7 WINDOW MANUFACTURE

OERTLI-High Performance Window Tools – Peak Quality from Switzerland

Tool technique: Details are decisive
Long tool life, best surface finish also on visible edges and other critical positions, quick knife change and an economical service – these are today's requirements demanded on high performance tools.
To reach these requirements, each of the following details is of paramount importance:
- Correct selection of the knife material
- Geometry and design of knives
- Clamping sleeve with anti-rotating device
- Precise balancing of the tool set

OERTLI has the know-how for these details – therefore more and more window manufacturer decide on tools from OERTLI.

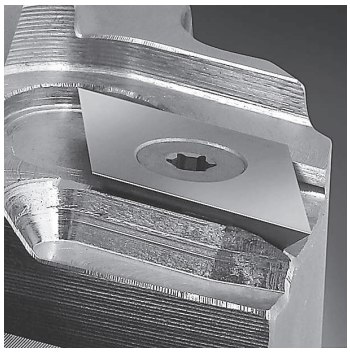


Fig. 1

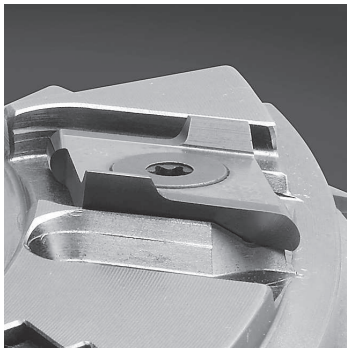


Fig. 2

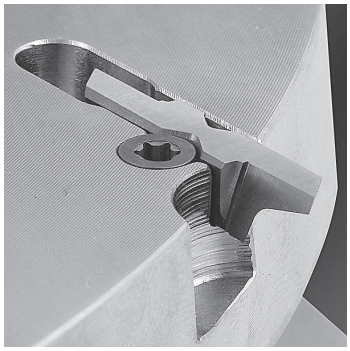


Fig. 3

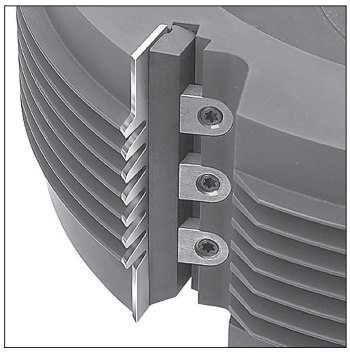


Fig. 4

Planing spur knife
All tools for along-grain machining are equipped with the well-known OERTLI spur knife with a positive hook angle. As a result, all lateral rebate edges receive a clean smooth surface (Fig. 1).

Ingenious rounding- and concave spur knife
As required, the inner- and outer rounding of the edge are incorporated into the same knife resulting in three functions in one knife (Fig. 2).

Edge rounding
Standardized rounding knives with a large shear cut angle as well as a large lateral run-out to take-up variations in wood thicknesses are available. Knives with various radii may be mounted into the same knife seat position (Fig. 3).

pur! Precision profile knives
For complex profiles more and more high precision profile knives with a polished cutting face are used. The pur! knife concept allows the possibility to adapt shear cut angle, hook angle and inclined tooth angle to material and machining application, thereby achieving long life times and optimized surface finishes (Fig. 4).

Profile knives or standard reversible knives?
The tool design engineer has the possibility to choose between two different cutting systems. Either he selects a single profile knife for the entire profile or he uses a combination of standard reversible knives. Both systems have advantages and disadvantages. OERTLI recommends using mainly sole profile knives in cases where the initial investment costs play a major role and where the tools are used only occasionally.
On the contrary, a combination of standard reversible knives is the right solution in cases where a high economical performance is of paramount importance. The divided cut and the optimized cutting geometry allows a less power consuming tool application with smooth operating conditions, thereby increasing the life time of the knives. Thanks to selected knife change, only dull knives are replaced and paid for.
OERTLI has a choice of over one thousand types of knives, manufactured economically in large quantities, readily available ex stock (Fig. 5).

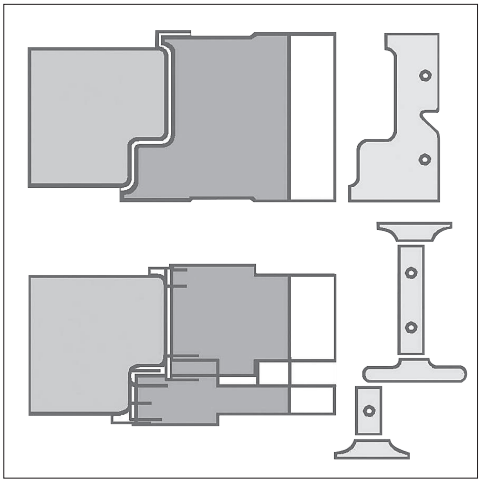


Fig. 5

Fig. 1

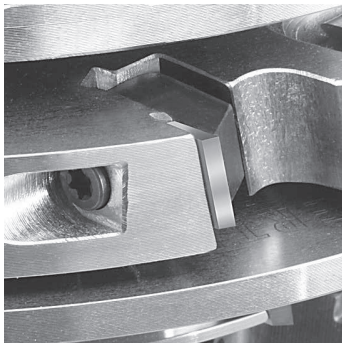


Fig. 2

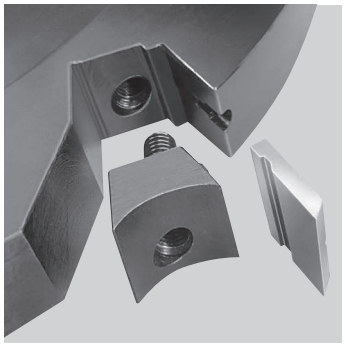


Fig. 3

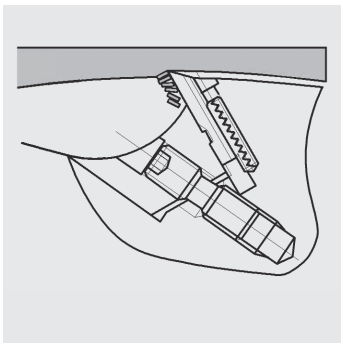


Fig. 4

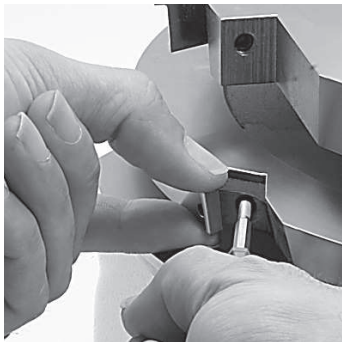


Fig. 5

Knives with eccentric clamping system
Ultra-fine, 4 mm wide profile knives with an ingenious clamping system, safe and simple to change (Fig. 1).

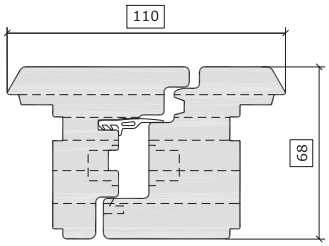
Raker-knives
For simple, straight cutting applications, OERTLI uses its 8 mm wide standard knives. The design of the knife allows a precise positioning in the knife seat. In addition, the knives are clamped from behind, thereby optimizing transmission of clamping forces and reducing service work (Fig. 2).

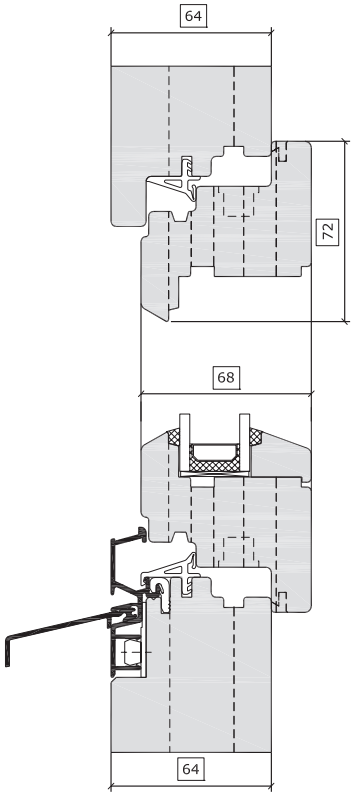
win! The intelligent system for slots and tenons
As sole tool manufacturer, OERTLI distinguishes between along-grain and end-grain machining. This is based on the fact, that for each machining application another cutting geometry and other chip gullets are required.

The win!-knife system is designed for a rationalized end-grain machining and for a simple knife change without removing the tool from the machine. The patented knife clamping system with a spring-loaded positioning pin guarantees over years a safe, clearance-free change of the knives. The HW-knives have a polished face on the cutting edge and provide, together with large chip gullets, for up-to-now unequalled production times (Fig. 3, 4, 5).

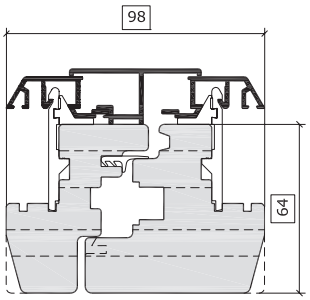
AMEX-E PH and AMEX-E PW (Switzerland)

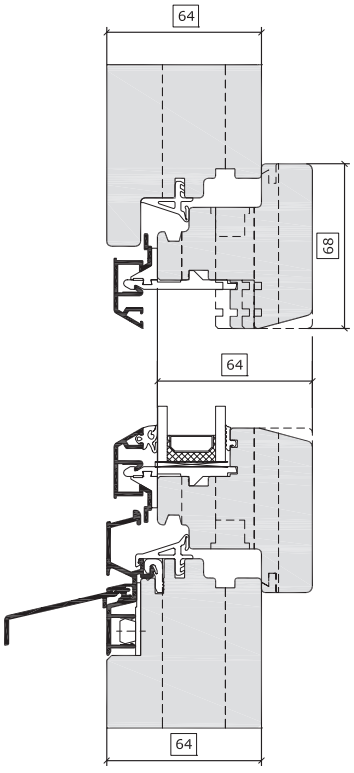
IV 68/12 mm Wood window with Euro-groove
Up to 74 mm Sash, 64 mm Frame. Water bar made in 2-parts with Flexo-connection. Frame tenon top and bottom alike. Sash with 21/2 tenon, middle section with integrated cover-bar. Vapour pressure compensation into the cold zone, glazing bar with rebate.





