1. BI-FireStop
FIRE-RESISTANT SAFETY GLASS

1.1 Description

BI-FireStop is a monolithic fire protection glass without wire or any other intermediate layers. It is manufactured by the float glass process and has excellent optical properties. Different processing systems permit a multiplicity of design variations. When combined as an insulating glass it can fulfill additional functional requirements such as sun, thermal or sound protection according to its construction.

1.2 Function

BI-FireStop fire-resistant glass is approved for glazing requiring fire resistance class G30.

During fire testing according to DIN 4102, Part 13 the high resistance values ensure that the glass can withstand rapid temperature increase. The required resistance time (integrity) of 30 minutes, during which flame and combustion gas penetration must be prevented, is significantly bettered by BI-FireStop.

In many tests the integrity of the room was protected for 40 minutes. The installation details and materials to be used are described accurately in the buildig approval documents. The following approval documents exist at present for BI-FireStop:

For steel frames:

    Z - 19.14 - 588 Single glass

    Z - 19.14 - 598 Single glass

    Z - 19.14 - 599 Single glass

    Z - 19.14 - 729 Single glass

    Z - 19.14 - 700 Insulating glass

For wooden frames:

    Z - 19.14 - 1038 Insulating glass

1.3 BI-FireStopColor

BI-FireStopColor is manfactured on the same principle as BI-FireStop but it has an additional ceramic colour coating. Every existing approval document for the use of BI-FireStop can be extenden with the option of using this colour printing process.

The maximum degree of printing is 50 %. It has been established for the purposes of uniformity that the degree of printing must be no greater than 50 % in any field of 100 x 100 mm.

Due to the special manufacturing process the ceramic colours are resistant to abrasion and acids (except hydrofluoric acid). They are also largely resistant to caustics and solvents, as well as UV and temperature changes. Virtually all the colours in the RAL system as well as individual colour mixtures can be produced.

BI-FireStopColor permits the option of having very individual colour mixtures in the design of fire-resistant glass. BGT offers over 50 standard decorative designs most of which have already been approved for general use.

1.4 Application

G-glazing can be used anywhere where room integrity is required with respect to smoke and flame penetration and where the heat transmission in the particular application is not critical.

This provides the following applicational areas :

- Partition wall glazing in walls which do not border escape routes and which offer sufficiently large safety clearances.

- Glazing in fanlights over 1,80 m high in the walls of escape routes (internal corridors)

- Door glazing for smoke protection and protection from flame flashover, but not for T doors.

- Glazing in the outer walls of buildings which are close together.

- Glazing in fire-resistant walls of external or glazed internal stairwells.

- Insulated glazing as external glazing to prevent flame flashover from floors with a higher fire load to floors with a lower fire load.

2. FURTHER PRODUCT FEATURES

2.1 Safety glass

Apart from the high safety reserves from the fire protection point of view, BI-FireStop also provides the additional properties of safety glass through its special manufacturing process.

BI-FireStop fulfills the requirements of the following tests:

DIN 18032 - Ball impact protection

DIN 52337 - Pendulum impact test

DIN 52338 - Falling ball test

DIN 52349 - Fracture structure / crumb
structure

2.2 Glass dimensions

BI-FireStop is supplied in generous glass sizes. The maximum permitted pane size is 1670 x 2850 mm and is therefore for example also suitable as showroom window glazing in shopping malls with sufficient safety clearance.

2.3 Frame systems

Through tests with different system manufacturers and with our own frame systems we can offer many different approved design variations.

The drawings attached provide a summary of these frame systems. You can find more detailed information on the frame design on the approval documents or you can ask your specialist consultant.

2.4 Insulating function glazing

BI-FireStop insulating glass can be made as single or multifunction glass.

Sun, heat and sound protection requirements can all be fulfilled individually or also in combinations.

2.5 Smoke-resistant glass

The suitability of the standard 6 mm and 10 mm BI-FireStop glazing for installation in smoke-resistant doors was proved by the Government's Material Testing Institute for NRW (North Rhine Westphalia)

In this application the particular advantage of BI-FireStop as a safety glass was demonstrated since the risk of injury is greatly diminished in the event of fracture due to the crumb structure.

