPDM	EPDM washerfor front plate
4	1	751260-2VA	fixture front plate D= 60 mm
3	1	751260-5POM	Pom sleeve for back plate
2	1	751260-6EPDM	EPDM washer for back plate
1	1	751260-8VA	fixture back plate, articulating D=60 mm
position	quantity	item-no.	description

Plate fixture – fixed, raised head
Item-No. 750280VAM16

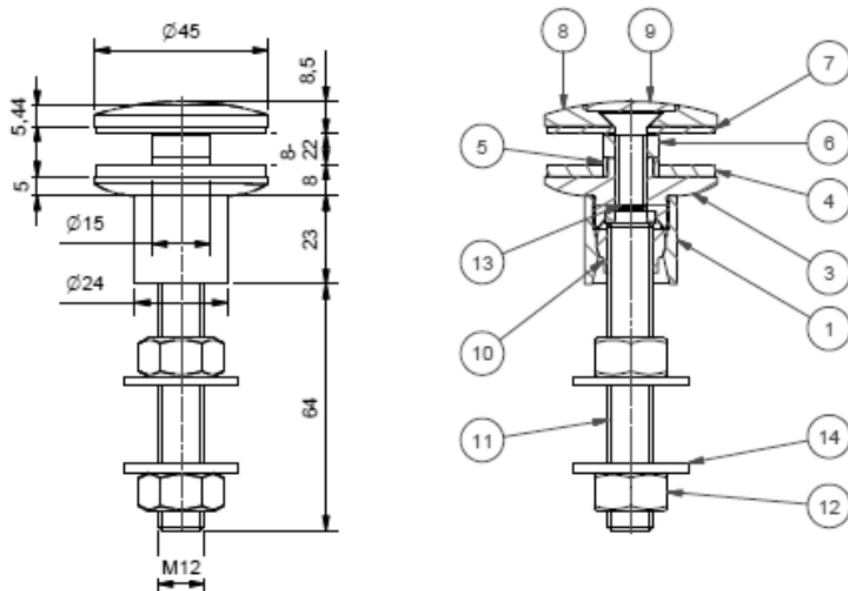


glass bore Ø22

point fixture material 1.4401

12	1	S7991A4D10x35	countersink screw with hex DIN 7991 - M10x35 - A4
11	2	S934A4D16	hex nut DIN 934 - M16 - A4
10	1	S913A4D16x90	threaded bolt DIN 913 - M16 x 90 - A4
9	1	751280-1VA	cover cap Ø48mm
8	2	S125A4D17A	washer DIN 125 - A 17 - A4
7	1	750260-10VA-M16	ridged adapter
6	1	751260-4POM	POM sleeve for front plate
5	1	751280-3EPDM	EPDM washer for front plate
4	1	751280-2VA	fixture front plate D= 80 mm
3	1	751260-5POM	POM sleeve for back plate
2	1	751280-6EPDM	EPDM washer for back plate
1	1	751280-8VA	fixture back plate, articulating D=80 mm
position	quantity	item-no.	description

Plate fixture – articulating, raised head
Item-No. 751245VAM12

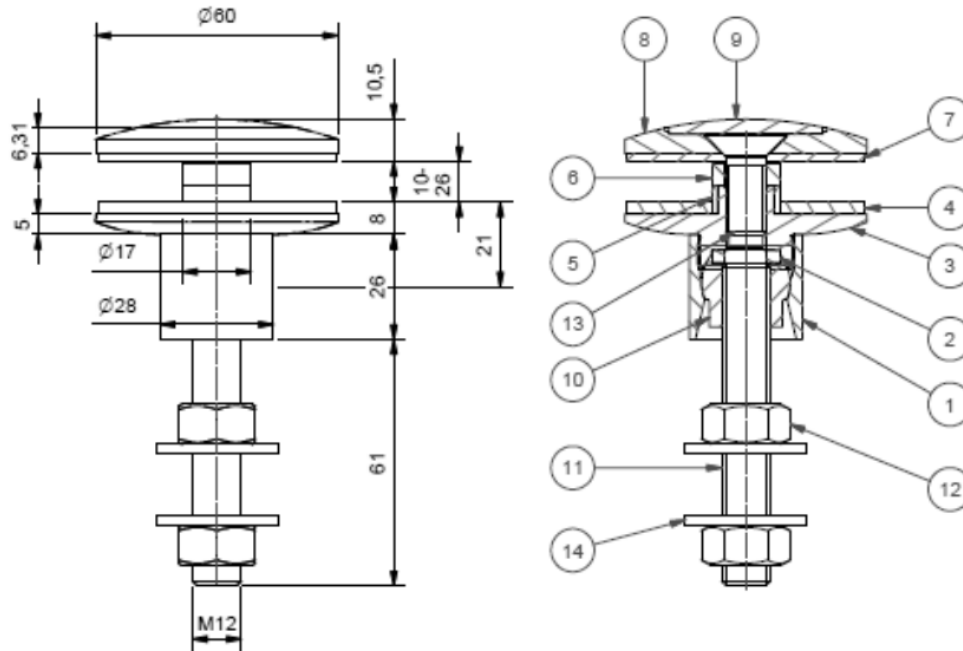


point fixture material 1.4401

glass bore Ø18

14	2	751245-11VA	washer Ø30xØ13x2,5mm
13	1	S7991A4D8x25	countersink screw with hex DIN 7991 - M8x25 - A4
12	2	S934A4D12	hex nut DIN 934 - M12 - A4
11	1	S913A4D12x80	threaded bolt DIN 913 - M12 x 80 - A4
10	1	751245-10VA-M12	articulating threaded sleeve M12
9	1	751245-1VA	cover cap Ø23mm
8	1	751245-2VA	fixture front plate Ø45 mm
7	1	751245-3EPDM	EPDM washer for front plate Ø44xØ8x2mm
6	1	751245-4POM	POM sleeve for front plate Ø15xØ8,2x6mm
5	1	751245-5POM	POM sleeve for back plate Ø15xØ12x5mm
4	1	751245-6EPDM	EPDM washer for back plate Ø44xØ15x3mm
3	1	751245-8VA	fixture back plate, articulating Ø45mm
2	1	751245-7EPDM	EPDM cushion Ø13xØ8,5x3mm
1	1	751245-9VA	articulating adapter Ø24x23mm
position	quantity	item-no.	description

Plate fixture – articulating, raised head
Item-No. 751260VAM12

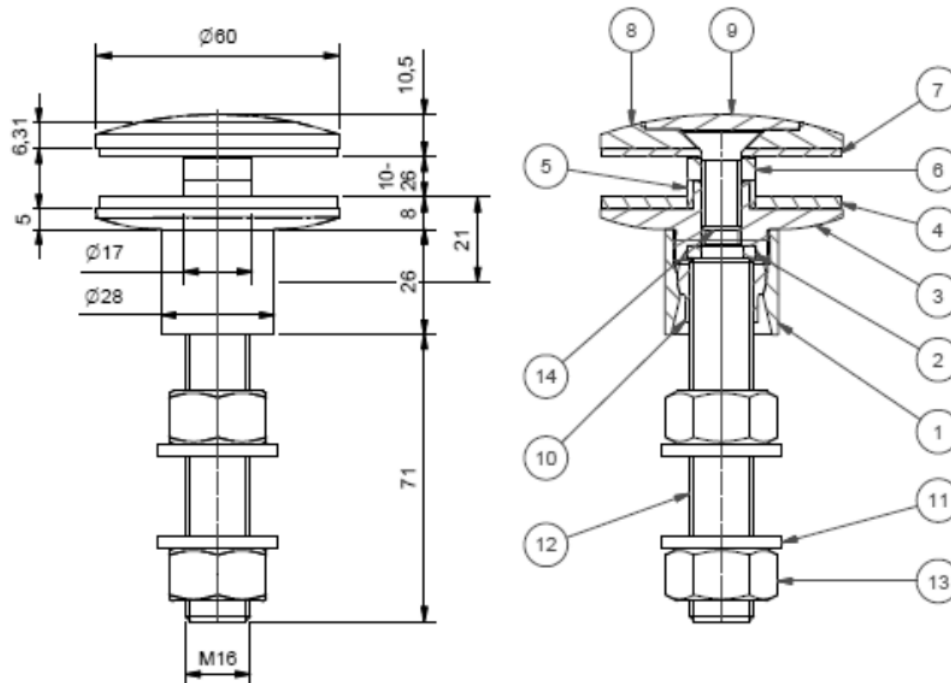


point fixture material 1.4401

glass bore $\varnothing 22$

14	2	751245-11VA	washer $\varnothing 30 \times \varnothing 13 \times 2,5 \text{ mm}$
13	1	S7991A4D10x25	countersink screw with hex DIN 7991 - M10x25 - A4
12	2	S934A4D12	hex nut DIN 934 - M12 - A4
11	1	S913A4D12x80	threaded bolt DIN 913 - M12 x 80 - A4
10	1	751260-10VA-M12	articulating threaded sleeve M12
9	1	751260-1VA	cover cap $\varnothing 38 \text{ mm}$
8	1	751260-2VA	fixture front plate $D = 60 \text{ mm}$
7	1	751260-3EPDM	EPDM washer for front plate
6	1	751260-4POM	POM sleeve for front plate
5	1	751260-5POM	POM sleeve for back plate
4	1	751260-6EPDM	EPDM washer for back plate
3	1	751260-8VA	fixture back plate, articulating $D = 60 \text{ mm}$
2	1	751260-7EPDM	EPDM cushion
1	1	751260-9VA	articulating adapter
position	quantity	item-no.	description