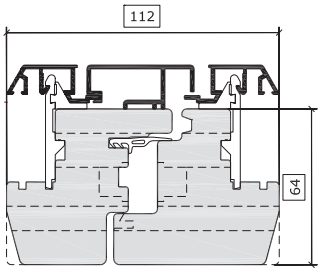
IV 64/12 mm Housing construction window with Euro-groove
64 mm Sash, 64mm Frame, variable glazing, inside and outside dry-glazing. Water bar made in 2-parts with Flexo-connection. Frame tenon top and bottom alike. Sash clips for mounting without screws.

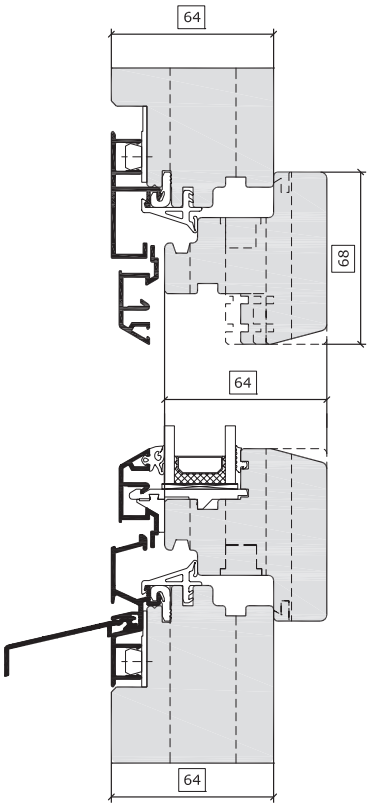




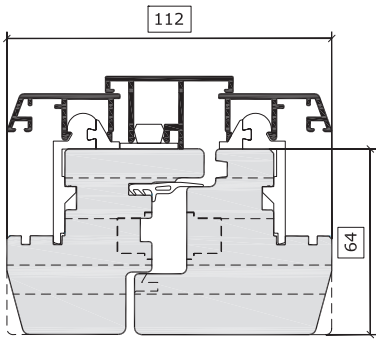
AMEX-E PWR and AMEX-E PK (Switzerland)

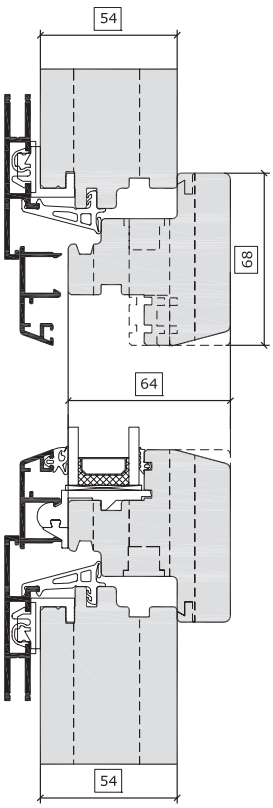
IV 64/12mm Housing construction window, Frame-covering, Euro-groove
64 mm Sash, 64 mm Frame, variable glazing, inside and outside dry-glazing. Water bar made in 2-parts with Flexo-connection. Frame tenon top and bottom alike. Sash clips for mounting without screws.





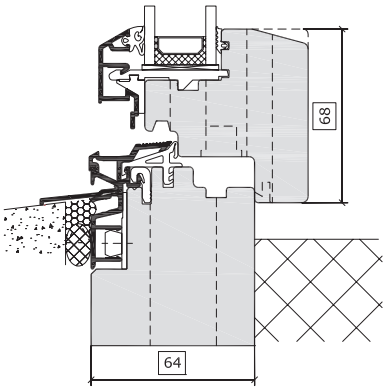
Wood-Alu Classic, Euro-groove
64 mm Sash, 54 mm Frame, variable glazing, inside and outside dry-glazing. Flush design. Frame- and Sash clips for mounting without screws.



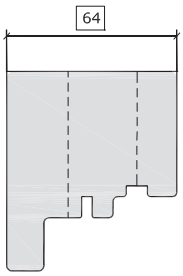


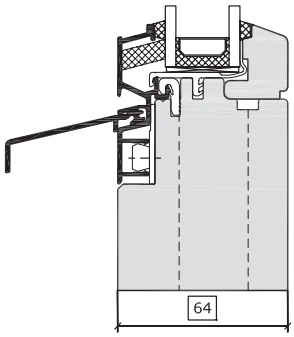
AMEX-E Wheelchair-Sill and AMEX-E PH Fix-glazing in the Frame (Switzerland)

Housing construction window for wheelchair
Water bar designed with covered seal strip in frame, useable for wheelchairs. Suitable for Wood windows and Housing construction windows.



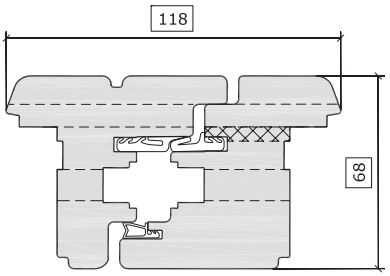
Wood window, Fix-glazing
Fix-glazing direct in the frame. Suitable for Wood windows and Housing construction windows.

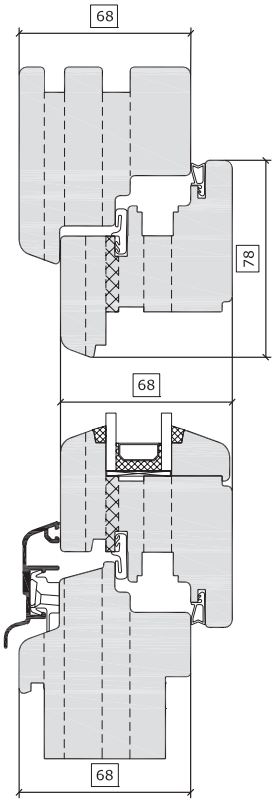




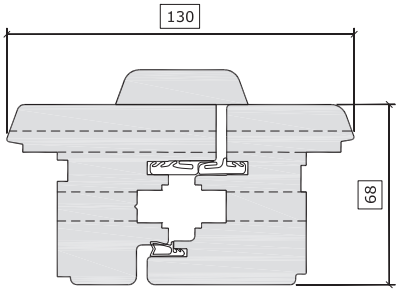
IV 68 Element construction and IV 68 House Door (Austria, Germany)

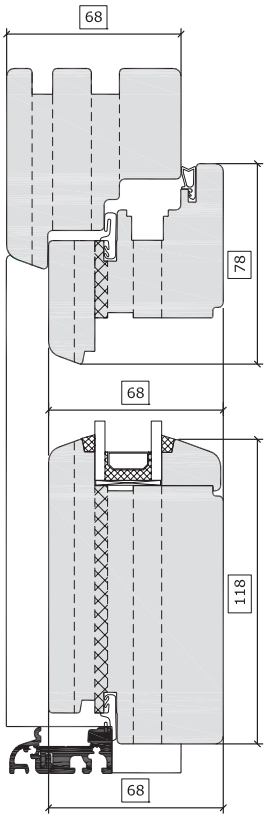
IV 68/12mm Euro-rebate
Water bar Spree, Sash and Frame with identical double tenon. Glazing bar inside with seal-rebate. Middle section with double sealing strip and integrated cover-bar, glazing bar with rebate. Suitable for single manufacture.





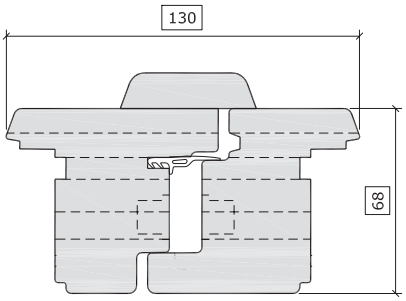
IV 68/12mm House Door
House Door as an addition to the by-standing Element construction. Middle section with separate cover-bar. Glazing bar with rebate.

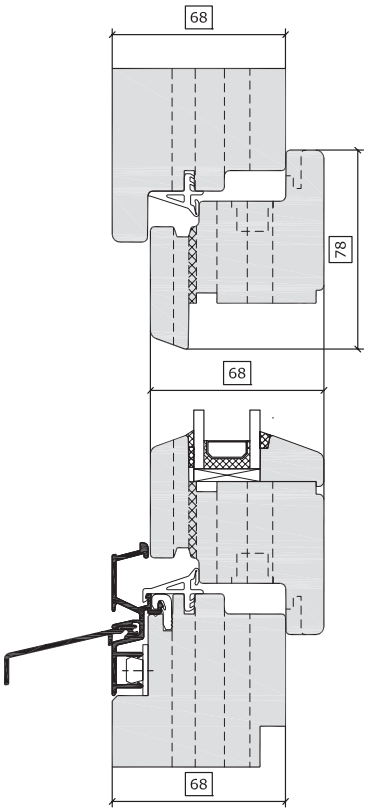




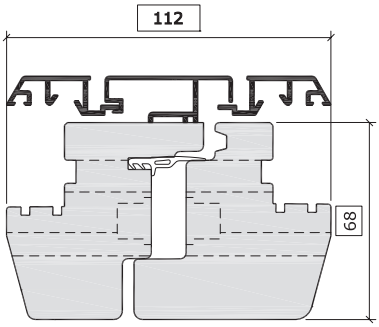
The Window platform, 4 systems – one tool (Europe)

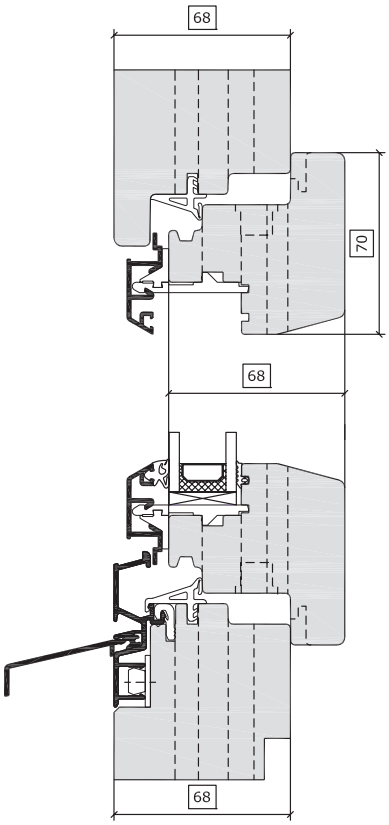
IV 68/12mm Euro-rebate P10
Water bar MEKO in 2-parts with Flexo-connection. Sash with 21/2 tenon. Glazing bar inside with seal rebate. Middle section designed with separate cover-bar.