3. TECHNICAL SUMMARY

3.1 **BI-FireStop** Single glass

Glass type	BI-FireStop, 6 mm	BI-FireStop, 8 mm	BI-FireStop, 10 mm	BI-FireStop, 12 mm	BI-FireStop, 15 mm
Maximum permitted size (mm)	1420 x 2020	1670 x 2270	1670 x 2850	1670 x 2850	1670 x 2850
Maximum production size (mm) [1]	1670 x 6000	1670 x 6000	1670 x 6000	1670 x 6000	1670 x 6000
Minimum size (mm)	200 x 300	200 x 300	200 x 300	200 x 300	200 x 300
Dimensional tolerances (mm)	± 2	± 2	± 2	± 2	± 2
Weight (kg/m²)	15	20	25	30	37,5
Effective Sound insulation value Rw (dB)	30	32	33	34	36
Sound protection glass	1	2	2	2	2
Degree of light transmission (%)	89*	88*	87*	86*	85*
Tensile bond strength (N/mm²)	≥ 180	≥ 180	≥ 180	≥ 180	≥ 180
Compression strength (N/mm²)	700 - 900	700 -900	700 - 900	700 - 900	700 - 900

* approx

1) These maximum dimensions can be manufactured technically. For dimensions, which exceed the permitted maximum sizes it is necessary to obtain individual approval certificates from the responsible authorities through the client.

3.2 BI-FireStop insulating glass

3.2.1 BI-FireStop standard insulating glass with increased thermal insulation

Glass type	BI-FireStop insulating glass	BI-FireStop insulating glass with increased thermal insulation	
Construction (mm)	6 / ≥ 6 / 6	6 / ≥ 6 / 6*	6* / 18 / 6*
Total thickness (mm)	≥ 18	≥ 18	30
Permitted maximum size (mm)	1160 x 1660	1160 x 1660	1160 x 1660
Maximum production size (mm)[1]	1500 x 2500	1500 x 2500	1500 x 2500
Minimum size (mm)	200 x 400	200 x 400	200 x 400
Dimensional tolerances (mm)	± 2	± 2	± 2
Weight (kg/m²)	30	30	30
Sound protection class	1 - 2	1 - 2	2
k-value (W/m²K)	3,0	1,8 (SZR = 16)	1,5
g-value (%)	75	approx. 70	n. b.
Light transmission (%)	81	approx. 74	n. b.

*   coated thermal insulation glass

1) These maximum dimensions can be manufactured technically. For dimensions, which exceed the permitted maximum sizes it is necessary to obtain individual approval certificates from the responsible authorities through the client.

3.2.2 BI-FireStop insulating glass with increased sun protection

Glass type	BI-FireStop insulating glass with increased sun protection			
	Clear	Bronze	Silver	Green
Construction (mm)	$8^{**} / \geq 6 / 6$	$8^{**} / \geq 6 / 6$	$8^{**} / \geq 6 / 6$	$8^{**} / \geq 6 / 6$
Total thickness (mm)	≥ 20	≥ 20	≥ 20	≥ 20
Maximum permitted size (mm)	1160 x 1660	1160 x 1660	1160 x 1660	1160 x 1660
Maximum production size (mm) [1]	1500 x 2500	1500 x 2500	1500 x 2500	1500 x 2500
Minimum size (mm)	200 x 400	200 x 400	200 x 400	200 x 400
Dimensional tolerances (mm)	± 2	± 2	± 2	± 2
Weight (kg/m²)	35	35	35	35
Sound insulation class	1 - 2	1 - 2	1 - 2	1 - 2
k-value (W/m²K)	3,0	3,0	3,0	3,0
Total energy transmission	48	33	58	36
b factor	0,55	0,38	0,67	0,41
Light transmission (%)	41	19	59	49

** Coated sun protection glass

BI-FireStop combinations with thermal and sun protection are possible. Please ask.

1) These maximum dimensions can be manufactured technically. For dimensions, which exceed the permitted maximum sizes it is necessary to obtain individual approval certificates from the responsible authorities through the client.

3.2.3 **BI-FireStop** insulating glass with increased sound insulation

Glass type	**BI-FireStop** insulating glass with increased sound insulation			
Construction (mm)	6/ 14 / 8	6 / 20 / 10	6 / 24 / 12	6 / 24 / 15
Total thickness (mm)	28	32 - 40	42	45
Maximum permitted size (mm)	1160 x 1660	1160 x 1660	1160 x 1660	1160 x 1660
Maximum production size (mm) [1]	1500 x 2500	1500 x 2500	1500 x 2500	1500 x 2500
Minimum size (mm)	200 x 400	200 x 400	200 x 400	200 x 400
Dimensional tolerances (mm)	± 2	± 2	± 2	± 2
Weight (kg/m²)	35	40	45	52,5
k-value (W/m²K)	≤ 3,0	≤ 3,0	≤ 3,0	≤ 3,0

Sound insulation values upon request

1) These maximum dimensions can be manufactured technically. For dimensions, which exceed the permitted maximum sizes it is necessary to obtain individual approval certificates from the responsible authorities through the client.

4. IMPORTANT INFORMATION

4.1 Marking

Every pane is permanently marked with a stamp with which it is possible to see the name of the manufacturer, the name of the product and the pane thickness.