Plate fixture – articulating, raised head
Item-No. 751260VAM16

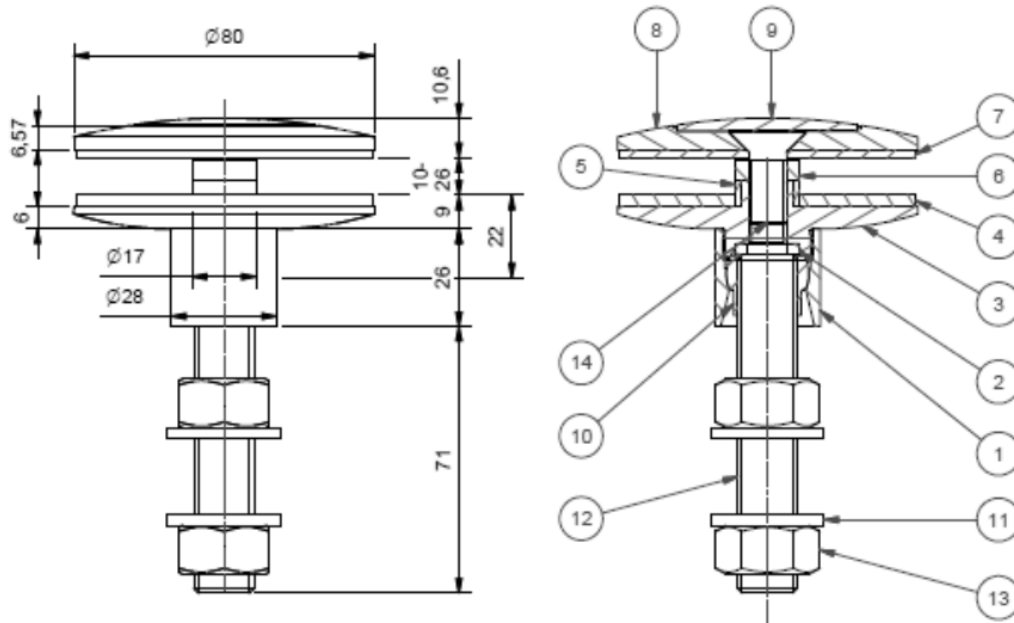


point fixture material 1.4401

glass bore Ø22

14	1	S7991A4D10x25	countersink screw with hex DIN 7991 - M10x25 - A4
13	2	S934A4D16	hex nut DIN 934 - M16 - A4
12	1	S913A4D16x90	threaded bolt DIN 913 - M16 x 90 - A4
11	2	S125A4D17A	washer DIN 125 - A 17 - A4
10	1	751260-10VA-M16	articulating threaded sleeve M16
9	1	751260-1VA	cover cap Ø38mm
8	1	751260-2VA	fixture front plate D= 60 mm
7	1	751260-3EPDM	EPDM washer for front plate
6	1	751260-4POM	POM sleeve for front plate
5	1	751260-5POM	POM sleeve for back plate
4	1	751260-6EPDM	EPDM washer for back plate
3	1	751260-8VA	fixture back plate, articulating D=60 mm
2	1	751260-7EPDM	EPDM cushion
1	1	751260-9VA	articulating adapter
position	quantity	item-no.	description

Plate fixture – articulating, raised head
Item-No. 751280VAM16

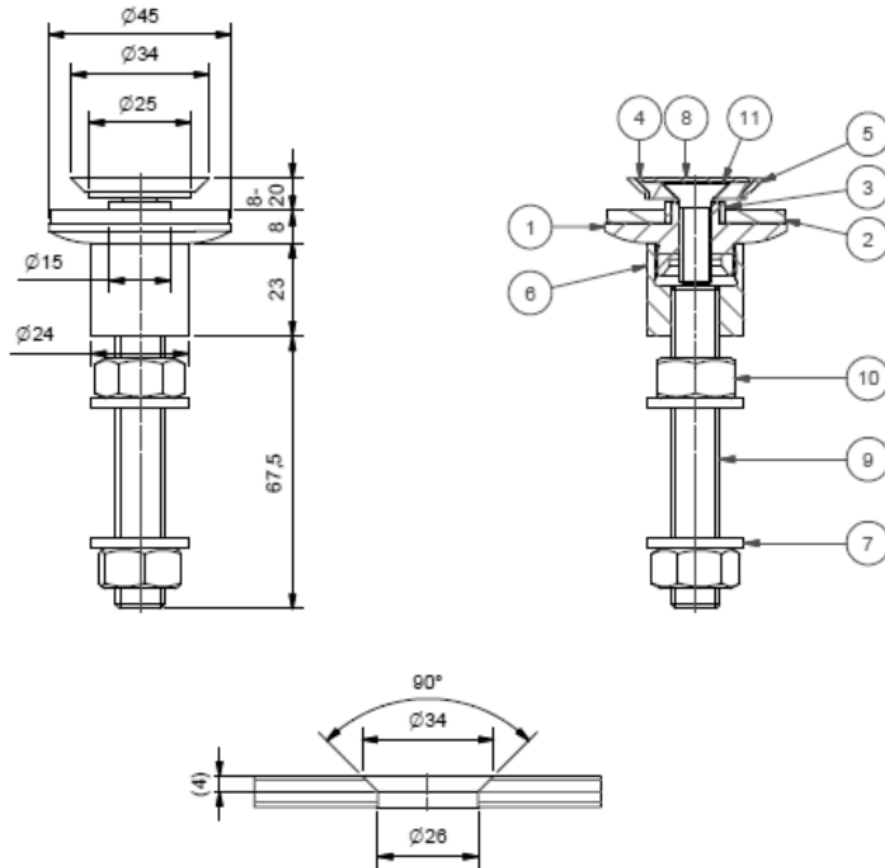


point fixture material 1.4401

glass bore Ø22

14	1	S7991A4D10x25	countersink screw with hex DIN 7991 - M10x25 - A4
13	2	S934A4D16	hex nut DIN 934 - M16 - A4
12	1	S913A4D16x90	threaded bolt DIN 913 - M16 x 90 - A4
11	2	S125A4D17A	washer DIN 125 - A 17 - A4
10	1	751280-10VA-M16	articulating threaded sleeve M16
9	1	751280-1VA	cover cap Ø48mm
8	1	751280-2VA	fixture front plate D= 80 mm
7	1	751280-3EPDM	EPDM washer for front plate
6	1	751280-4POM	POM sleeve for front plate
5	1	751280-5POM	POM sleeve for back plate
4	1	751280-6EPDM	EPDM washer for back plate
3	1	751280-8VA	fixture back plate, articulating D=80 mm
2	1	751280-7EPDM	EPDM cushion
1	1	751280-9VA	articulating adapter
position	quantity	item-no.	description

Countersunk fixture – fixed, flush
Item-No. 750345VAM12

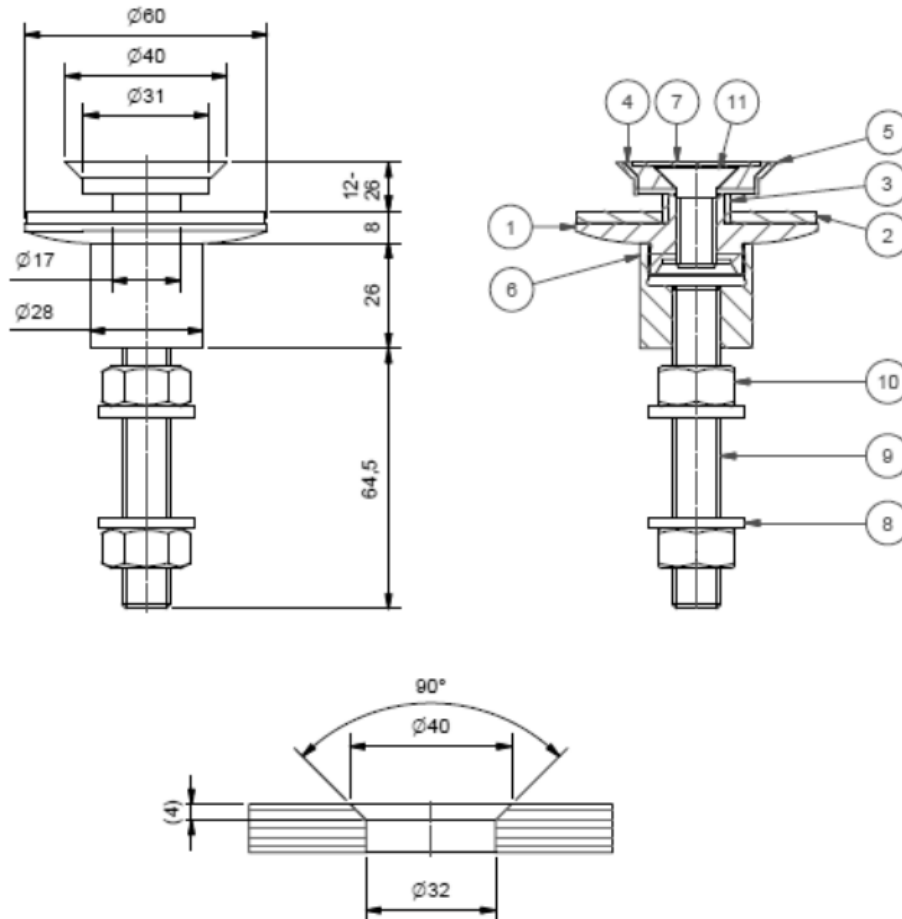


point fixture material: 1.4401

glass bore Ø34/90°/Ø26

11	1	S7991A4D8x25	countersink screw with hex DIN 7991 - M8x25 - A4
10	2	S934A4D12	hex nut DIN 934 - M12 - A4
9	1	S913A4D12x80	threaded bolt DIN 913 - M12 x 80 - A4
8	1	751345-1VA	cover plate
7	2	S125A4D13A	washer DIN 125 - A 13
6	1	750245-10VA-M12	ridged adapter
5	1	751345-3POM	POM countersink sleeve
4	1	751345-2VA	countersink core
3	1	751245-5POM	POM sleeve for back plate Ø15xØ12x5mm
2	1	751245-6EPDM	EPDM washer for front plate Ø44xØ15x3mm
1	1	751245-8VA	fixture back plate, articulating Ø45mm
position	quantity	item-no.	description