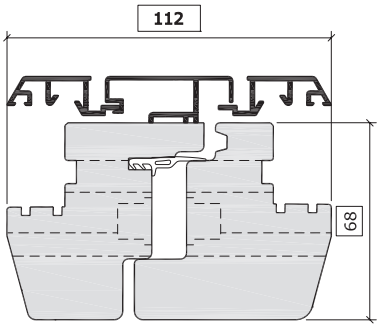
Housing construction window 68/12 Euro-rebate, Sash-covering P20
Sash and Frame 68mm, Water bar MEKO in 2-parts with Flexo-connection. Sash with Alu-covering. Variable glazing, inside and outside dry-glazing. Frame tenon top and bottom alike. Sash clips for mounting without screws.

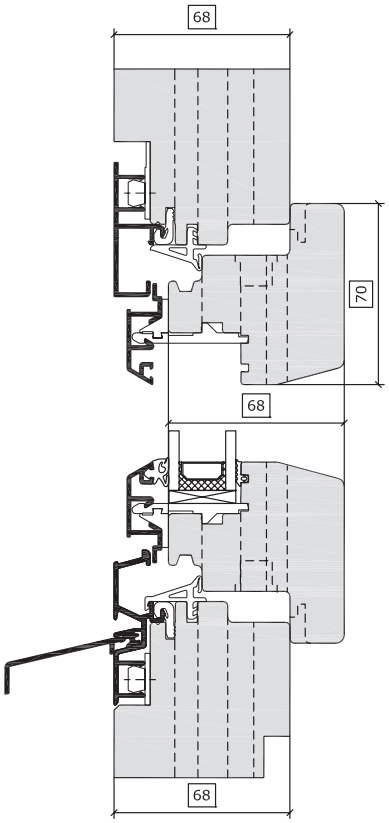




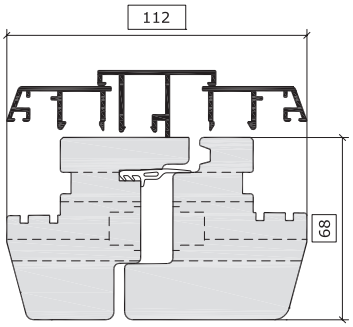
The Window platform, 4 systems – one tool (Europe)

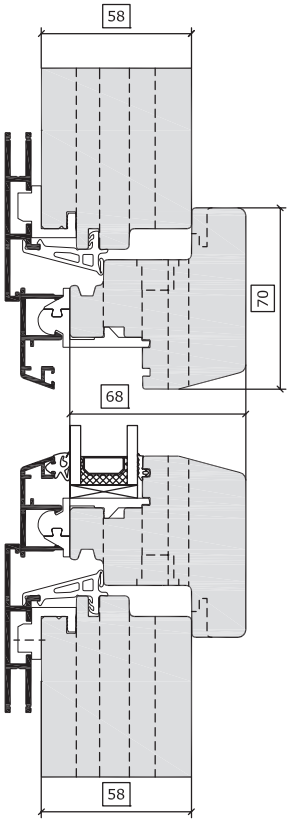
Housing construction window 68/12 Euro-rebate, Frame- and Sash covering P25
68 mm Sash and Frame, Water bar MEKO in 2-parts with Flexo-connection. Sash and Frame with Alu-covering. Variable glazing, inside and outside dry-glazing. Frame tenon top and bottom alike. Sash clips for mounting without screws.





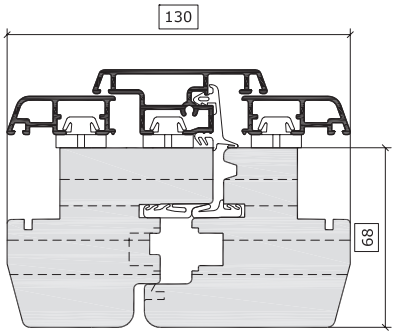
Wood-Alu classic, Euro-rebate P 30
68 mm Sash, 58 mm Frame, variable glazing, inside and outside dry-glazing. Flush design. Frame- and Sash clips for mounting without screws.

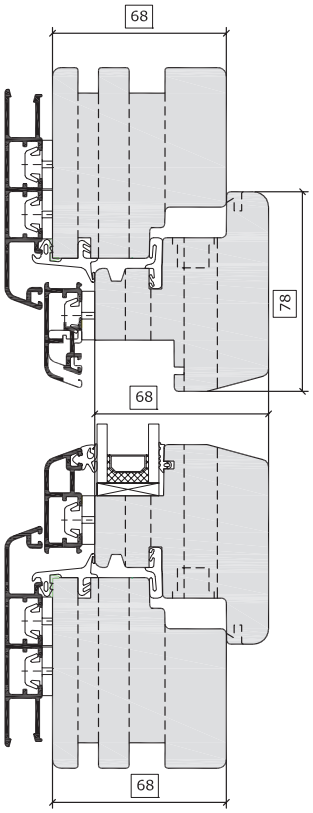




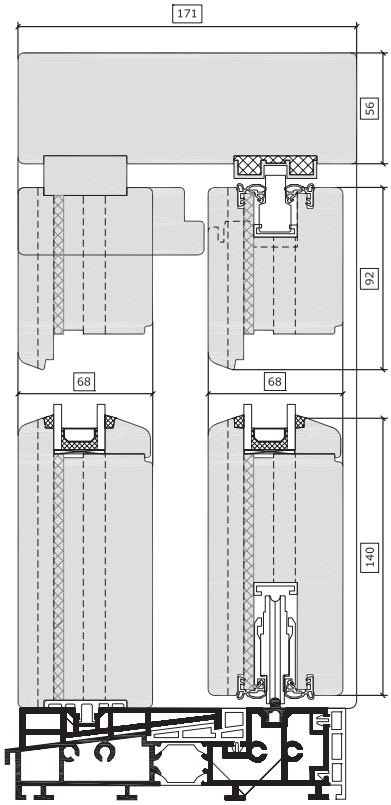
Wood-Alu and Sliding Door (Europe)

Wood-Alu system Gutmann / BUG – Uniform / Alto Nova / Benaco and others
68 mm Sash, 68 mm Frame, variable glazing, inside and outside dry-glazing



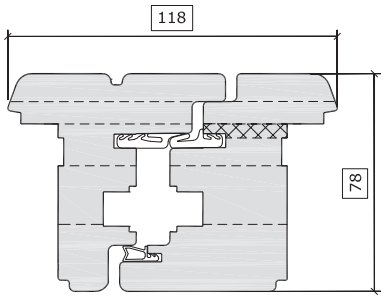


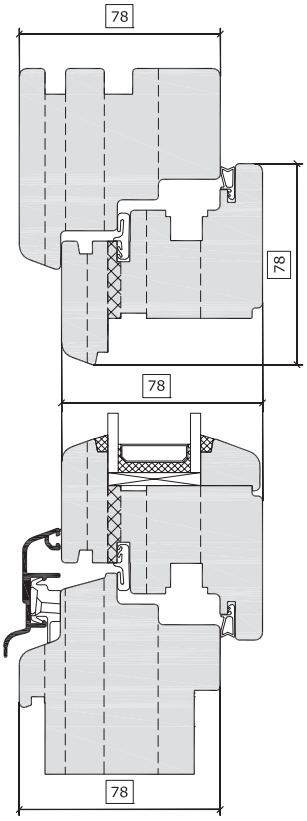
IV Sliding Door, System GU
68 mm Sliding Sash with heat restrained floor sill



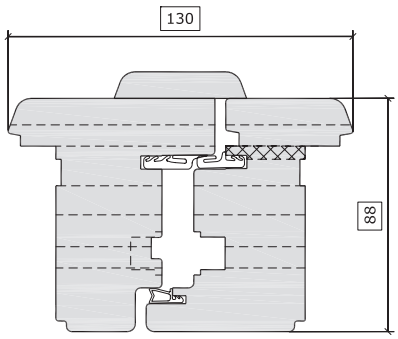
Ghost-Norm 12/25 (Eastern Europe/Russia)

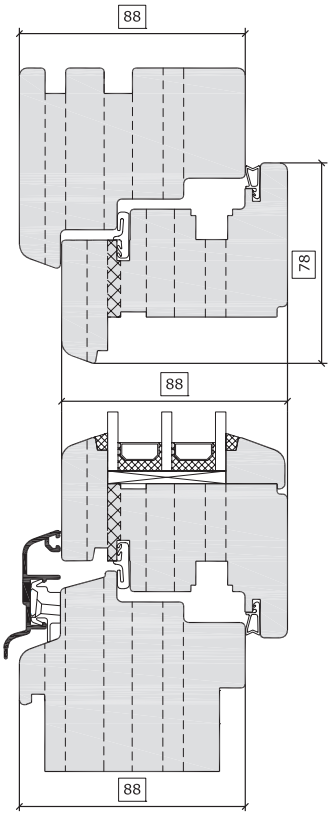
IV 78/12 mm Euro-rebate
Water bar Spree, Sash and Frame with identical double tenon. Inside and outside with seal-rebate. Middle section with double sealing strip and integrated cover-bar, glazing bar with rebate. Suitable for single manufacture.