Sample (e.g. **BI-FireStop, 6 mm**)

4.2 General

4.2.1 External monitoring

BI-FireStop is independently monitored externally by the Government Material Testing Institute for NRW.

In addition the fire-resistant panes are strictly monitored internally and are subject to strict quality controls.

4.2.2 Damage to panes

Panes with damage to the edges and/or rough surface damage may not be installed.

4.2.3 Installation

Installation may only be carried out by trained specialist companies. We will send you a list of approval installers upon request.

The approvals are specifically bound to the described glazing system. Dimensions, materials and installation instructions must be taken account of according to the terms of the approval certificate.

4.2.4 Manufacturer's certificate

The necessary manufacturer's certificate can be supplied by BGT Bischoff Glastechnik for the respective building authority as a plain form upon request.

4.2.5 Steel signs

The steel signs, required for the identification of the glass, can be obtained from BGT by filling in and returning a copy of the manufacturer's certificate.
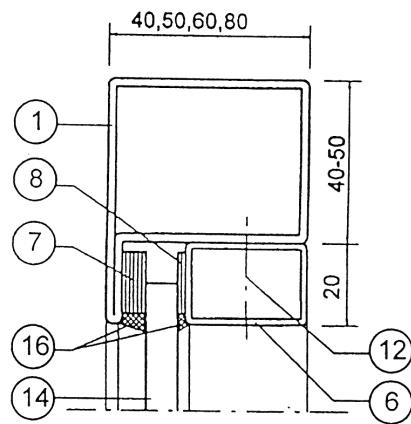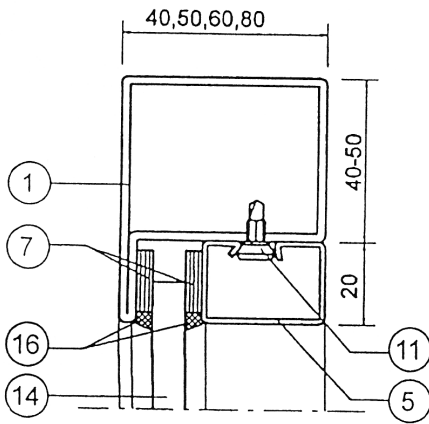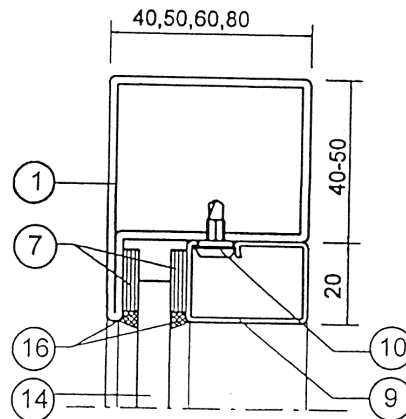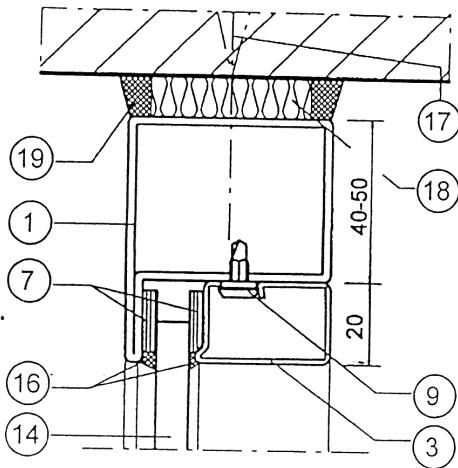
4.3 Assistance with tendering documents

Detailed texts for tendering documentation can be obtained for each product upon request.