Countersunk fixture – fixed, flush
Item-No. 750360VAM12

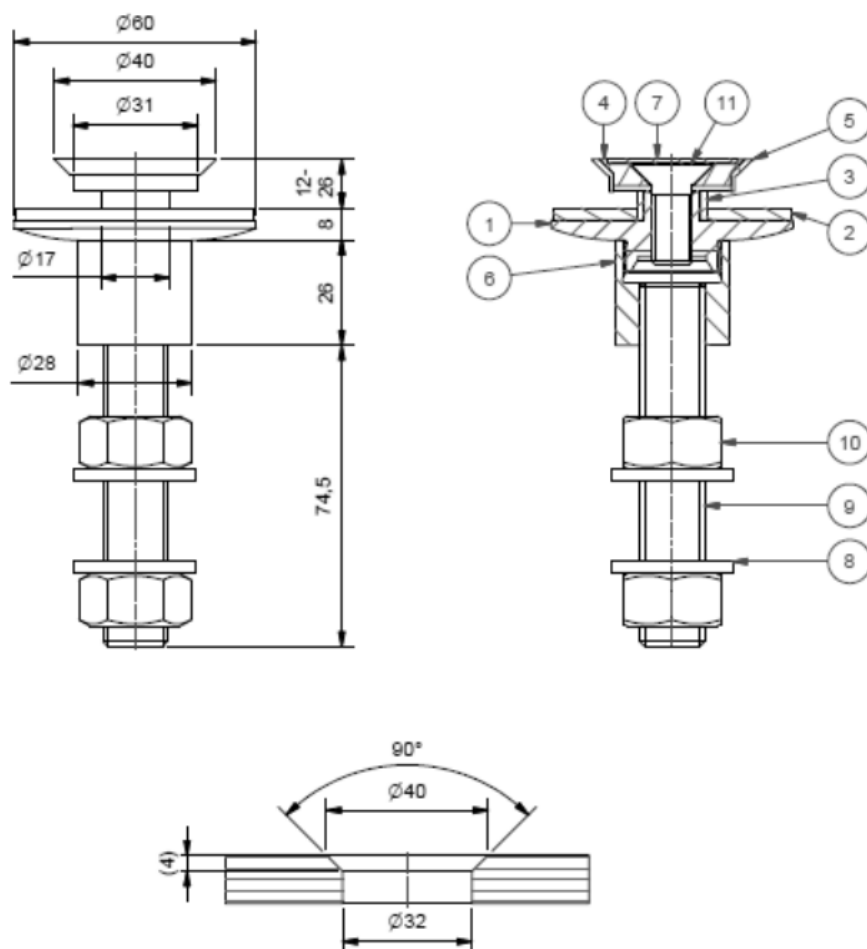


point fixture material 1.4401

glass bore Ø40/90°/Ø32

11	1	S7991A4D10x25	countersink screw with hex DIN 7991 - M10x25 - A4
10	2	S934A4D12	hex nut DIN 934 - M12 - A4
9	1	S913A4D12x80	threaded bolt DIN 913 - M12 x 80 - A4
8	2	S125A4D13A	washer DIN 125 - A 13
7	1	751360-1VA	cover plate
6	1	750260-10VA-M12	ridged adapter
5	1	751360-3POM	POM countersink sleeve
4	1	751360-2VA	countersink core
3	1	751260-5POM	POM sleeve for back plate
2	1	751260-8EPDM	EPDM washer for back plate
1	1	751260-8VA	fixture back plate, articulating D=60 mm
position	quant	item-no.	description

Countersunk fixture – fixed, flush
Item-No. 750360VAM16

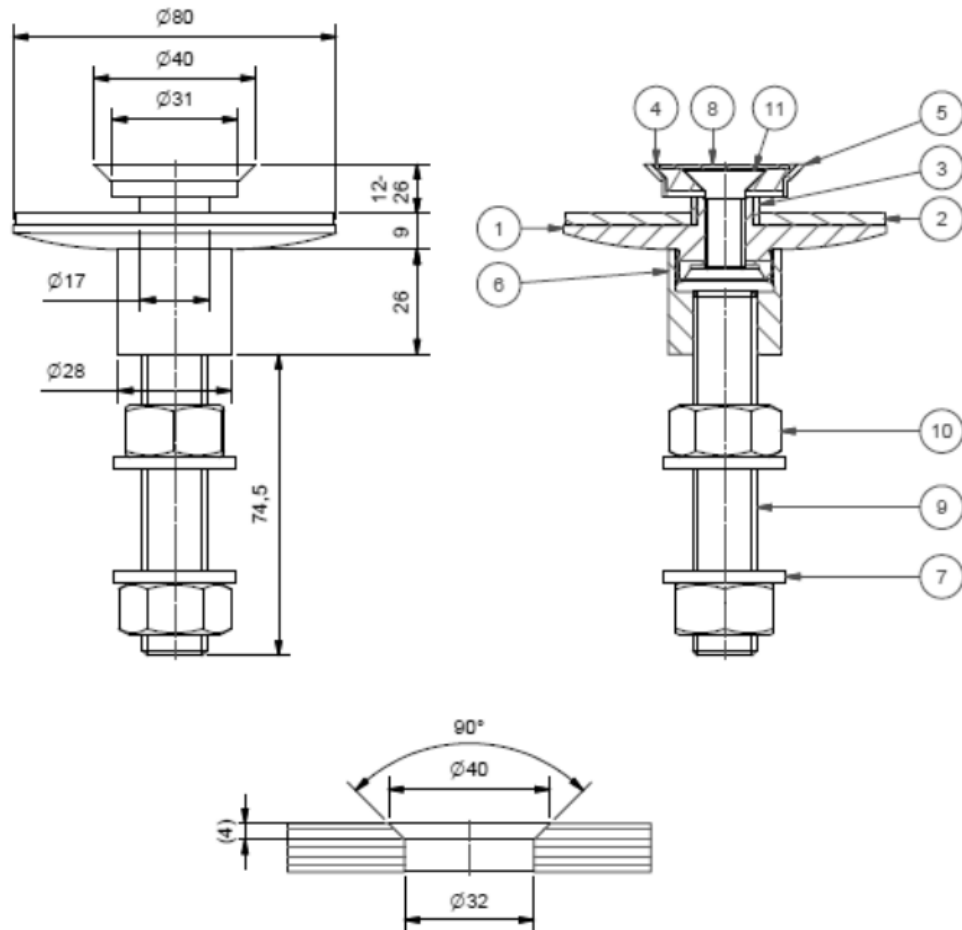


point fixture material 1.4401

glass bore Ø40/90°/Ø32

11	1	S7991A4D10x25	countersink screw with hex DIN 7991 - M10x25 - A4
10	2	S934A4D16	hex nut DIN 934 - M16 - A4
9	1	S913A4D16x90	threaded bolt DIN 913 - M16 x 90 - A4
8	2	S125A4D17A	washer DIN 125 - A 17 - A4
7	1	751380-1VA	cover plate
6	1	750280-10VA-M16	ridged adapter
5	1	751380-3POM	POM countersink sleeve D= 40 mm
4	1	751380-2VA	countersink core
3	1	751280-5POM	POM sleeve for back plate
2	1	751280-6EPDM	EPDM washer for back plate
1	1	751280-8VA	fixture back plate, articulating D=60 mm
position	quantity	item-no.	description

Countersunk fixture – fixed, flush
Item-No. 750380VAM16

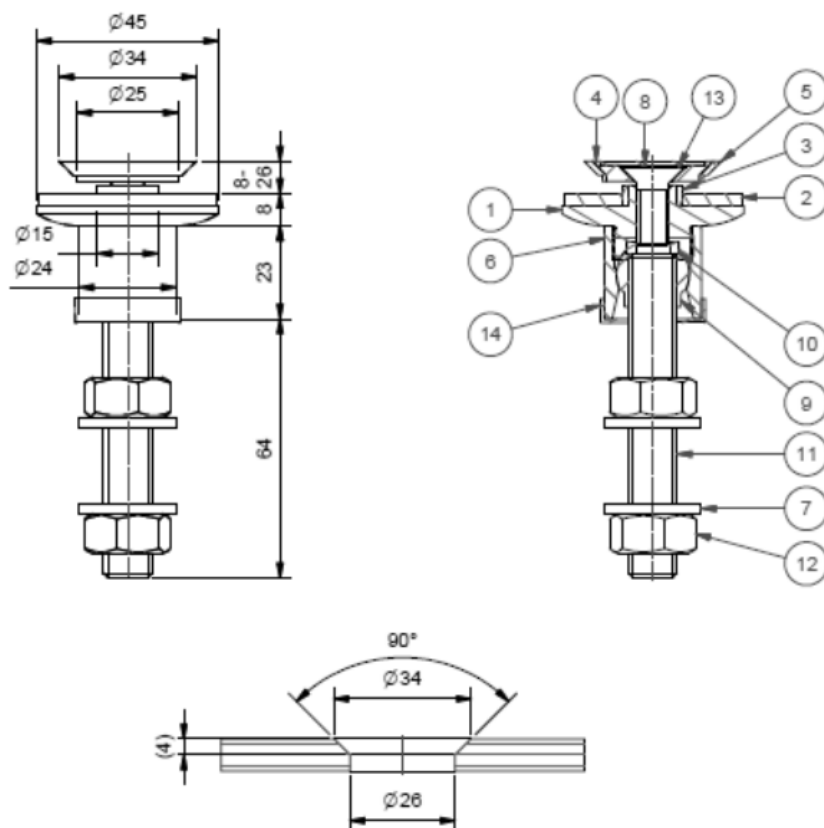


point fixture material 1.4401

glass bore $\varnothing 40/90^\circ/\varnothing 32$

11	1	S7991A4D10x25	countersink screw with hex DIN 7991 - M10x25 - A4
10	2	S934A4D16	hex nut DIN 934 - M16 - A4
9	1	S913A4D16x90	threaded bolt DIN 913 - M16 x 90 - A4
8	1	751360-1VA	cover plate
7	2	S125A4D17A	washer DIN 125 - A 17 - A4
6	1	750260-10VA-M16	ridged adapter
5	1	751360-3POM	POM countersink sleeve D= 40 mm
4	1	751360-2VA	countersink core
3	1	751260-5POM	POM sleeve for back plate
2	1	751280-6EPDM	EPDM washer for back plate
1	1	751280-8VA	fixture back plate, articulating D=80 mm
position	quantity	item-no.	description