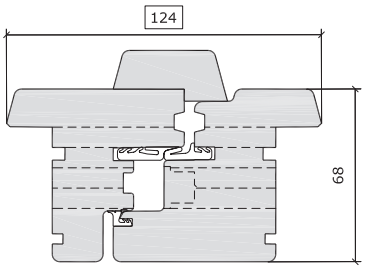
IV 88/12 mm Euro-rebate
Water bar Spree, Sash and Frame with identical triple tenon. Inside and outside with seal-rebate. Middle section with double sealing strip and integrated cover-bar, glazing bar with rebate. Suitable for single manufacture.

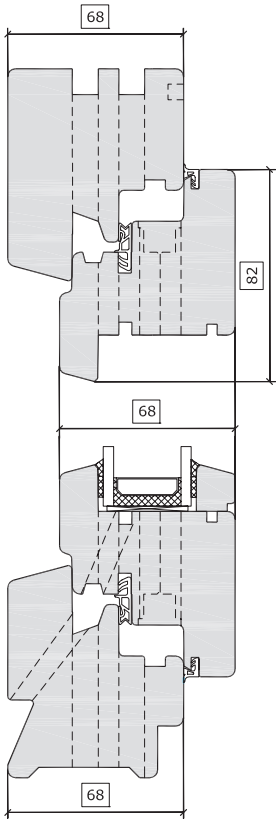




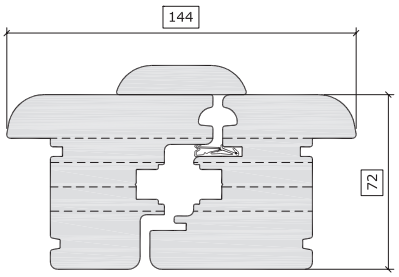
TOP-NORM (Belgium, Italy)

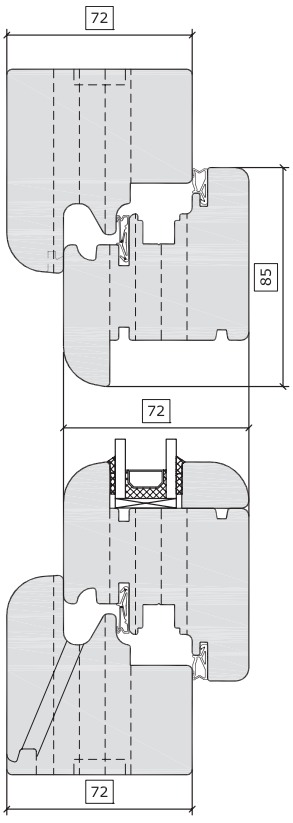
IV 68 without Alu water bar
12 mm Euro-groove, all-around frame profile, also available with Alu water bar. Frame with double tenon, Sash with 21/2 tenon.





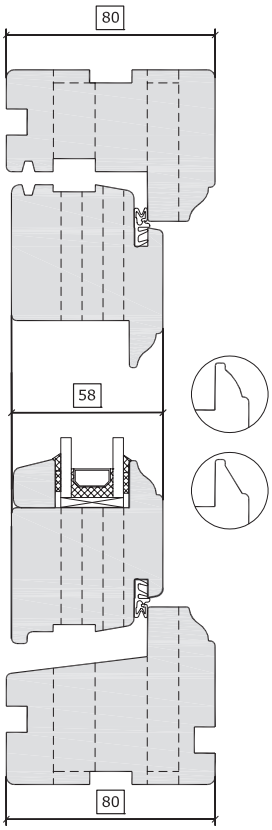
IV 72 without Alu water bar
12 mm Euro-rebate, all-around frame profile, also available with Alu water bar. Frame and Sash with double tenon.



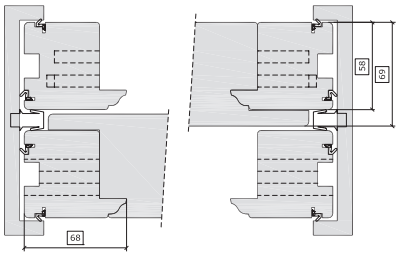


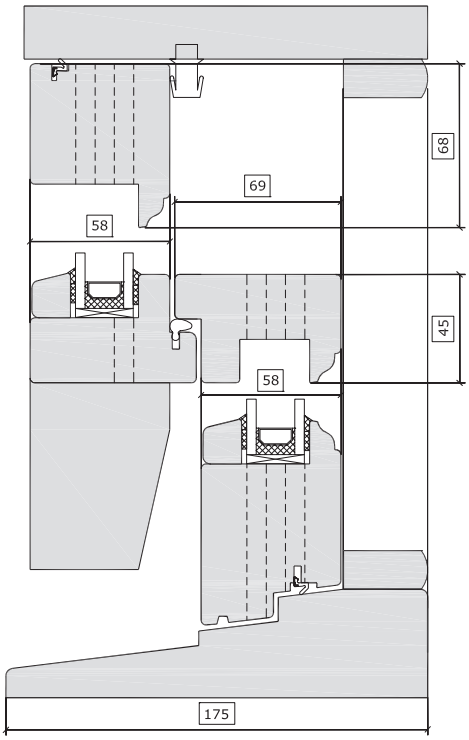
UK Norm (United Kingdom, Ireland)

PN Combi 500 System Window
80 mm Frame and 58 mm Sash.
Also available for PN Uni-System.



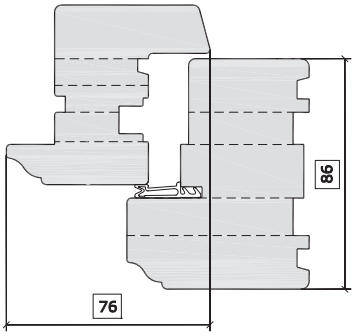
Sliding Sash Window
58 mm Sash to accept Double glazing with Meeting rails in solid piece. Smaller sash systems are available for traditional replacement windows.

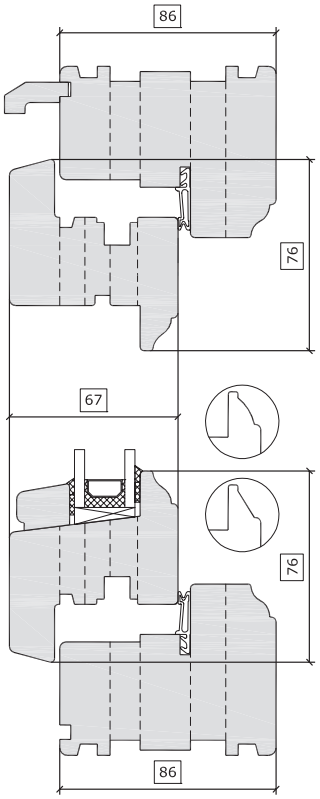




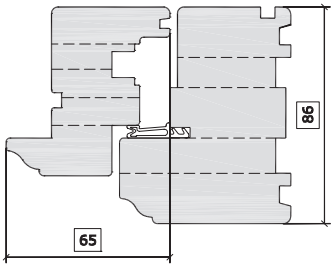
UK Norm (United Kingdom, Ireland)

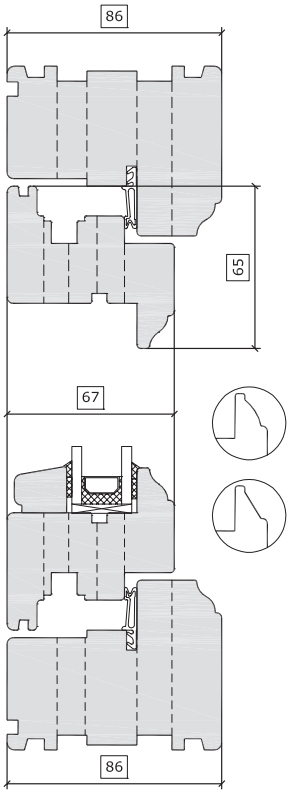
High Performance Storm proof Window
86mm Frame and 67mm Sash.
68mm Frame and 57mm Sash systems are also available.





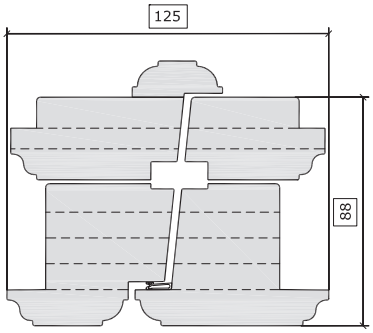
High Performance Traditional Flush Window
86mm Frame and 67mm Sash.
Other frame and sash systems are available for Traditional Flush replacement windows.

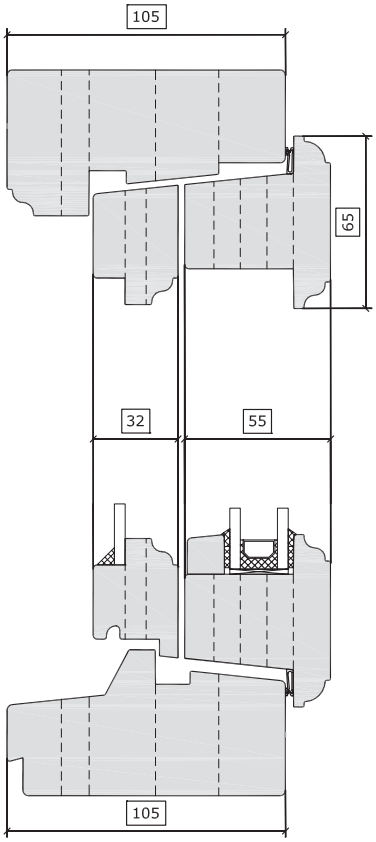




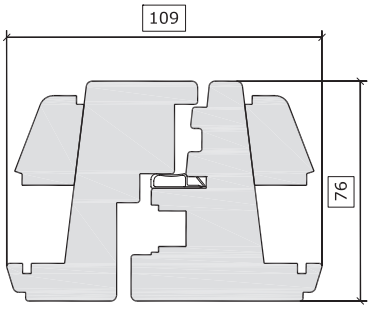
Scan-Norm (Scandinavia)

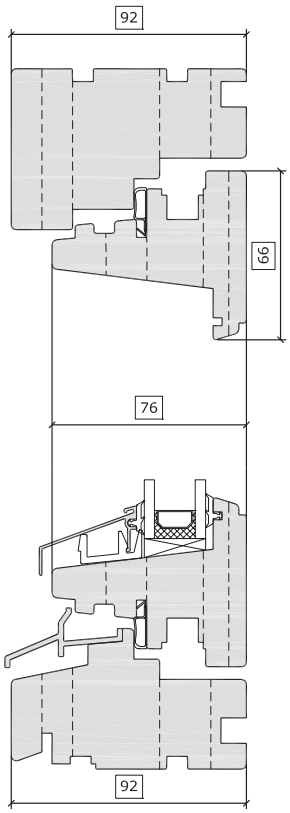
Compound Window, opening towards inside
105 mm Frame, 32/55 mm Sash.