"BGT, Type profile 8 - G 30"
Z - 19.14 - 729

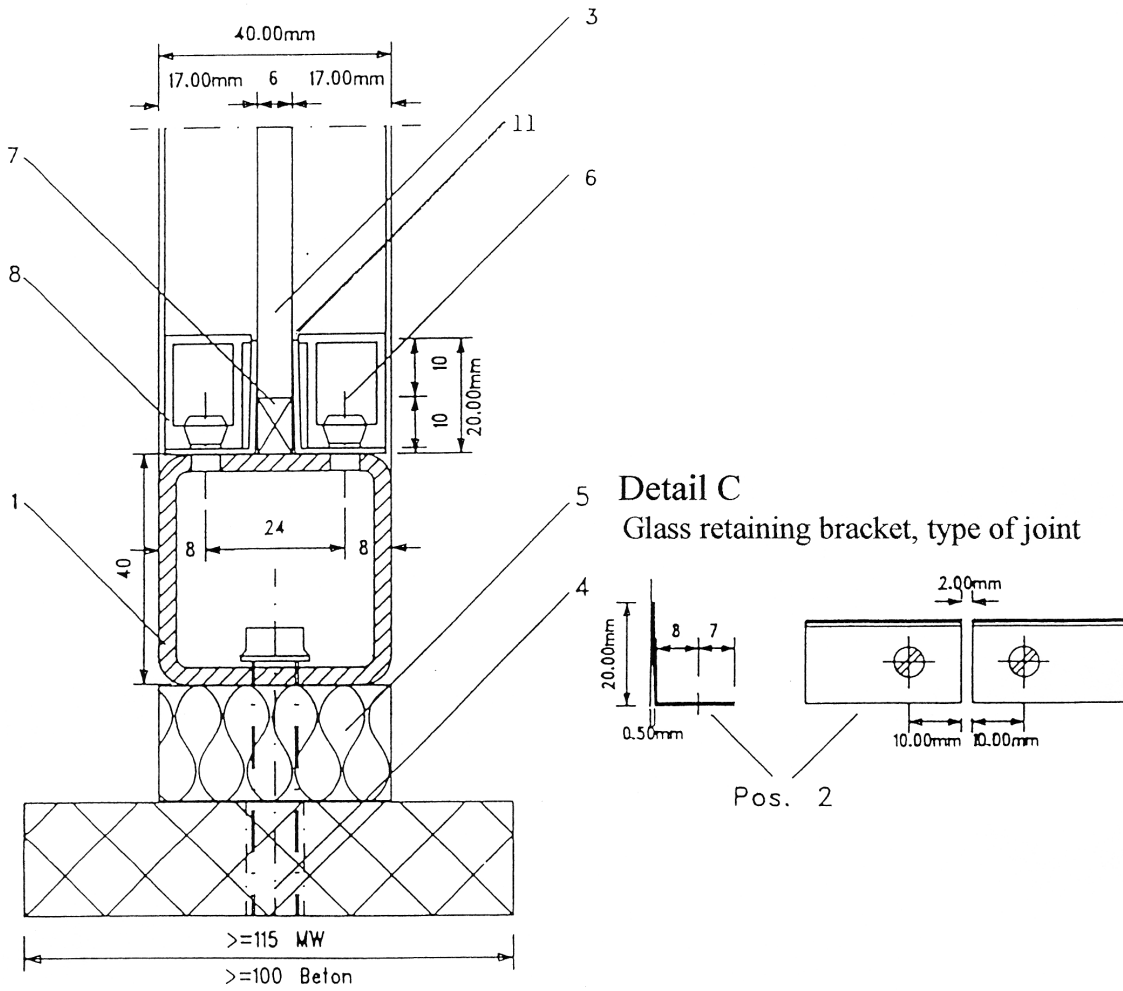<u>optionally</u>

"BGT, Type profile 8 - G 30"
Z - 19.14 - 729

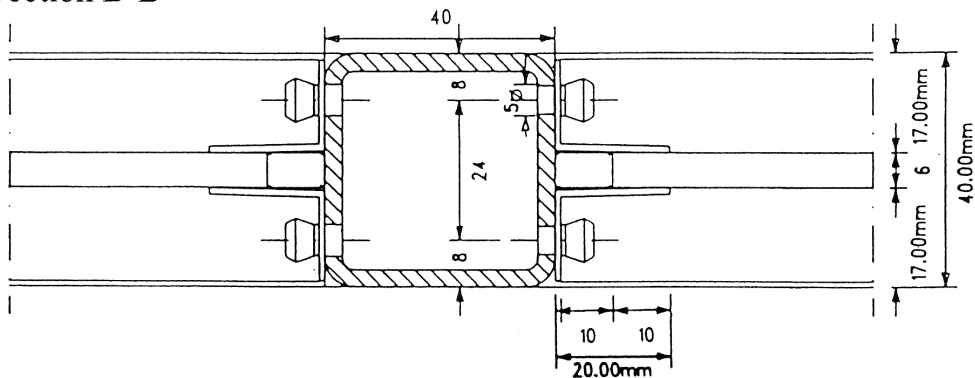| Parts list	
1	Edge post and bolt, 20 mm hollow steel profile with shoulder, 2 mm wall thickness, overall depth 40, 50, 60 or 80 mm
1a	Optional edge post and bolt, 22 mm hollow steel profile with shoulder, 2 mm wall thickness, overall depth 40, 50, 60 or 80 mm
2	Middle post and bolt, 20 mm hollow steel profile with shoulder, 2 mm wall thickness, overall depth 40, 50, 60 oder 80 mm
2a	Optional edge post and bolt, 22 mm hollow steel profile with shoulder, 2 mm wall thickness, overall depth 40, 50, 60 oder 80 mm
3	Glazing bars, steel, wall thickness 1,2 mm, acc. to Appendix 6 manufacturer Mannesmann Hoesch Präzisrohr GmbH („MHP")
4	Glazing bars, steel, wall thickness 1,25 mm, acc. to Appendix 6 manufacturer: Hermann Forster AG, Arbon/Schweiz
5	Glazing bars, steel, wall thickness 1,25 mm, acc. to Appendix 6 manufacturer: Jansen AG, Oberriet SG/Schweiz
6	Glazing bars made of square steel tubes with wall thickness $\geq$ 1,5 mm, according to Appendix 5
7	15 mm wide sealing strips, 4 - 6 mm thick (according to the glass thickness used) of „Fiberfrax" or „Kerafix" type, which is to be compressed to 2/3rds of the starting thickness in the installed situation. No pretension is necessary when using RHS.
8	„Kerafix" expanded paper, 20 mm width, 2 - 3 mm thick (acc. to the glass thickness used)
9	Stud fastener „MHP" no. 604100
10	Stud fastener „Forster" no. 906577
11	Stud fastener „Jansen" no. 450.002
12	Self-tapping screw with countersunk head, 4,8 x 32
13	10 mm pads x pane thickness in mm x 80 mm made of „Promatect-H" or „Promatect-H (new)" or „Flammi 12"
14	12 mm pads x pane thickness in mm x 80 mm made of „Promatect-H" or „Promatect-H (new)" or „Flammi 12" (if using profile with 22 mm stop)
15	Pane of „BI-FireStop" or „BI-FireStopColor" $\geq$ 8 mm thick
15	Flat steel, 2 mm thick, width according to the glass beading used
16	Sealed with highly inflammable silicone sealant (construction material class DIN 4102-B1) according to test report of the German Institute of Building Technology
17	Dowel anchors and steel screws with general building approval
18	Non-flammable mineral wool (construction material class DIN 4102-A)
19	Optional seals (construction material class DIN 4102-B1)