Countersunk fixture – articulating, flush
Item-No. 751345VAM12

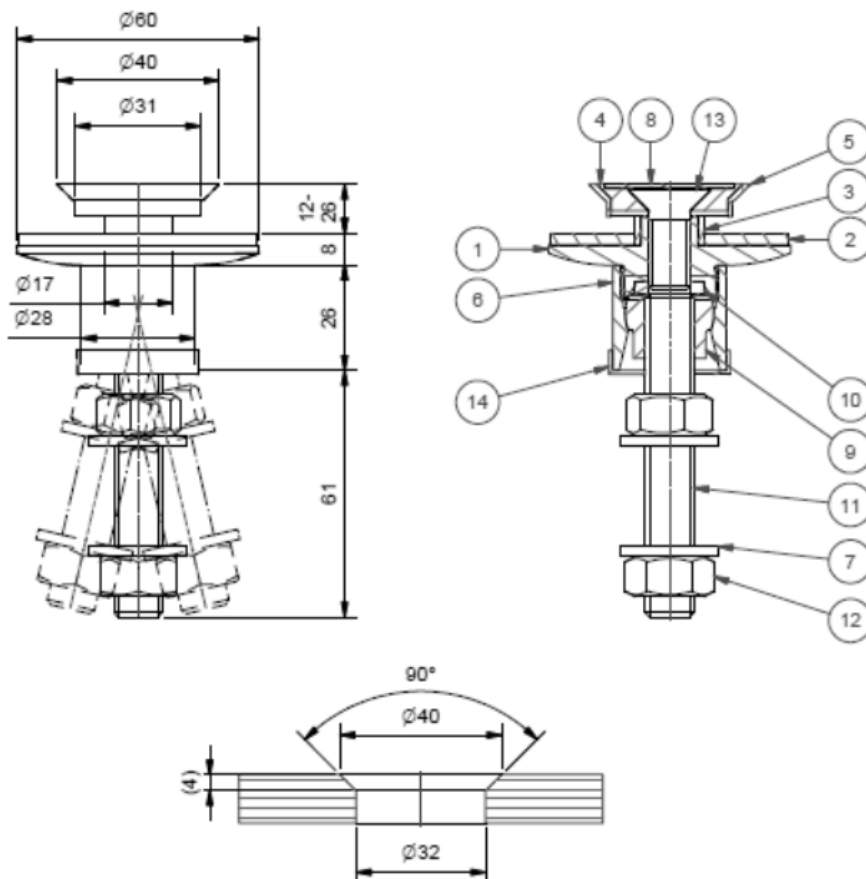


point fixture material 1.4401

glass bore $\varnothing 34/90^\circ/\varnothing 26$

14	1	751245-12KU-12	silicone dust cover $\varnothing 26\text{mm} \times \varnothing 10\text{mm} \times 6\text{mm}$
13	1	S7991A4D8x20	countersink screw with hex DIN 7991 - M8x20 - A4
12	2	S934A4D12	hex nut DIN 934 - M12 - A4
11	1	S913A4D12x80	threaded bolt DIN 913 - M12 x 80 - A4
10	1	751245-7EPDM	EPDM cushion $\varnothing 13 \times \varnothing 8,5 \times 3\text{mm}$
9	1	751245-10VA-M12	articulating adapter M12
8	1	751345-1VA	cover plate
7	2	S125A4D13A	washer DIN 125 - A 13
6	1	751245-9VA	articulating adapter $\varnothing 24 \times 23\text{mm}$
5	1	751345-3POM	POM countersink sleeve $D=40\text{mm}$
4	1	751345-2VA	countersink core
3	1	751245-5POM	POM sleeve for back plate $\varnothing 15 \times \varnothing 12 \times 5\text{mm}$
2	1	751245-6EPDM	EPDM washer for back plate $\varnothing 44 \times \varnothing 15 \times 3\text{mm}$
1	1	751245-8VA	fixture back plate, articulating $\varnothing 45\text{mm}$
position	quantity	item-no.	description

Countersunk fixture – articulating, flush
Item-No. 751360VAM12

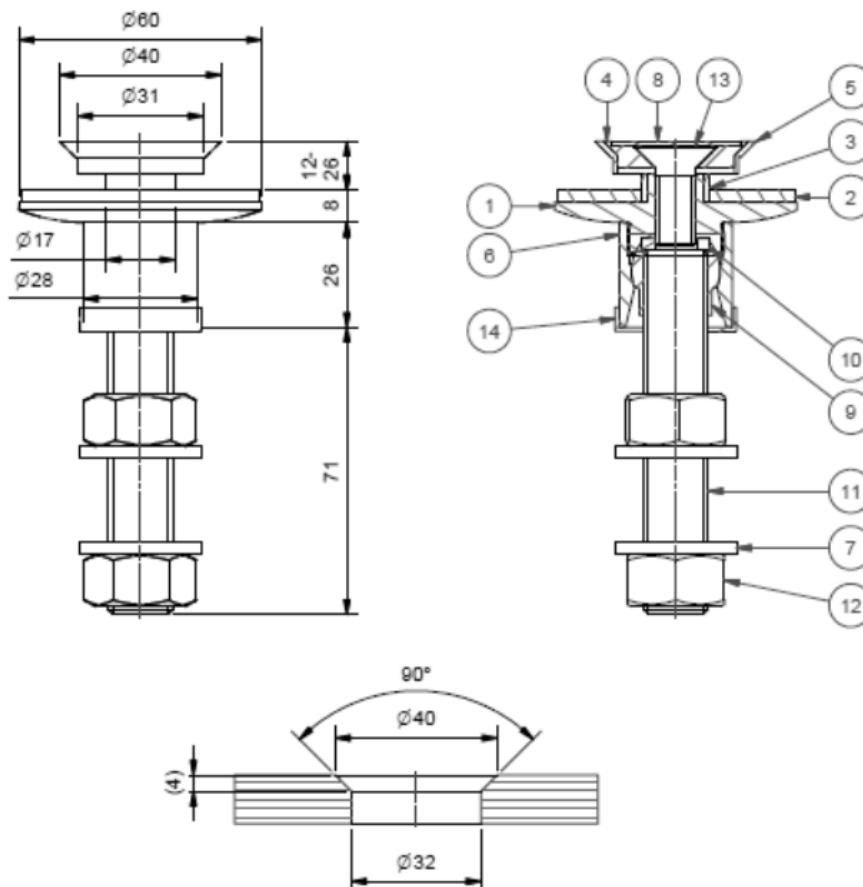


point fixture material 1.4401

glass bore $\varnothing 40/90^\circ/\varnothing 32$

14	1	751260-12KU-12	silicone dust cover $\varnothing 30\text{mm} \times \varnothing 10\text{mm} \times 8\text{mm}$
13	1	S7991A4D10x25	countersink screw with hex DIN 7991 - M10x25 - A4
12	2	S934A4D12	hex nut DIN 934 - M12 - A4
11	1	S913A4D12x80	threaded bolt DIN 913 - M12 x 80 - A4
10	1	751260-7EPDM	EPDM cushion
9	1	751260-10VA-M12	articulating adapter M12
8	1	751360-1VA	cover plate
7	2	S125A4D13A	washer DIN 125 - A 13
6	1	751260-9VA	articulating adapter
5	1	751360-3POM	POM countersink sleeve D=40mm
4	1	751360-2VA	countersink core
3	1	751260-5POM	POM sleeve for back plate
2	1	751260-6EPDM	EPDM washer for back plate
1	1	751260-8VA	fixture back plate, articulating D=60mm
position	quantity	item-no.	description

Countersunk fixture – articulating, flush
Item-No. 751360VAM16

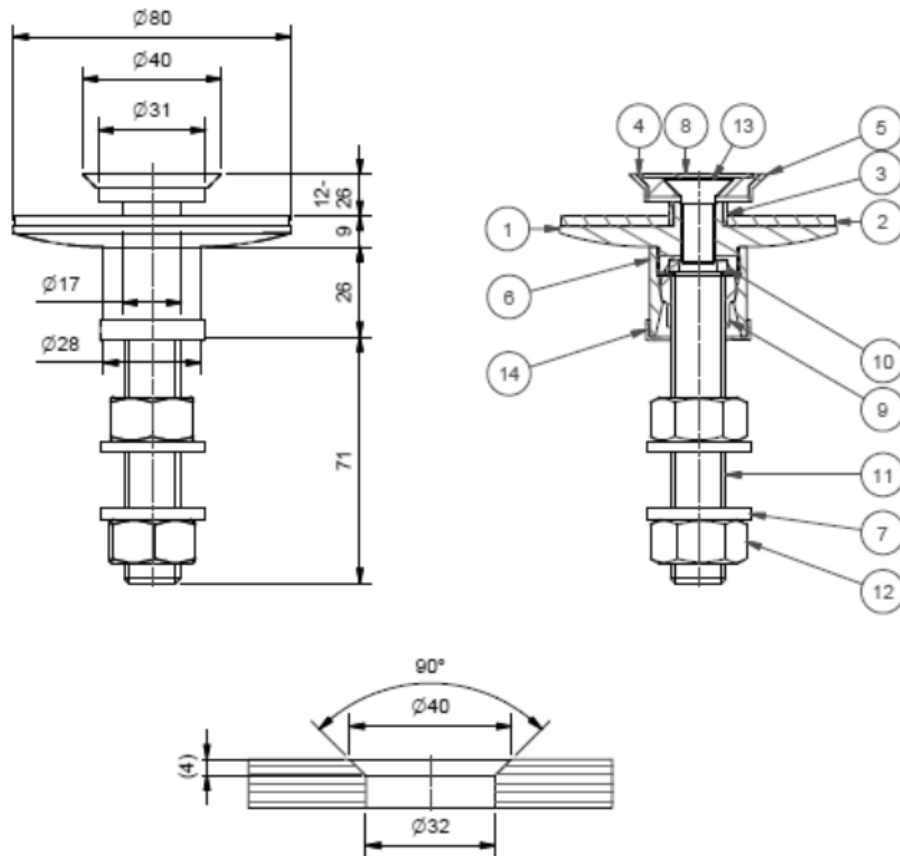


point fixture material 1.4401

glass bore $\varnothing 40/90^\circ/\varnothing 32$

14	1	751260-12KU-16	silicone dust cover $\varnothing 30\text{mm} \times \varnothing 14\text{mm} \times 6\text{mm}$
13	1	S7991A4D10x25	countersink screw with hex DIN 7991 - M10x25 - A4
12	2	S934A4D16	hex nut DIN 934 - M16 - A4
11	1	S913A4D16x90	threaded bolt DIN 913 - M16 x 90 - A4
10	1	751260-7EPDM	EPDM cushion
9	1	751260-10VA-M16	articulating adapter M16
8	1	751360-1VA	cover plate
7	2	S125A4D17A	washer DIN 125 - A 17 - A4
6	1	751260-9VA	articulating adapter
5	1	751360-3POM	POM countersink sleeve D=40mm
4	1	751360-2VA	countersink core
3	1	751260-5POM	POM sleeve for back plate
2	1	751260-6EPDM	EPDM washer for back plate
1	1	751260-8VA	fixture back plate, articulating D=60mm
position	quantity	item-no.	description