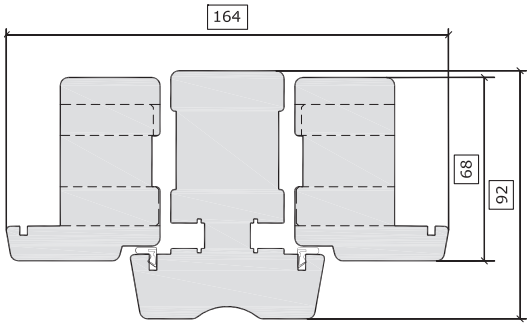
IV Window, opening towards inside
92 mm Frame, 76 mm Sash, Sealing strip on Sash.

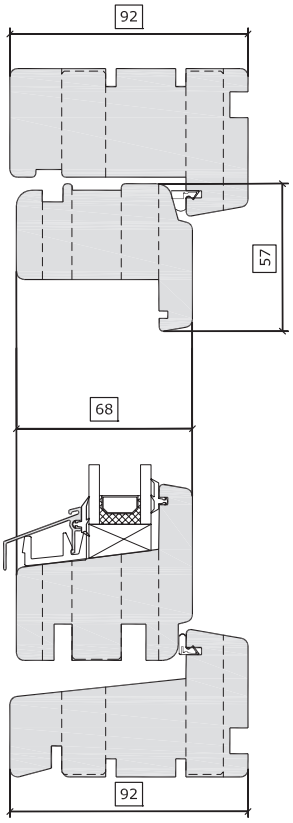




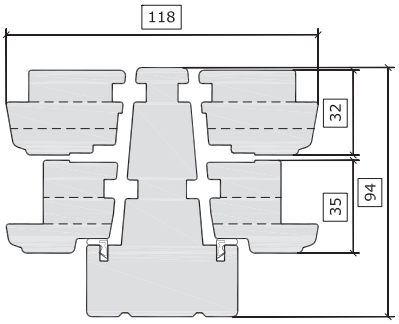
Scan-Norm (Scandinavia)

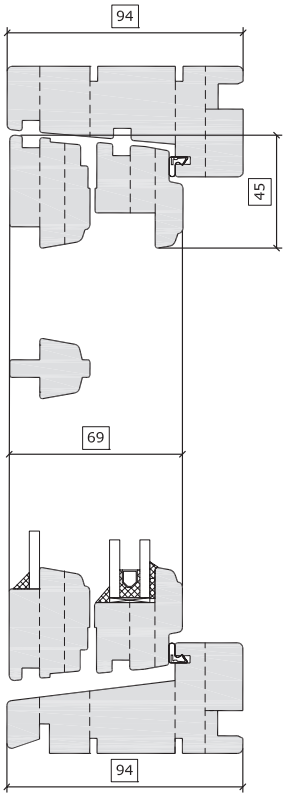
IV Window, opening towards outside
92 mm Frame, 68 mm Sash, Sealing strip on Frame.





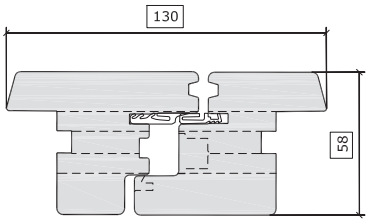
Compound Window, opening towards outside
94 mm Frame, 32/55 mm Sash, Sealing strip on Frame.

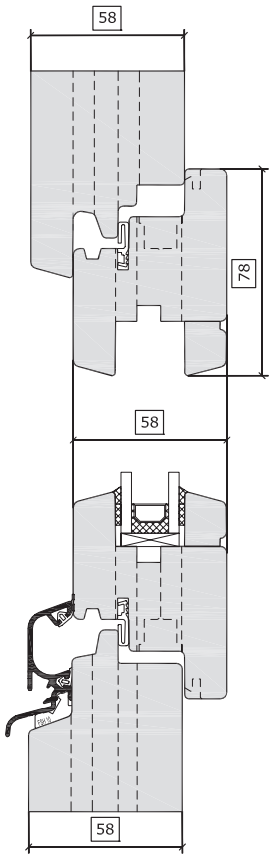




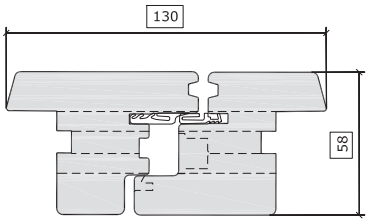
OERTLI-FITEX (France)

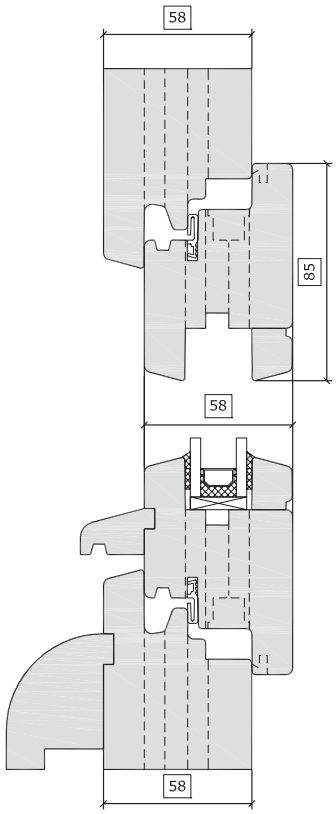
IV58 (68), 12 mm Euro-rebate
With Alu Water bar. Frame and Sash with double tenon.





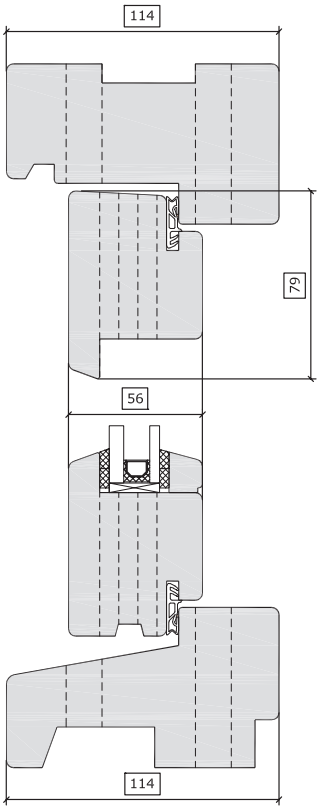
IV58 (68), 12 mm Euro-rebate
With all-around frame-profile and sash water bar in wood.



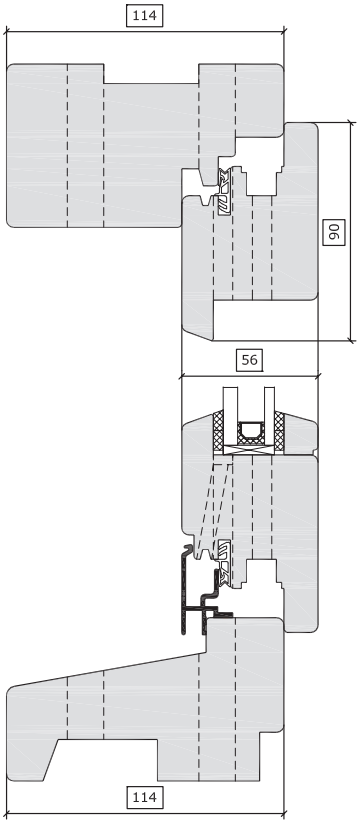


Holland-Norm (Netherland)

IV 114/56 Casement Window
Sash opening towards outside, Sealing strip on sash.

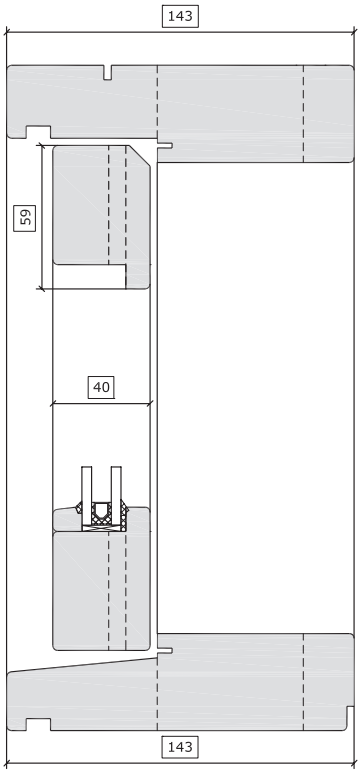


IV 114/56 Casement Window
Sash opening towards inside, Sealing strip on sash.

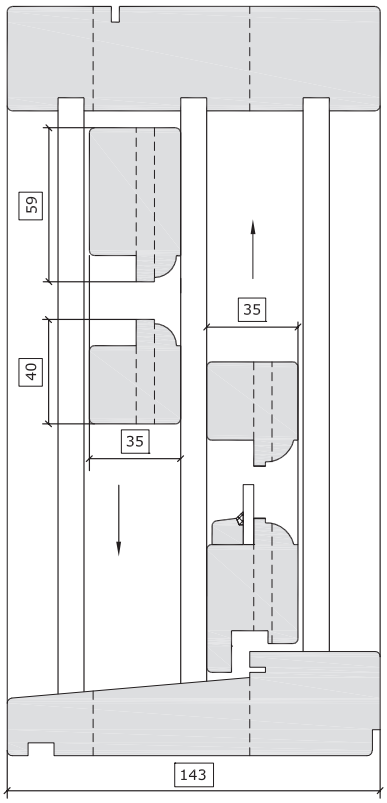


Australian-Norm (Australia)

IV 143/40 Pivot-Window Awning / Casement
143 mm Frame, 40 mm Sash, Sealing strip on Frame.