"BGT, Type 1 - G 30"
Z - 19.14 - 588

Section A-A

40.00mm

17.00mm 6 17.00mm

3

11

6

7

8

10

10

20.00mm

1

5

40

24

8 8

Detail C
Glass retaining bracket, type of joint

2.00mm

4

20.00mm

8 7

0.50mm

10.00mm 10.00mm

Pos. 2

>=115 MW

>=100 Beton

Section B-B

40

8

5

24

8

17.00mm

6

17.00mm

40.00mm

10 10

20.00mm

"BGT, Type 1 - G 30"

Z - 19.14 - 588

Parts list	
1	Steel tube 40 x 40 x 3 mm
2	Steel angle 15 x 20 x 1 mm, expanded
3	Pane of 6 mm **BI-FireStop**, or 6 mm **BI-FireStopColor**
4	Dowel anchors and M 8 steel screws with general building approval
5	Mineral wool, non-flammable (construction material class DIN 4102-A)
6	Stud fastener with M 5 screw
7	6 x 10 x 60 mm pads made of "Promatect-H" or "Promatect-H (new) or "Flammi 12"
8	Aluminium - clamping profile 15 x 20 x 1,5 mm
9	Steel angle 60 x 33,5 x 5 mm, 34 mm wide*
10	Steel plate 40 x 33,5 x 6 mm*
11	Sealed with highly inflammable silicone sealant (construction material class DIN 4102-B1) acc. to test report of the German Institute of Building Technology

* Frames optionally welded

"BGT, Type 2 - G 30"