Countersunk fixture – articulating, flush
Item-No. 751380VAM16



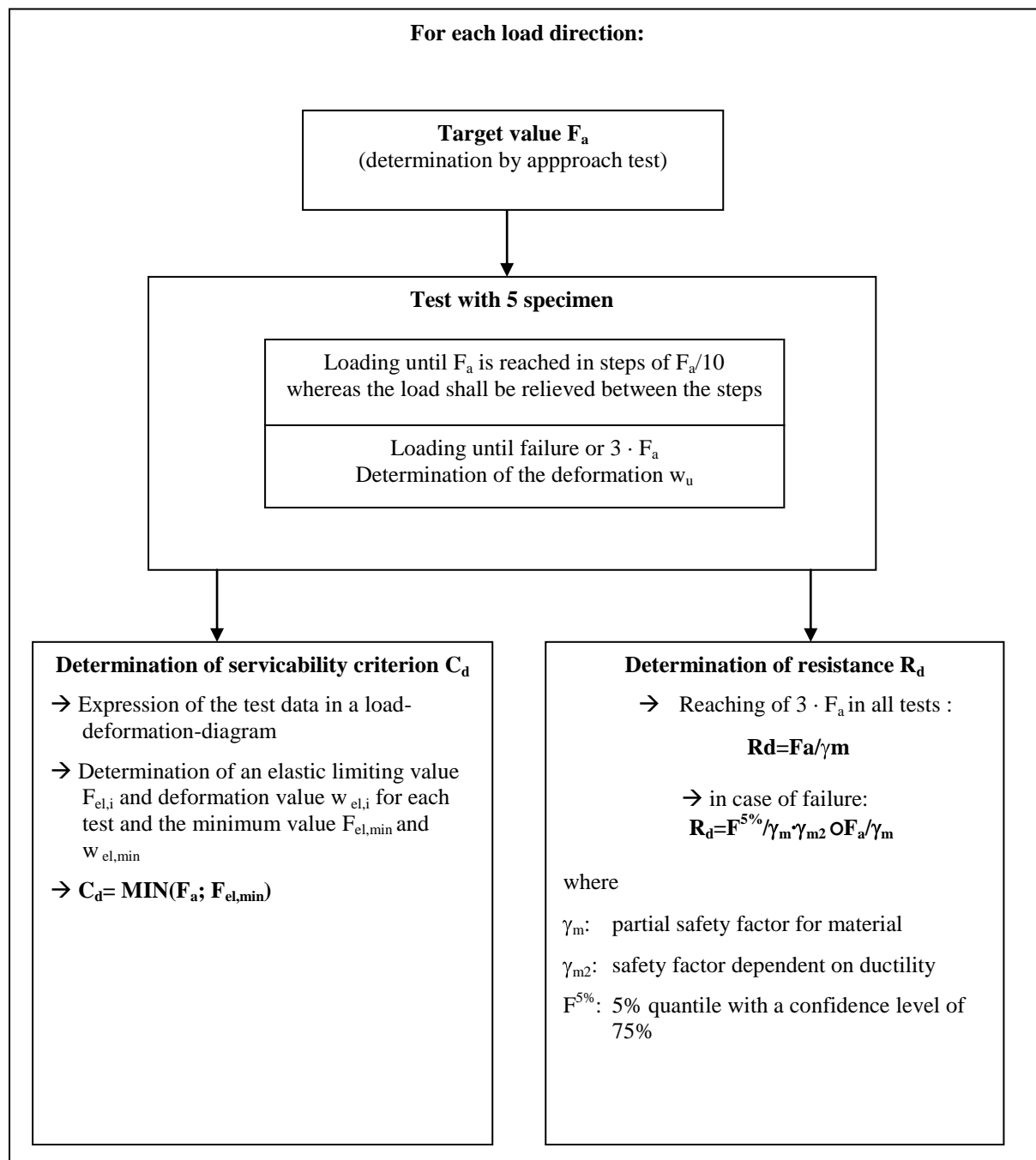
point fixture material 1.4401

glass bore Ø40/90°/Ø32

14	1	751280-12KU-16	silicone dust cover Ø30mmxØ14mmx8mm
13	1	S7991A4D10x25	countersink screw with hex DIN 7991 - M10x25 - A4
12	2	S934A4D16	hex nut DIN 934 - M16 - A4
11	1	S913A4D16x90	threaded bolt DIN 913 - M16 x 90 - A4
10	1	751280-7EPDM	EPDM cushion
9	1	751280-10VA-M16	articulating adapter M16
8	1	751380-1VA	cover plate
7	2	S125A4D17A	washer DIN 125 - A 17 - A4
6	1	751280-9VA	articulating adapter
5	1	751380-3POM	POM countersink sleeve D=40mm
4	1	751380-2VA	countersink core
3	1	751280-5POM	POM sleeve for back plate
2	1	751280-6EPDM	EPDM washer for back plate
1	1	751280-8VA	fixture back plate, articulating D=80mm
position	quantity	item-no.	description

ANNEX 5 – Strength resistance of point fixings

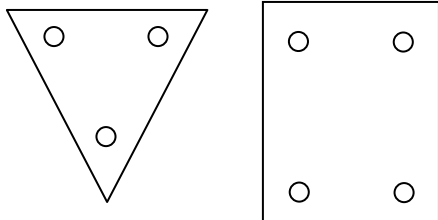
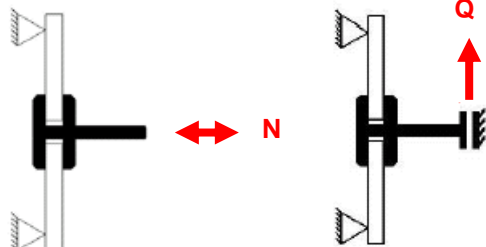
The calculation of the design values R_d and C_d given in the tables and diagrams are based on the German standard DIN 18008-3 and explained in the following:



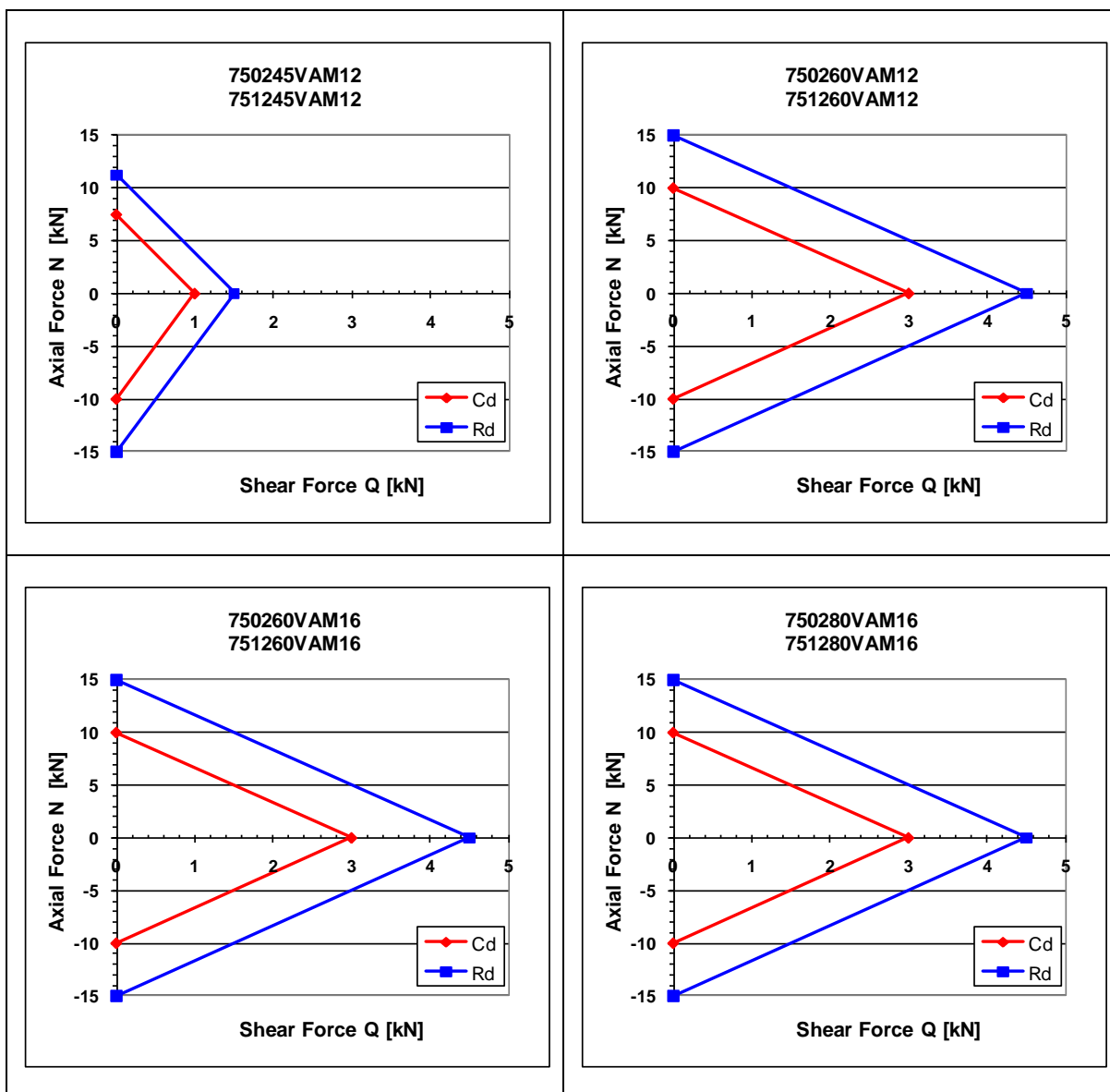
$$\gamma_m = 1,1$$

$$\gamma_{m2} = \frac{w_{u,m}}{w_{el,m}}$$

where $w_{u,m}$: mean value of the deformation in case of failure or $3 \cdot F_a$
 $w_{el,m}$: mean value of the elastic deformation