System Double Hung
143 mm Frame, 35 mm each Sash.



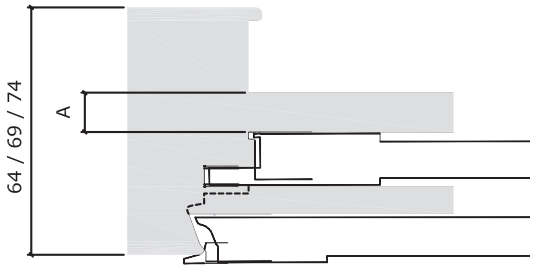
Machining concepts

Tool-splitting
Splitting – a partial dissolution of systemized tool sets – allows up-to-now unequalled variations in window production. Machining of individual wood profiles is distributed onto several machine spindles. Thereby, the number of possible window constructions can be increased with fewer tools resulting in more flexibility and higher economy.
Consequent application of the splitting technology allows amongst other things:

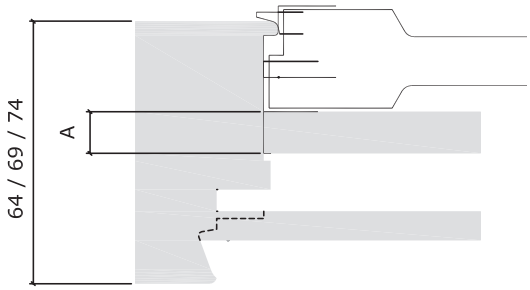
- Different wood thicknesses in Sash and Frame
- Variable glazing thicknesses
- Variable glazing bars
- Glazing bars with different profiles
- Open or closed exposed joint as option
- 4 or 12 mm concealed space between frame and closed sash

Example for splitting:
Slots on two, one after another arranged spindles. Dimension A is variable allowing machining various wood thicknesses without a tool change.

1. Spindle: Lower profile part is machined.



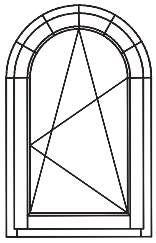
2. Spindle: Upper profile part is machined.
Adjustment height: Wood 64 = 309 mm
Wood 69 = 314 mm
Wood 74 = 319 mm



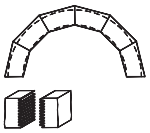
Machining sequence for Arch-windows on CNC machining centre

A CNC machining centre can only be economically operated with the right tool. OERTLI has developed various tool systems, which are used according to application.

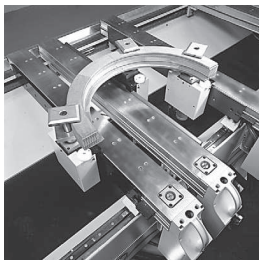
An investment into new tools leads to a close, long-lasting relationship between window manufacturer and tool supplier. OERTLI lays the basis for such a relationship with an open communication and a description allowing to follow-up afterwards the expected performance.



Connection of segments with End glue joint profile

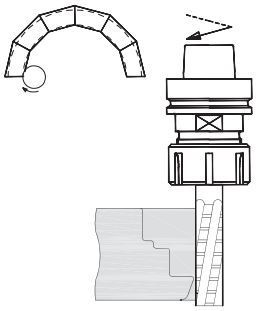


Clamping situation of arch

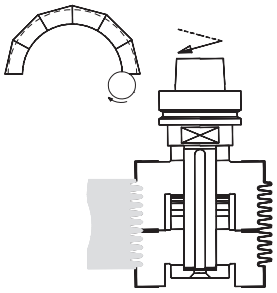


Frame manufacture

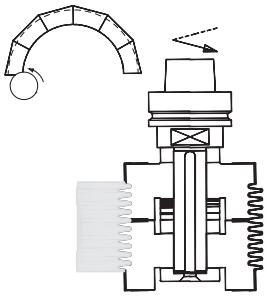
1. Sizing



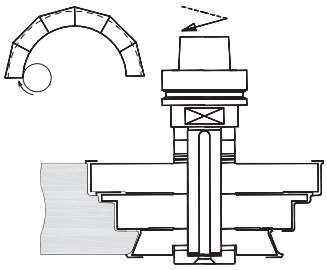
2. End glue joint profile



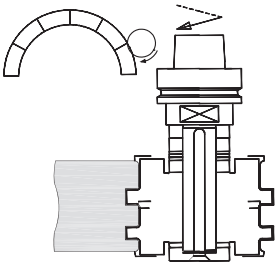
3. End glue joint Counter profile



4. Frame inside

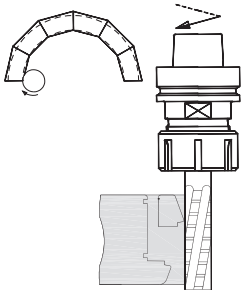


5. Frame outside

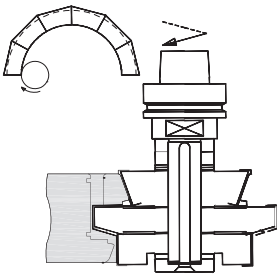


Sash manufacture

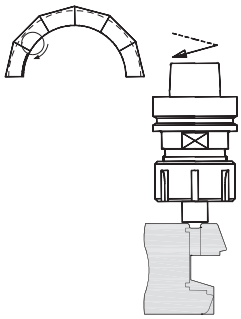
1. Sizing



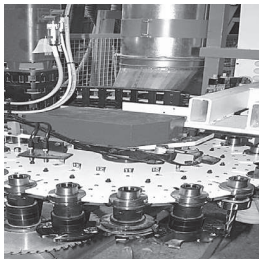
2. Pre-machining of sash inside



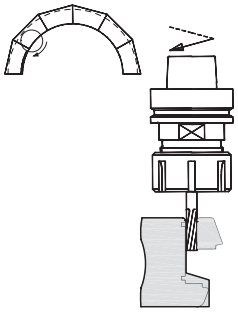
3. Machining of roundness's



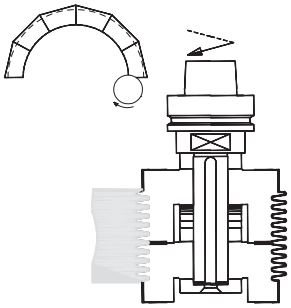
Disc changer with OERTLI Tools



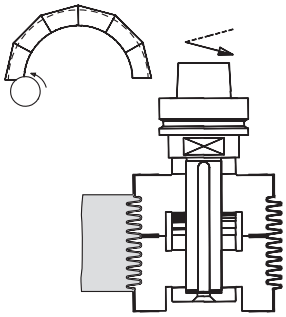
4. Separation of glazing bar



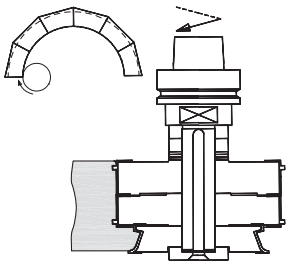
5. End glue joint profile



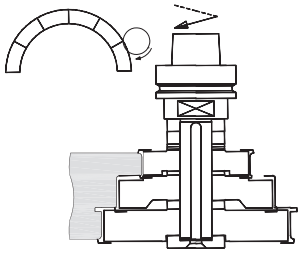
6. End glue joint Counter profile



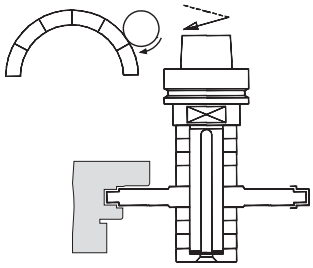
7. Final cut of sash inside



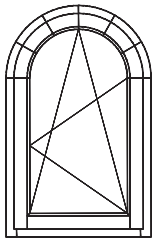
8. Machining of sash outside



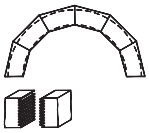
9. Machining of closure groove



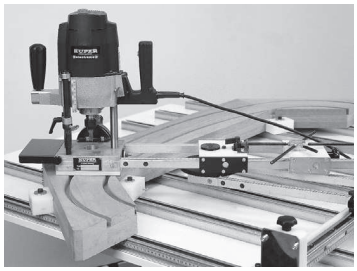
Machining sequence with the Arch-machining device
A perfect solution for machining of arch-windows is the use of a pivoted ruler with a connected portable router. No time-consuming manufacture of templates is necessary. The guide edges as reference areas for the ball bearing collars as well as for the shadow groove and the separation of the glazing bars are achieved to measure with the Arch-machining device.
For the economical manufacture of arch-windows, OERTLI supplies tools for MAN operation. All tools are set in diameter and mounted on sleeves with ball bearing collars suitable to our Arch-machining device.