Z - 19.14 - 598
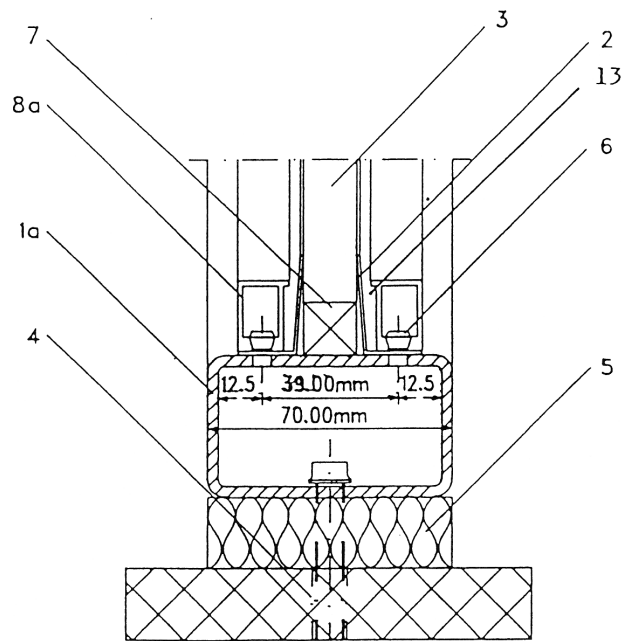
Version A
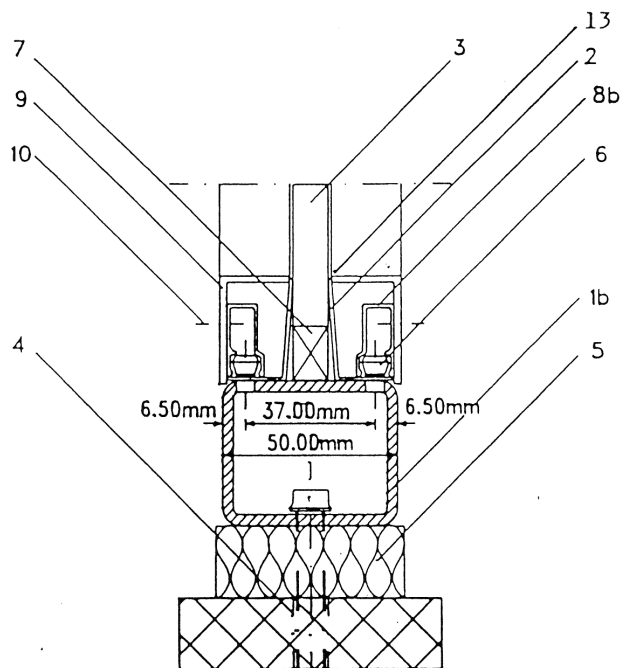
Version B
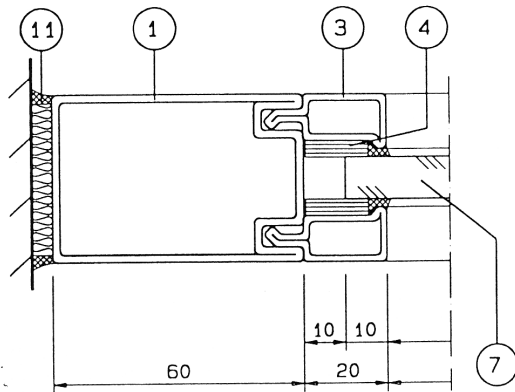
"BGT, Type 2 - G 30"

Z - 19.14 - 598

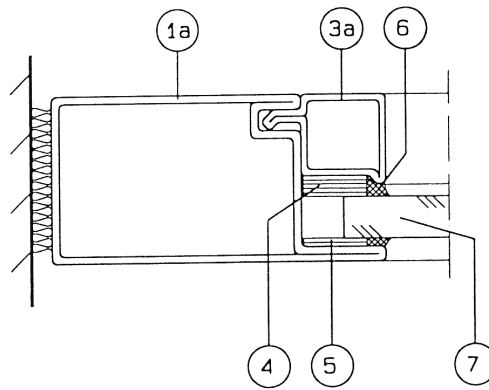| Parts list Type A or Type B	
1a	Steel tube 70 x 40 x 3 mm
1b	Steel tube 50 x 40 x 3 mm
2	Steel angle 28 x 17 x 1 mm, expanded
3	**BI-FireStop, G 30**, d ≥ 10 mm or **BI-FireStopColor G 30**, d ≥ 10 mm
4	Dowel anchors and M 8 steel screws with general building approval
5	Mineral wool, non-flammable (construction material class DIN 4102-A)
6	Stud fastener with M 5 screw, a ≤ 200 mm
7	Pads made of "Promatect - H" or "Promatect-H (new) or "Flammi 12" or "VERMIPAN A2"
8a	Aluminium - clamping 15 x 20 x 1,5 mm
8b	Aluminium - clamping profile 9 x 20 x 1,0 mm
9	Aluminium - angle profile 30 x 15 x 2 mm
10	Countersunk head screw M 5, a ≤ 500 mm
11 a	Steel angle 60 x 33,5 x 5 mm, 64 mm wide*
11 b	Steel angle 60 x 35,5 x 5 mm, 44 mm wide*
12 a	Steel plate 40 x 63,6 x 6 mm, *
12 b	Steel plate 40 x 43,6 x 6 mm
13	Sealed with highly inflammable silicone sealant (construction material class DIN 4102-B1) acc. to test report of the German Institute of Building Technology