Point fixing						
Installation:			Test:			
						
Testing conditions:						
The test set-up is based on an installation with at least 3 fixings per glass pane, therefore the test results are only valid for comparable supporting conditions. The design values for axial and shear forces where determined separately, full superposition is therefore not verified.						
	Axial force Tension		Axial force Compression		Shear force	
Item-No.	R _d	C _d	R _d	C _d	R _d	C _d
75 02 45 VAM12	11,25	7,5	15	10	1,5	1,0
75 12 45 VAM12	11,25	7,5	15	10	1,5	1,0
75 03 45 VAM12	8,5	8,5	15	10	1,5	1,0
75 13 45 VAM12	8,5	8,5	15	10	1,5	1,0
75 02 60 VAM12	15	10	15	10	4,5	3,0
75 12 60 VAM12	15	10	15	10	4,5	3,0
75 03 60 VAM12	15	10	15	10	3,0	1,0
75 13 60 VAM12	15	10	15	10	3,0	1,5
75 02 60 VAM16	15	10	15	10	4,5	3,0
75 12 60 VAM16	15	10	15	10	4,5	3,0
75 03 60 VAM16	15	10	15	10	3,0	2,0
75 13 60 VAM16	15	10	15	10	3,0	2,0
75 02 80 VAM16	15	10	15	10	4,5	3,0
75 12 80 VAM16	15	10	15	10	4,5	3,0
75 03 80 VAM16	15	10	15	10	3,0	1,5
75 13 80 VAM16	15	10	15	10	3,0	2,0

Point fixings – plate fixture

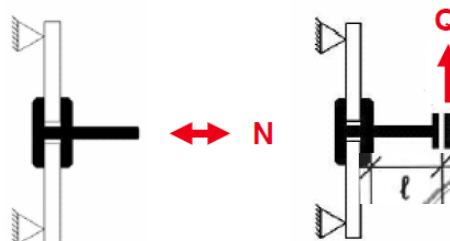


C_d : design value of the relevant serviceability criterion

R_d : design value of the resistance to the actions

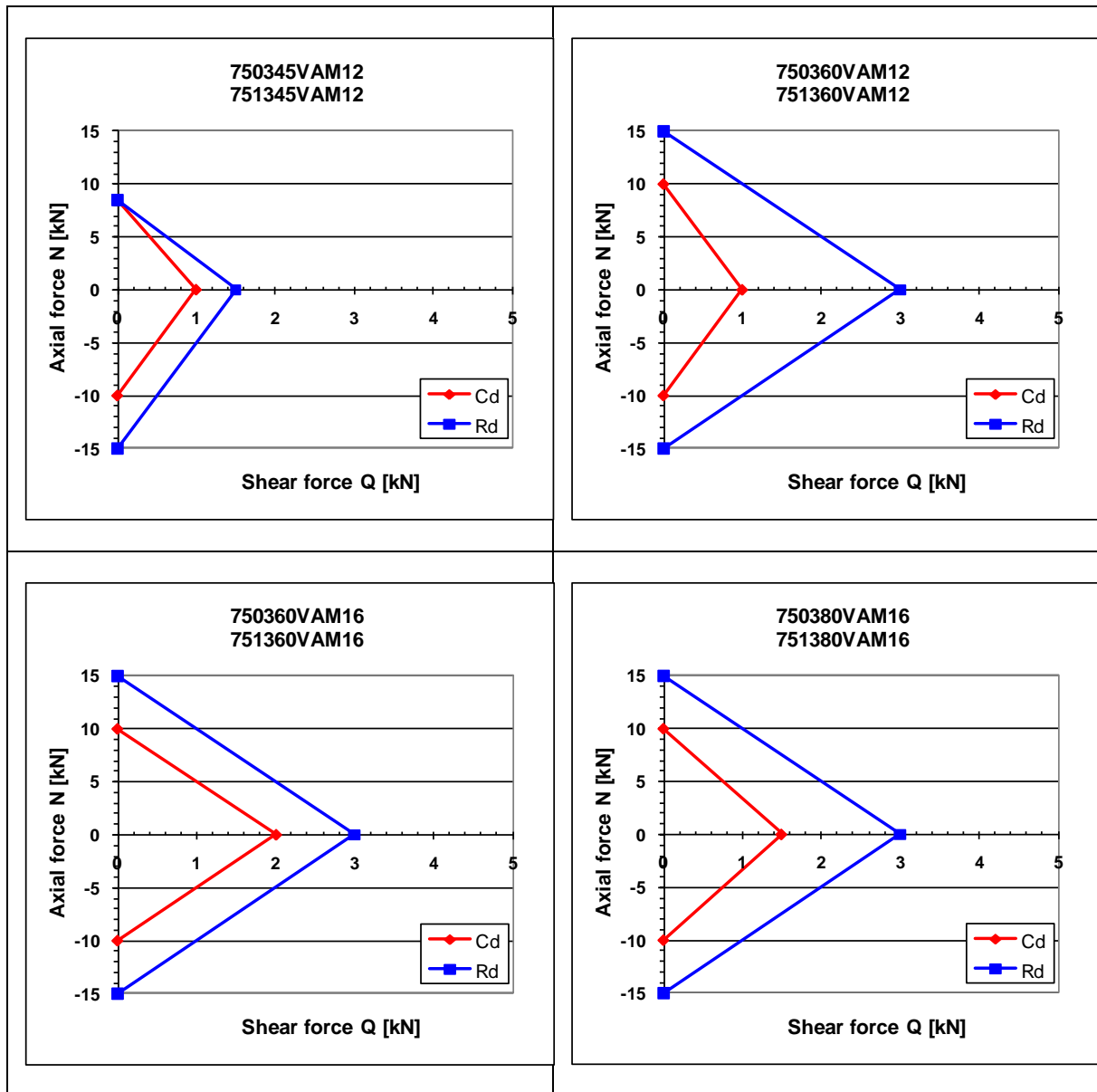
N : Axial force

Q : Shear force



Max. cantilever ℓ according to Annex 4

Point fixings – countersunk fixture

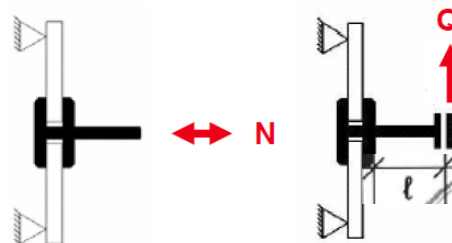


C_d : design value of the relevant serviceability criterion

R_d : design value of the resistance to the actions

N : Axial force

Q : Shear force



Max. cantilever l according to Annex 4

■ Beispiel zur Anwendung der Bemessungsdiagramme | example of how to use the dimensioning tables

Beispiel:

Es soll eine Fassade mit vertikal montierten, rechteckigen Glasscheiben gebaut werden, die mit vier Punkthaltern des Typs 751280VAM16 in gleichmäßigen Randabständen an der Unterkonstruktion befestigt sind.

Die Windlast beträgt $1,5 \text{ kN/m}^2$

Für die Scheibe gelten folgende Maße:

Breite: 2,0 m

Höhe: 3,0 m

Gewicht: 360 kg

Example:

You want to construct a facade with vertically mounted rectangular glass panels which are mounted with 4 point fixings of type 751280VAM16 in equal edge distances to your substructure.

The wind load is $1,5 \text{ kN/m}^2$

The following dimensions apply to the panel:

width: 2,0 m

height: 3,0 m

weight: 360 kg

Es ergeben sich folgende Lasten: | The following loads result:

$$Q_k = G_k \cdot \text{Scheibe} \cdot \text{panel} = 360 \text{ kg} \cdot 10 \text{ N/kg} = 3,6 \text{ kN}$$

--> $3,6 \text{ kN} / 2 = 1,8 \text{ kN}$ je Halter | per fixing*

$$Q_d = \gamma_G \cdot G_k = 1,35 \cdot 1,8 \text{ kN} = 2,43 \text{ kN}$$
 je Halter | per fixing

$$N_k = w_k \cdot A = 1,5 \text{ kN/m}^2 \cdot 2,0 \text{ m} \cdot 3,0 \text{ m} = 9,0 \text{ kN}$$

--> $9,0 \text{ kN} / 4 = 2,25 \text{ kN}$ je Halter | per fitting*

$$N_d = \gamma_Q \cdot N_k = 1,5 \cdot 2,25 \text{ kN} = 3,38 \text{ kN}$$
 je Halter | per fixing

Es sind zwei Nachweise zu führen:

(Die Scheibe selbst, das Glas, ist nicht Bestandteil dieses Nachweises!)

- Die Kombination aus Q_k und N_k muss kleiner als C_d sein und
- die Kombination aus Q_d und N_d muss kleiner als R_d sein.

Nachweis:

1. Die Linien von Q_k und N_k schneiden sich unter C_d --> ok ✓
2. Die Linien von Q_d und N_d schneiden sich unter R_d --> ok ✓

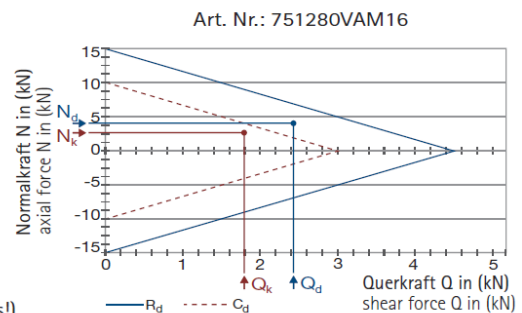
Two verifications are needed:

(the panel itself, the glass, is not included in this verification!)