Connection of segments with End Glue Joint

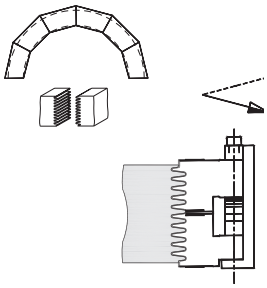


Arch-machining device

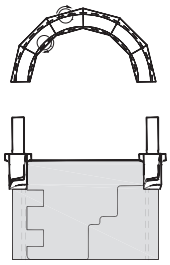


Frame manufacture

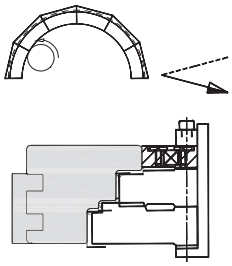
1. End glue joint profile



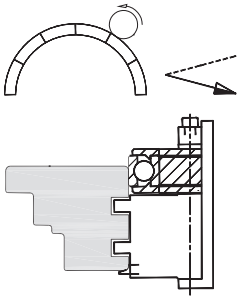
2. Machining of arch contours, rough cut-out with band saw



3. Machining of frame inside

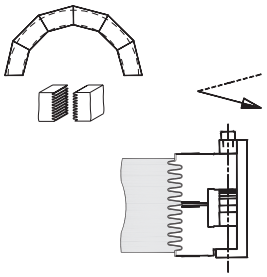


4. Machining of frame outside

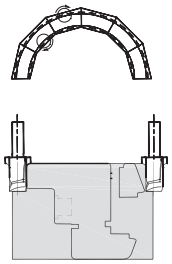


Sash manufacture

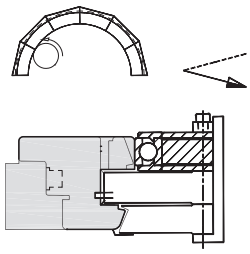
1. End glue joint profile



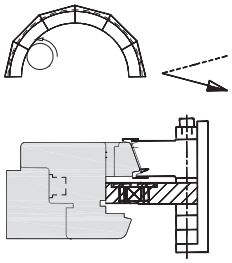
2. Machining of arch contours, rough cut-out with band saw



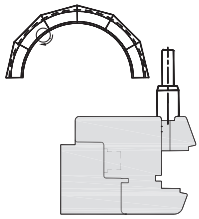
3. Pre-machining of sash inside



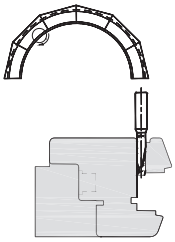
4. Profiling of glazing bar



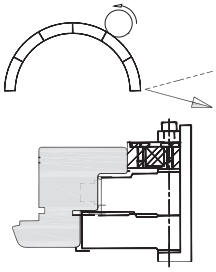
5. Machining of roundness's



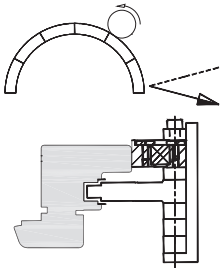
6. Separation of glazing bar



7. Machining of sash outside



8. Machining of closure groove



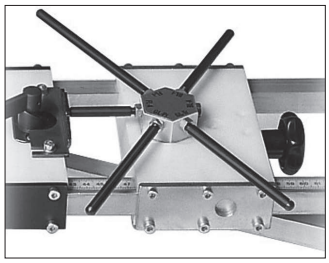
Kuper Arch-machining device

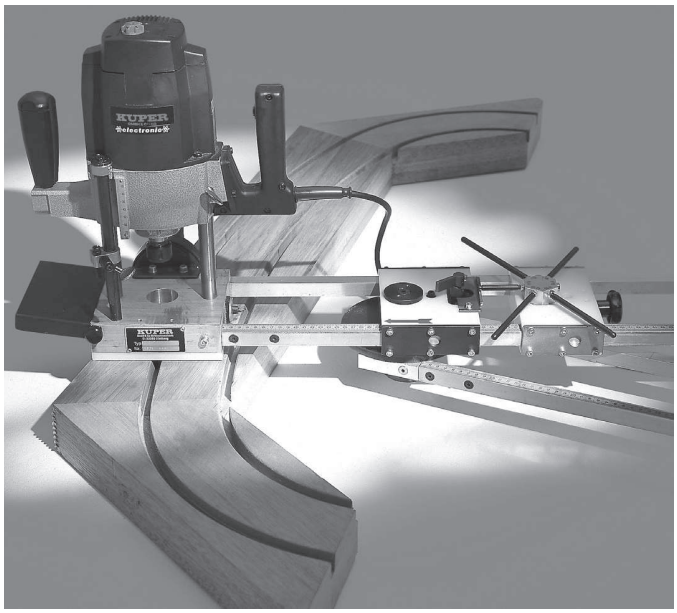
Arch-machining device Type BFG
With portable router, 220 volt, 2000 watt, 10 000–18 000 RPM, step-less electronic system, built-in collet 8mm and exhaust nozzle, including radius ruler 1,5 m long, with scale and pivot-point for radii up to 1,4 m.
Radius ruler exchangeable for radii up to 6.0 m. Easy manufacture of all radii of arches.

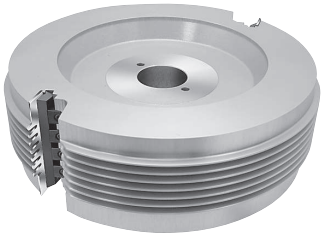
Further products and auxiliary devices are available upon request.
For example:

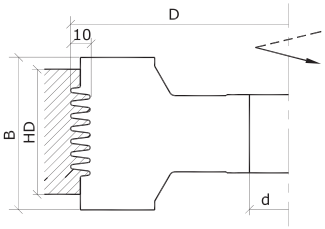
- Device for basket arch
- Guide bars 3 m or 6 m
- Turret head
- Copy-roller
- Pencil holder for drawing of radii
- Scan-template to find curved shapes
- Mounting set to assemble an arch machining table

Detail of turret head









Gluing cutter with profile knives, profile 10x6,5

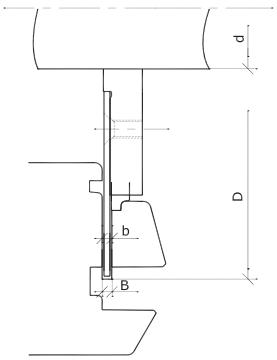
Application: For cutting of mini finger jointing connections in solid wood for arch windows • Tenoning machines with or without cut-off saw blade, spindle moulders and moulding machines

Design: Tungsten carbide profile knives • Profiled on one side, straight cut • Profile not self-clamping • Tool body in aluminium • MAN (manual feed)

Art. Nr.	D	B	HD	d	Z	n
97236	320	90	54-78	65	2	2'600-4'500

Spare parts

Art.Nr.	
193841	Profile knives, B=80 Typ=10x6.5 Qual=HW
193842	Profile knives, B=80 Typ=10x6.5 Qual=HW
950379	Clamping wedge
950391	Gib, L=80
851341	Set screws, M=6 L=18 Typ=Torx 15



Cut-out set for glazing bar with reversible knives and circular saw blade

Application: For separation of glazing bars • Moulding machines

Design: Tungsten carbide reversible knives • Tungsten carbide tipped • 2 cutting edges, straight cut • Tool body in steel • MEC (mechanical feed)

Cutter set, 2-parts

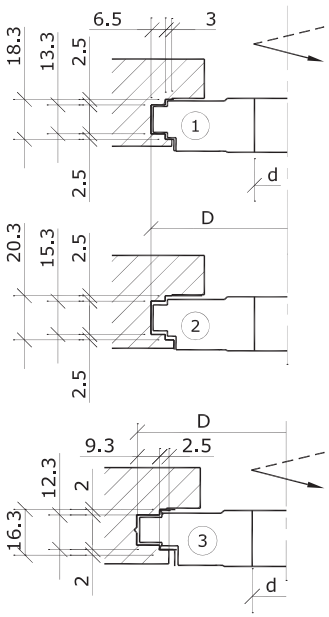
Art. Nr.	D	B	b	d	Z	n max.
209051	180	13	13	40	2/24	9'000

Circular saw blade for cutter set

Art. Nr.	D	B	b	d	Z	n max.
209053	180	3.2	2.0	55	24	9'000

Spare parts

Art.Nr.	
216631	Reversible knives OERTLI, Format, R=1.0 Qual=HW
851074	Screws, M=4 D=6.5 L=10 Typ=Torx 20



Closure grooving cutter with profile knives

Application: For cutting of grooves for Treplane and Tribloc closures • Spindle moulding machines

Design: Tungsten carbide profile knives • Profiled on one side, straight cut • Both profile knives useable in the same cutter body • Tool body in steel • MAN (manual feed)

Type Treplan / Tribloc

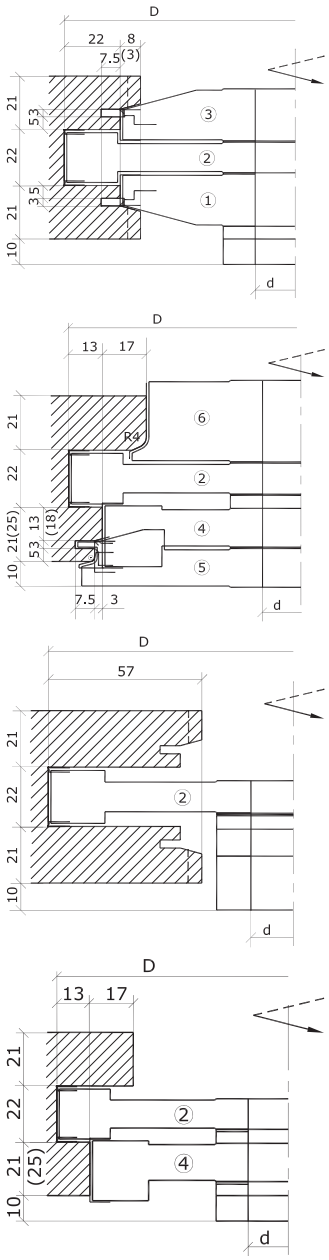
Art. Nr.	D	B	d	Z	n	Pos.	Index
230105	140	-	30	2	5'900-10'100	-	1
230103	140	18.3/13.3	30	2	5'900-10'100	1	2
230104	140	20.3/15.3	30	2	5'900-10'100	2	3

Type Geze, Gretsch-Unitas, Roto, Maco, etc.