* Frames optionally welded

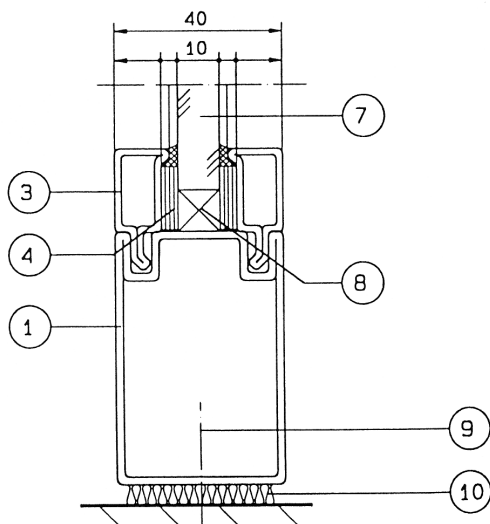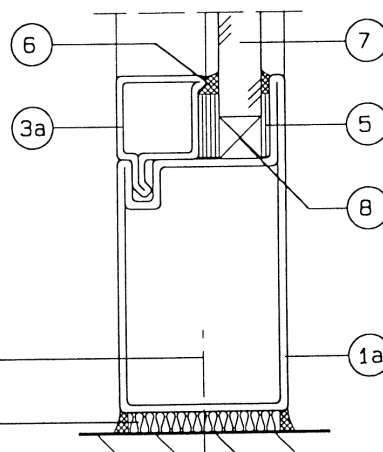# "BGT/mhp, Type RP - G 30"
Z - 19.14 - 599

Section A-A

optionally:

Section B-B

optionally:

"BGT/mhp, Type RP - G 30"

Z-19.14-599

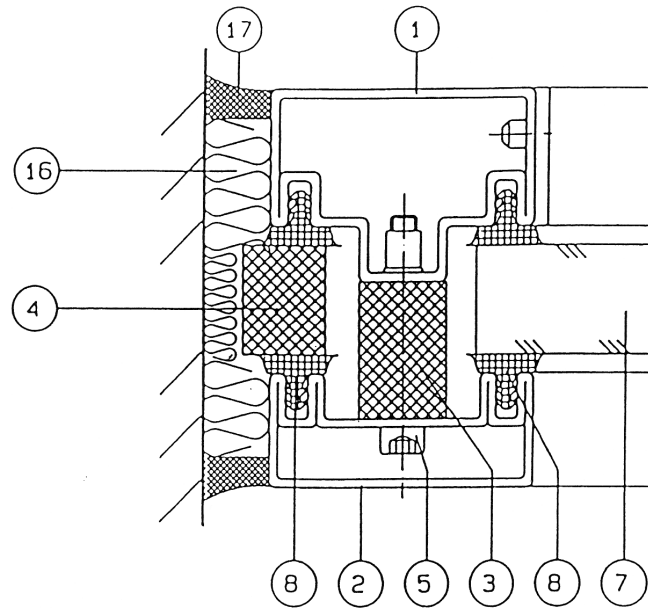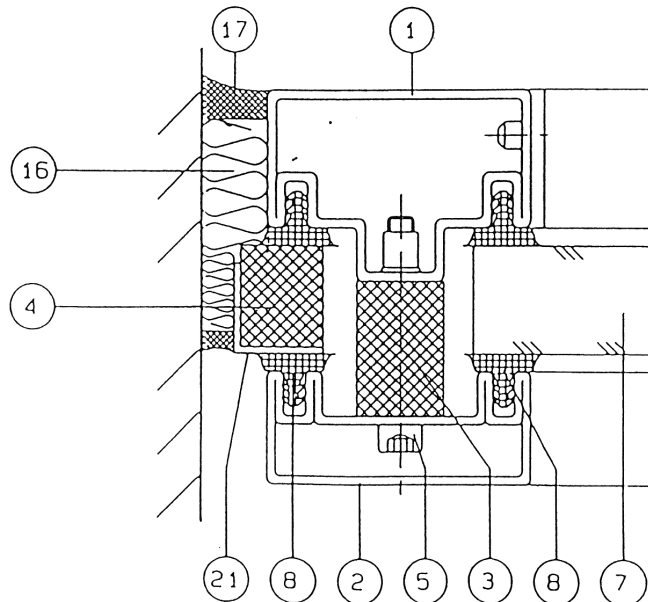| Parts list		
1	Edge profile RP 1604, Overall depth 40 mm, Width 60 mm	optionally RP 1230; RP 1658 or RP 1662
2	Middle post RP 1405, Overall depth 40 mm, Width 30 mm	optionally RP 1228, RP 1229, RP 1291 or RP 1674
3	Glazing bead RP 1591 (overall depth 40 mm)	RP 1637 (overall depth 50 mm) with **both-sided** arrangement
		or RP 1657 (overall depth 50 mm) **optionally** RP 1606 (overall depth 40 mm) with **one-sided** arrangement
4	15 x 5 mm sealing strips of type "Fiberfrax" or "Kerafix"	
5	15 x 2 mm sealing strips of type "Fiberfrax" or "Kerafix"	
6	Sealed with highly inflammable silicone sealant (construction material class DIN 4102-B1) acc. to test report of the German Institute of Building Technology	
7	Pane **BI-FireStop**, 10 mm or **BI-FireStopColor**, 10 mm	
8	10 x 10 x 100 mm pads made of "Promatect H" or "Promatect - H" (new) or "Flammi 12" or "VERMIPAN A2"	
9	Dowel anchors and M 8 steel screws (a ≤ 50 cm) with general building approval	
10	Non-flammable mineral wool (construction material class DIN 4102-A)	
11	Sealing (optional)	