- the combination of Q_k and N_k has to be smaller than C_d and
- the combination of Q_d and N_d has to be smaller than R_d .

Verification:

1. The lines from Q_k and N_k intersect under C_d --> ok ✓
2. The lines from Q_d and N_d intersect under R_d --> ok ✓



*Aus montage-technischen Gründen wird die vertikale Last (das Eigengewicht der Scheibe) nur von zwei Punkthaltern abgetragen. Das Gewicht der Scheibe wirkt bei vertikaler Montage als Querkraft auf den Halter. Die Windlast beansprucht die Halter in Achsrichtung und wirkt als Normalkraft auf alle vier Halter.

*For technical assembly reasons, the vertical load (weight of the glass panel itself) should be borne by two point fixings only. The weight of the panel acts as a shear force on the fixing if mounted vertically. The wind puts a load on the fixings in an axial direction and acts as an axial load on all four fixings.

Erklärung:

G_k : Last aus Eigengewicht der Scheibe

Q_k : charakteristische Querkraftbeanspruchung (ohne Sicherheitsfaktoren)

Q_d : Bemessungswert der Querkraftbeanspruchung (inkl. Teilsicherheitsfaktor)

N_k : charakteristische Normalkraftbeanspruchung (ohne Sicherheitsfaktoren)

N_d : Bemessungswert der Normalkraftbeanspruchung (inkl. Teilsicherheitsfaktor)

γ_G : Teilsicherheitsbeiwert für ständige Einwirkungen

γ_Q : Teilsicherheitsbeiwert für veränderliche Einwirkungen

w_k : charakteristische Windlast

Definition:

G_k : Load of the weight of the glass panel itself

Q_k : characteristic shear force load (without safety factor)

Q_d : rated value of the shear force load (incl. partial safety factor)

N_k : characteristic axial force load (without safety factors)

N_d : rated value of the axial force load (incl. partial safety factor)

γ_G : partial safety coefficient for constant effects

γ_Q : partial safety coefficient for variable effects

w_k : characteristic wind load

ANNEX 6 – Residual load bearing capacity of canopies or roofs

The residual load bearing capacity has been verified according to CUAP 06.02/08, Annex A, clause A1.2.

Test procedure:

- Predamaging of all layers of laminated glass
by steel ball (4.1kg) from a height of 1m, 2m and 3m at several point of impact (the drop height will be increased if the laminated glass is not fractured)
by hole punch and hammer if the laminated glass is not fractured by the steel ball
- The most onerous points of impact were chosen
- Applied load: 0.5 kN/m² and 0.8 kN/m² by sandbags
- Loading time 24h
- Test deemed to be passed: no collapse of the system, no large fragments on the ground, glass remained in the point fixings.

Annex 6.1 Interlayer SentryGlas® SGP 5000

The roof can be hanging or elevated, but without any tension rod system (no horizontal forces are induced into the glass panel).

Following plate fixings are to be used:

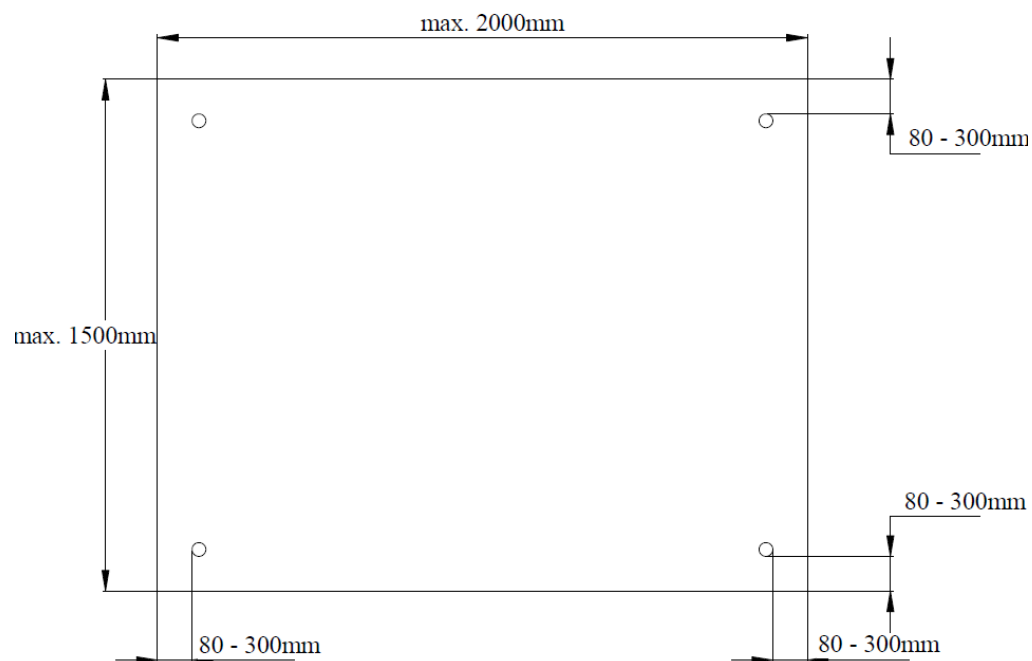
	Ø 45 mm	Ø 60 mm	Ø 80 mm
Fixed	750245VAM12	750260VAM12 750260VAM16	750280VAM16
Articulated	751245VAM12	751260VAM12 751260VAM16	751280VAM16

Glass set-up:

Laminated glass (VSG) made of:

- 5mm thermally toughened safety glass (ESG)
- 1.52mm SentryGlas® SGP 5000
- 5mm thermally toughened safety glass (ESG)

Glass sizes 4 point fixings:



Annex 6.2 Interlayer PVB

The roof can be hanging or elevated, but without any tension rod system (no horizontal forces are induced into the glass panel).

Following plate fixings are to be used:

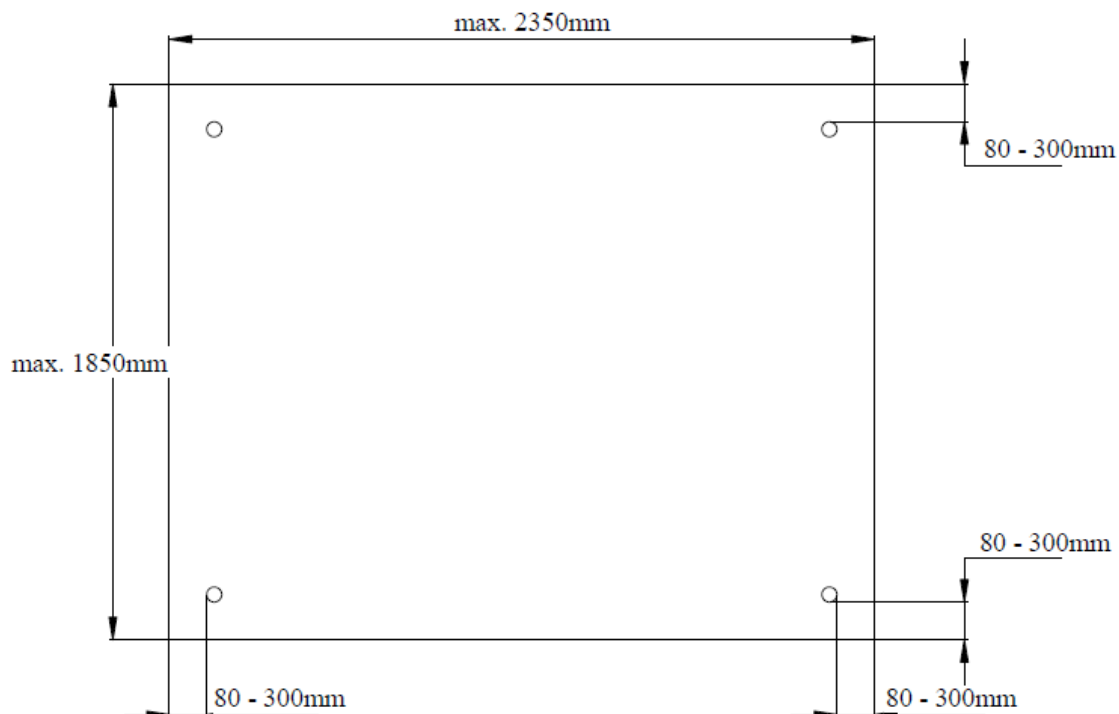
	Ø 60 mm	Ø 80 mm
Fixed	750260VAM12 750260VAM16	750280VAM16
Articulated	751260VAM12 751260VAM16	751280VAM16

Glass set-up:

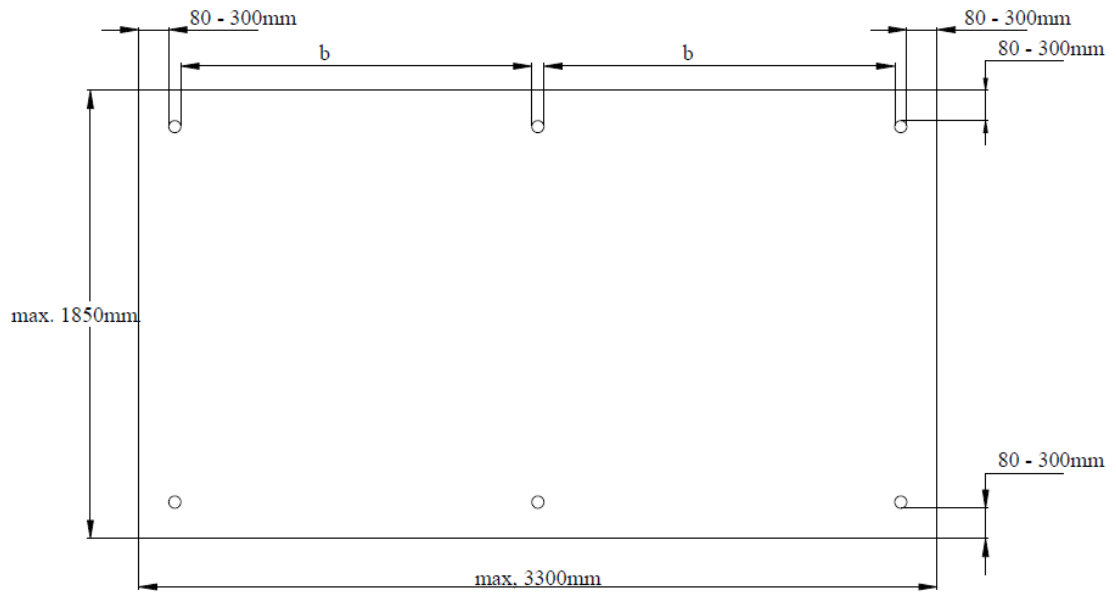
Laminated glass (VSG) made of heat strengthened glass (TVG)