Art. Nr.	D	B	d	Z	n	Pos.	Index
230106	200	16.3/12.3	65	6 (2+2+2)	4'500-8'000	3	4

Spare parts

Art.Nr.		Index
131159	Profile knives, B=20 Typ=Geze, Gretsch-Unitas, Roto, Maco, etc. Qual=HW	4
201860	Profile knives, B=25 Typ=Treplane Qual=HW	2
201861	Profile knives, B=25 Typ=Tribloc Qual=HW	3
216001	Reversible knives OERTLI, Format, B=17.7 h=17.7 a=3.0 Qual=HW	4
950379	Clamping wedge	1-4
950384	Gib, L=20	4
950385	Gib, L=25	1-3
851017	Screws, M=5 D=10 L=11 Typ=Torx 20	4
851341	Set screws, M=6 L=18 Typ=Torx 15	1-4



Cutter set, 6-parts, with reversible knives for sliding doors

Application: For sliding door HS-Portal 250/ECO • Spindle moulding machines

Design: Tungsten carbide profile- and reversible knives • Tool body in steel • MAN (manual feed)

Cutter set, 6-parts

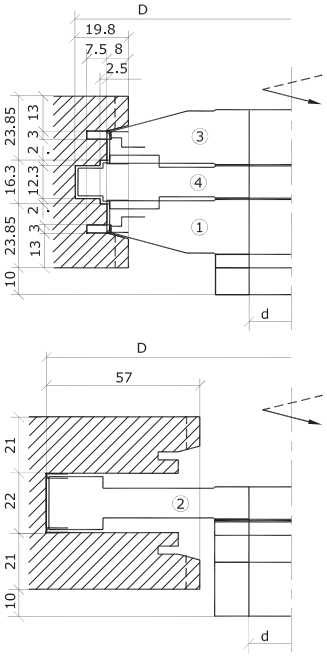
Art. Nr.	D	HD	d	Z	Pos.	n	Index
230080	180	64	30	2	1-6	4'300-9'000	1

Single cutter

Art. Nr.	D	B	d	Z	Pos.	n	Index
230081	151	14	30	6 (2+2+2)	1	5'000-10'700	2
230082	180	22	30	6 (2+2+2)	2	4'300-9'000	3
230083	151	14	30	6 (2+2+2)	3	5'000-10'700	4
230084	154	25	30	2	4	5'000-10'500	5
230085	175	14	30	8 (2+2+2+2)	5	5'000-9'200	6
230086	133	29	30	2	6	5'900-12'200	7

Spare parts

Art.Nr.		Index
192941	Profile knives, B=30 Typ=R=4.0 Qual=HW	1, 7
216009	Reversible knives OERTLI, Format, B=14.0 h=14.0 a=2.0 Qual=HW	1, 2, 4, 6
216013	Reversible knives OERTLI, Format, B=16.0 h=16.0 a=3.0 Qual=HW	1, 3
216152	Reversible knives OERTLI, Format, R=1.5 Typ=X ·1=15° ·2=15° T max=6.00 B=6.0 Qual=HW	1, 6
216728	Reversible knives OERTLI, Format, B=3.0 T max=8.0 Qual=HW	1, 6
217012	Reversible knives OERTLI, straight, B=12 h=8 a=1.5 Qual=HW	1, 4, 6
217020	Reversible knives OERTLI, straight, B=20 h=8 a=1.5 Qual=HW	1, 3
217025	Reversible knives OERTLI, straight, B=25 h=8 a=1.5 Qual=HW	1, 2, 5
855457	Grooving knives OERTLI, B=3.0 T max=12 Qual=HW	1, 2
855458	Grooving knives OERTLI, B=3.0 T max=12 Qual=HW	1, 4
950379	Clamping wedge	1, 7
950386	Gib, L=30	1, 7
950902	Gib, L=10.1 Typ=+10°	1, 2
950903	Gib, L=10.1 Typ=-10°	1, 4, 6
950908	Gib, L=17.2 Typ=+15°	1, 3
950909	Gib, L=17.2 Typ=-15°	1, 3
950912	Gib, L=22.2 Typ=-15°	1, 5
851032	Screws, M=5 D=8.5 L=11 Typ=Torx 20	1, 3
851038	Screws, M=5 D=8 L=6.3 Typ=Torx 20	1, 2, 4, 6
851059	Screws, M=5 D=6.8 L=23 Typ=Torx 20	1, 2, 4, 6
851074	Screws, M=4 D=6.5 L=10 Typ=Torx 20	1, 6
851077	Screws, M=4 D=6.5 L=16 Typ=Torx 20	1, 6
851098	Screws, M=6 D=10.0 L=8 Typ=ISK 5	1, 2, 4
851341	Set screws, M=6 L=18 Typ=Torx 15	1, 7
851347	Screws, M=6 D=9.5 L=20 Typ=Torx 20	1, 3, 5



Cutter set, 4-parts, with reversible knives for sliding doors

Application: For sliding door Roto Patio Life • Spindle moulding machines

Design: Tungsten carbide profile- and reversible knives • Tool body in steel • MAN (manual feed)

Cutter set, 4-parts

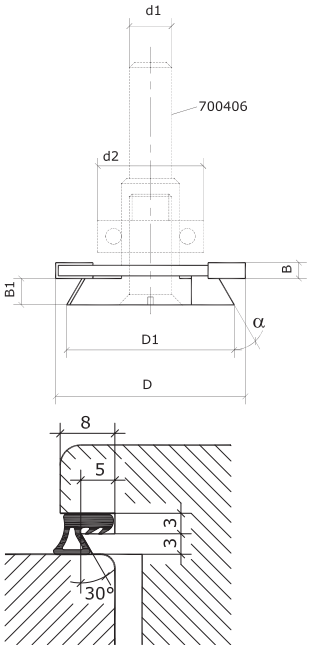
Art. Nr.	D	HD	d	Z	Pos.	n	Index
230090	180	64	30	2	1-4	4'300-9'000	1

Single cutter

Art. Nr.	D	B	d	Z	Pos.	n	Index
230081	151	14	30	6 (2+2+2)	1	5'000-10'700	2
230082	180	22	30	6 (2+2+2)	2	4'300-9'000	3
230083	151	14	30	6 (2+2+2)	3	5'000-10'700	4
230069	160	19	30	2	4	5'800-10'100	5

Spare parts

Art.Nr.		Index
135766	Profile knives, B=20 Typ=16.3/12.3 Qual=HW	1, 5
216009	Reversible knives OERTLI, Format, B=14.0 h=14.0 a=2.0 Qual=HW	1, 2, 4
216013	Reversible knives OERTLI, Format, B=16.0 h=16.0 a=3.0 Qual=HW	1, 3
217012	Reversible knives OERTLI, straight, B=12 h=8 a=1.5 Qual=HW	1, 4
217020	Reversible knives OERTLI, straight, B=20 h=8 a=1.5 Qual=HW	1, 3
217025	Reversible knives OERTLI, straight, B=25 h=8 a=1.5 Qual=HW	2
855457	Grooving knives OERTLI, B=3.0 T max=12 Qual=HW	1, 2
855458	Grooving knives OERTLI, B=3.0 T max=12 Qual=HW	1, 4
950379	Clamping wedge	1, 5
950384	Gib, L=20	1, 5
950902	Gib, L=10.1 Typ=+10°	1, 2
950903	Gib, L=10.1 Typ=-10°	1, 4
950908	Gib, L=17.2 Typ=+15°	1, 3
950909	Gib, L=17.2 Typ=-15°	1, 3
851032	Screws, M=5 D=8.5 L=11 Typ=Torx 20	1, 3
851038	Screws, M=5 D=8 L=6.3 Typ=Torx 20	1, 2, 4
851059	Screws, M=5 D=6.8 L=23 Typ=Torx 20	1, 2, 4
851098	Screws, M=6 D=10.0 L=8 Typ=ISK 5	1, 2, 4
851341	Set screws, M=6 L=18 Typ=Torx 15	1, 5
851347	Screws, M=6 D=9.5 L=20 Typ=Torx 20	1, 3



Cutter set for seal strip, tungsten carbide tipped

Application: For cutting of grooves and simultaneously bevels for seal strips on sound-protection windows • Portable routing machines

Design: Tungsten carbide tipped • Straight cut • 2-parts, comprising of bevel cutter and grooving saw • Tool body in steel • MAN (manual feed)

Cutter set for seal strip, 2-parts

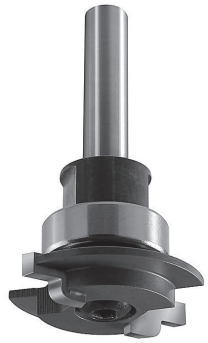
Art. Nr.	D	D1	d2	B	B1	α	Z	n max.	Index
700405	36	31.2	20	3.0	5.0	30°	4 (2+2) re.	27'000	1

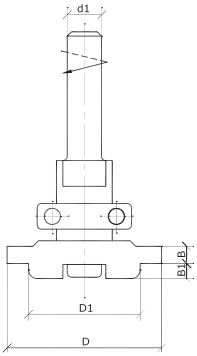
Interchangeable shank and accessories

Art. Nr.	d2	d1	Index
700406	20	8	2

Spare parts

Art.Nr.		Index
700407	Grooving saw, D=36 B=3.0 Qual=HW	1
700408	Bevelling cutter, D=31.2 B=5.0 d=8	1
700426	Ball bearings, D=20 d=16	2
851109	Screws, M=8 D=20 L=20.7 Typ=ISK 6	2





Cutter set for seal strip, tungsten carbide tipped

Application: For cutting of seal grooves in the middle section • Portable routing machines

Design: Tungsten carbide tipped • Straight cut • Tool body in steel • MAN (manual feed)

Cutter set for seal strip, 2-parts

Art. Nr.	D	D1	d2	B	B1	d1	Z	n max.
700440	36	26	22	4.0	3.5	8	2 re.	24'000

Tool installation device, pivotable

Application: As working aid by tool assembly as well as for inserted knife change

Design: With quick clamping lever • Pivotable

Art. Nr.	Typ
676831	HSK-P

Spare parts

Art.Nr.	
206903	Clamping shafts HSK-P, d=30+DKN A=26 L1=164 Typ=HSK-P n max=12'000
629330	Spacers, d=30 B=1.00 D=55 NL=2/7.0/45
629332	Spacers, d=30 B=2.00 D=55 NL=2/7.0/45
629337	Spacers, d=30 B=10.00 D=55 NL=2/6.5/45
629338	Spacers, d=30 B=5.00 D=55 NL=2/6.5/45
629339	Spacers, d=30 B=20.00 D=55 NL=2/6.5/45
640220	Reducing sleeves with rim, d=30 D=40 B=10 b=6 D1=60
640257	Reducing sleeves with rim, d=30 D=50 B=15 b=6 D1=68
640259	Reducing sleeves with rim, d=30 D=65 B=15 b=6 D1=83