# "BGT/mhp, Type RP- Iso - G 30"

Z - 19.14 - 700

Section A-A

optionally:

"BGT/mhp, Type RP - Iso - G 30"

Z - 19.14 - 700

	Parts list	
1	Post- or bar profile RP 1611 Post- or bar profile RP 1611	**optionally** RP 1675, RP 1612 or RP 1610
2	Glazing bead RP 1522	**optionally** RP 1676, RP 5117 or RP 9644
3	Distance piece, 20 mm high, thickness according to the insulating glass pane which is used and glazing bead made of "Promatect H" or "Promatect-H" (new)	
4	Distance piece, 20 mm high, thickness according to the insulating glass pane which is used and glazing bead made of "Promatect H" or "Promatect-H" (new)	
5	Hex socket head screw M6 x 45	
7	**BI-FireStop or BI-FireStopColor** insulating glass pane	
8	Seal type no.: 300490	
16	Non-flammable mineral wool (construction material class DIN 4102-A)	
17	Sealing Silicone B1	
21	Fixing angle 30 x 35 x 3 mm	

„BGT, Type H-ISO-G30"

Z - 19.14 - 1038
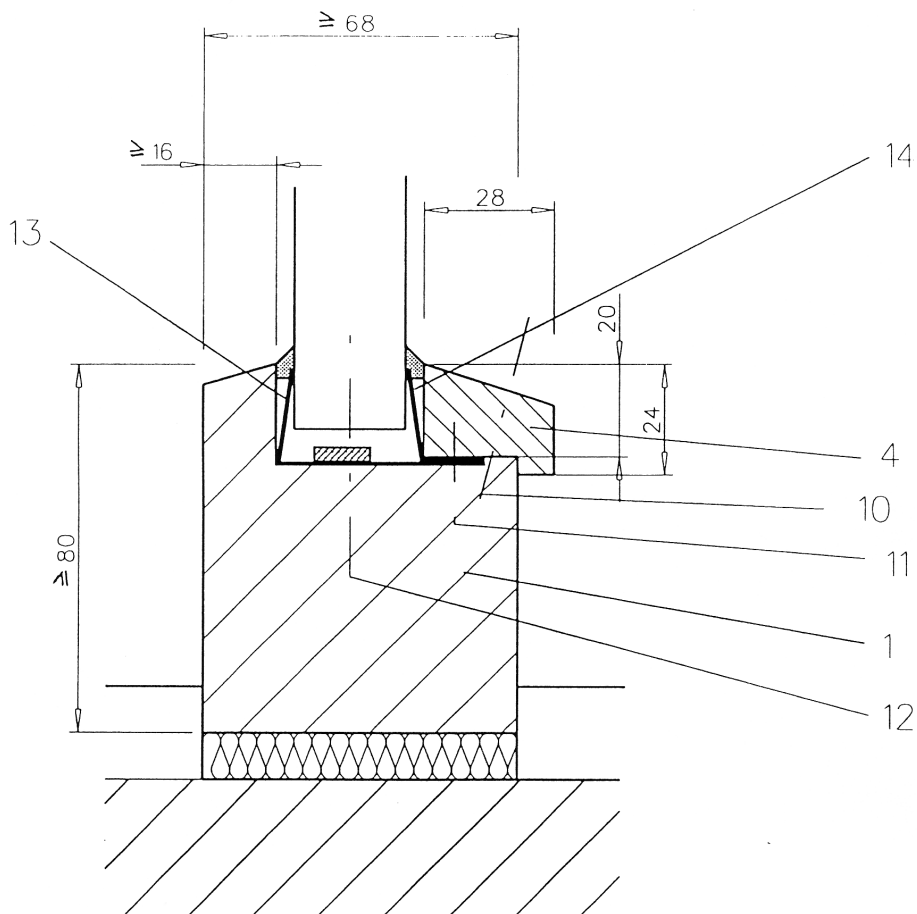
Parts list

1 Blind frame of solid wood, min. 68 x 80 mm, surface painted or glazed, acc. to DIN 18363, hardwood with gross density greater than 600 kg/m³, frame with double mortise connection, glued with PVAC glue B4

4 Glazing bead, wood as above, rebated, min. 28 x 24 mm, screwed together with VA screws of 4 x 40 mm all 25 cm

10 Raised countersunk screw V2A, 4 x 40 mm

11 Countersunk headed screw, 3 x 10 mm, sheet metal screw

12 Countersunk headed screw, 3 x 30 mm

13 Sheet metal angle 45 x 21 x 1 mm, V2A

14 Sheet metal angle as above, 20 x 20 x 1 mm