VSG made of TVG with 1.52 mm PVB interlayer	2x6 mm	2x8 mm	2x10 mm	2x12 mm
--	--------	--------	---------	---------

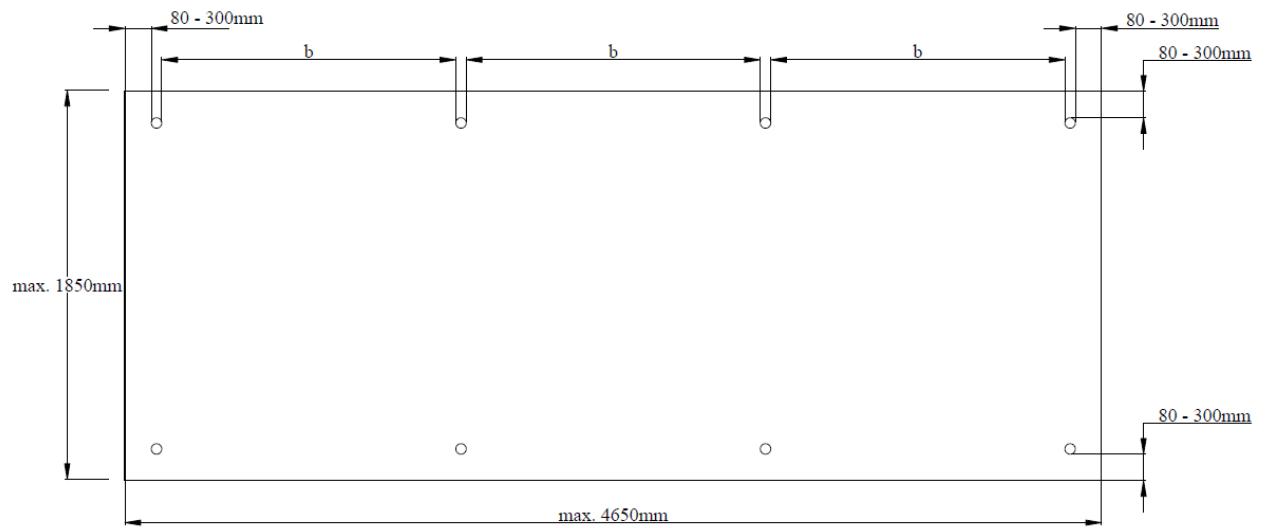
Glass sizes 4 point fixings:



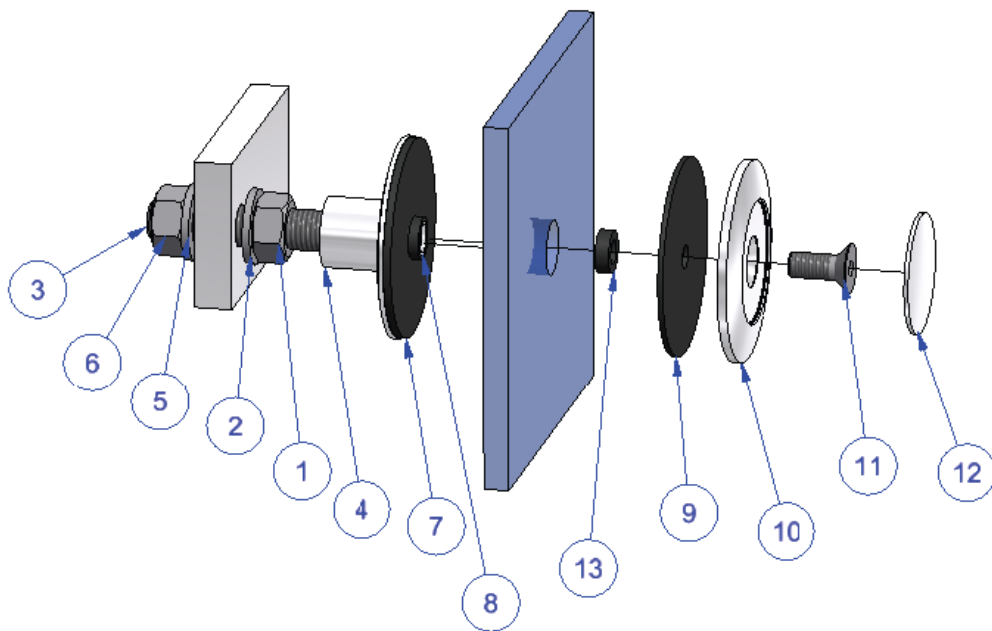
Glass sizes 6 point fixings:



Glass sizes 8 point fixings:



ANNEX 7 – Installation instructions



Front assembly

1 Assembly preparation:

Before assembly, be sure to check for any damage to the glass panels.

2 Mounting point fixtures to the substructure

- Substructure with through-hole:

Lead with nut (1) and washer (2) on the provided bolt (3) at the rear section of the point fixture (4) through the through-hole of the substructure and secure with washer (5) and nut (6). Tightening torque of 56 N·m for M12 and 135 N·m for M16.

- Substructure as a threaded sleeve:

Lead with nut (1) and washer (2) on the provided bolt (3) at the rear section of the point fixture (4) screw the bolt into the sleeve and secure by countering the nut (1). This is only possible with an articulating point fixture.

3 Assembly of the point fixtures to the glass panel

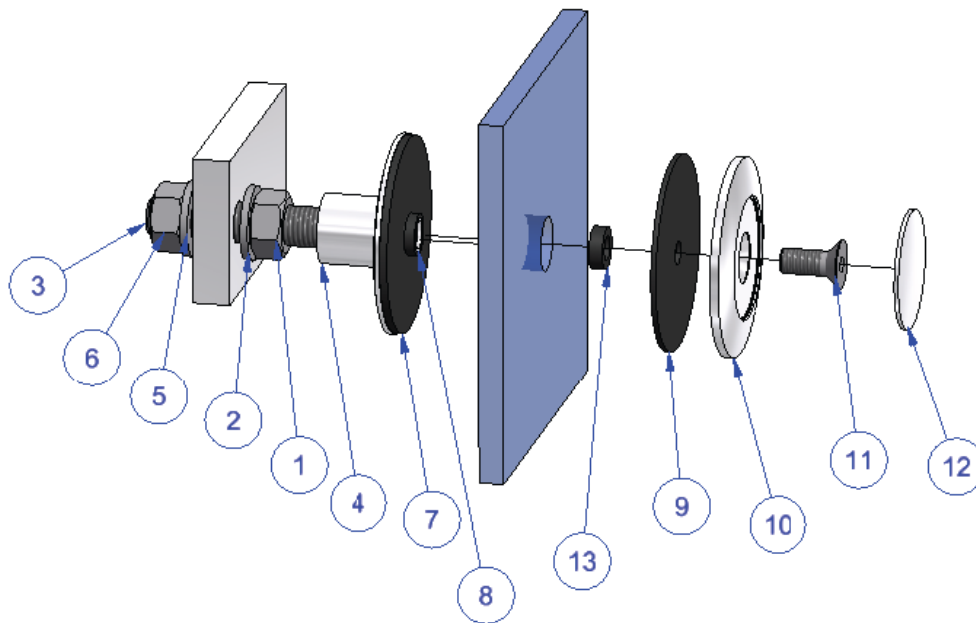
Using suitable lifting means, position the Glass panel in front of the EPDM gasket (7) and POM-sleeve (8) provided at the rear section of the point fixture (4). Select the proper screw (11) (length according table) to fit the glass thickness. Insert the POMsleeve

(13) into the drilled hole of the glass panel, position the EPDM gasket (9) and plate (10). Using the countersink screw (11) tighten it with a torque of 15 N·m for M8 and 18 N·m for M10.

Secure the cover cap (12) to the point fixture with a silicone adhesive.

It is important to ensure that the glass panels are installed free of constraint i.e. tension and compression.

In general, all threaded connections are to be made with an appropriate thread locker, for example, Loctite® 480.



Rear assembly

1 Assembly preparation:

Before assembly, be sure to check for any damage to the glass panels.

2 Assembly of the point fixtures to the glass panel

Position the Glass panel in front of the EPDM gasket (7) and POM-sleeve (8) provided at the rear section of the point fixture (4). Select the proper screw (11) (length according table) to fit the glass thickness. Insert the POM-sleeve (13) into the drilled hole of the glass panel, position the EPDM gasket (9) and plate (10). Using the countersink screw (11) tighten it with a torque of 15 N·m for M8 and 18 N·m for M10. Secure the cover cap (12) to the point fixture with a silicone adhesive.

3 Mounting point fixtures and glass panel to the substructure

- Substructure with through-hole:

using suitable lifting means, carefully lead with nut (1) and washer (2) on the provided bolt (3) at the rear section of the point fixture (4) through the through-hole of the substructure and secure with washer (5) and nut (6). Tightening torque of 56 N·m for M12 and 135 N·m for M16.

- Substructure as a threaded sleeve:

using suitable lifting means, carefully lead with nut (1) and washer (2) on the provided bolt (3) at the rear section of the point fixture (4) screw the bolt into the sleeve and secure by countering the nut (1). Tightening torque of 56 N·m for M12 and 135 N·m for M16. This is only possible with an articulating point fixture.

It is important to ensure that the glass panels are installed free of constraint i.e. tension and compression.

In general, all threaded connections are to be made with an appropriate thread locker, for example, Loctite® 480.