

technical information

balconies

An abstract graphic consisting of several overlapping, curved blue lines that sweep from the left side of the page towards the right, creating a sense of motion and depth.

kronospan



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Balconies

Balustrades are used not only as a protection but also as a decorative element. Optimum design combines in itself the elegance and modern look with practicality and comfort.

Materials used as balcony paneling have their limitations, for instance, those based on cement or glass have low impact strength, less durability of colours and others.

The paneling from **Kronoart** panels fulfills the highest requirements in terms of aesthetics and they can be used for long years without deteriorating their properties.

There is a great diversity of methods of fixing the **Kronoart** panels to substructures, among others:

- fitting to posts using connectors or clamping fixtures,
- fitting to posts in sections,
- fitting to posts using passing through panel,
- fitting to posts using profiles.

Installation of HPL panels takes place mechanically using bolts and screws, self-drilling connectors or blind rivets to the aluminum or from galvanized steel profiles.



Characteristics of laminate board

Resistance to weather conditions

Kronoart panels are extremely resistant to weather conditions. Sun rays, acid rains and humidity deteriorate neither the surface quality nor internal layers of the panel. Resistance to UV radiation and light is very high. Also fast temperature variations do not have any adverse effect on the panel.

Due to the closed structure of surface and edges the **Kronoart** panels are easy to clean.

Contaminations do not deposit and the putrefactive bacteria cannot develop, and the material does not decompose. Due to that both the aesthetic and mechanical properties do not change almost at all during many years.

Resistance to vandalism

Due to combination of bending strength and flexibility the **Kronoart** panels are to the great extent resistant to impact loads and are perfectly suited at places that are exposed to vandalism.

Graffiti can be easily removed leaving no traces using suitable solvent without deteriorating the panel surface.

Fire resistance

Material of the panels has high fire resistance (according to EN 13501, DIN 4102, and NRO) - it does not melt, does not drip, vapours are not explosive, it does not go off under influence of fire and it is stable for long time. Due to low smoke emission it is not hazardous as it is not toxic.

Edges of cutting

Surfaces and edges of cutting do not require painting or coating with protective layer. For machining, for instance cutting or milling, one can use all tools used in machining of hard wood. To protect against damage, it is recommended to smooth the cutting surface using for instance flat, metal file or carbide cutter.

General recommendations how to proceed

Transport and unloading

The **Kronoart** panels have excellent strength, however, during transport, there is a danger of damage both for the panels themselves and for their decorative surfaces.

Therefore the following rules should be followed:

- the panels should be protected against shifting,
- before placing the panels on the pallet they all should be cleaned and all obstacles removed,
- put maximum 5 pallets one on top another,
- to protect the panels against dirt use the protective foil.

During unloading do exercise caution; lifting should be carried out always in vertical position, don't pull and don't shift in relation to each other without lifting them.

Attention! Don't hit the edges and surfaces of the panels.

Storage

For storage the panels should be placed on flat and stable surfaces or racks in natural climatic conditions, dry and protected against water. During storage the edges of panels should be aligned.

Top panel should be covered on its entire surface with the cover board and the stack should be wrapped with plastics foil. Also avoid humidity in places of application (installation) and machining by covering with foil. Original packing of the panels should be removed directly before they are used (from both sides at the same time).

Kronoart panels are protected with foil with special UV filter. Remove the foil after the panel is installed. Never lean the panels against a wall; it can cause the irreversible bending of the panel.

Incorrect storage may lead to permanent deformation and surface damage, which cannot be used as a justification for lodging the complaint.

balconies

Cleaning

The **Kronoart** panels are exceptionally easy in maintenance. Small contaminations can be wiped with a cloth wetted with water with addition of soap or other household cleaning agents. Difficult to remove dirt can be cleaned using the cleaning agents in commercial offer and suitable for household use.

Start cleaning from a small part of the surface to check whether any changes occur.



Fig. Cleaning.

Method of cleaning the panels with UV filter

The **Kronoart** panels with special UV filters can be washed up using alcohol solvents. Basically, any cleaning agents that can scratch the panel surface cannot be used.

Thorough cleaning can be performed using pressure devices. During cleaning with pressure devices perform movement from the bottom up and crosswise.

After cleaning rinse with a stream of clean water.

The distance from the surface should not be less than 20-30 cm. Water temperature should not exceed 90-100°C. Working pressure should be maximum 100 bars.

Machining of panels

The panels are machined at the same way as the hard wood or laminated chip boards. For machining use the standard tools used for wood with parts covered with hard metal. The panels can be cut, drilled and milled.

To obtain straight cutting line and avoid excessive heating of the edges the tools should be sharp.

The panels can be tapped as well as the self-threading screws can be used.

Optimum machining parameters

Cutting of HPL panels can be performed using the circular saw blades, stationary or manual, with guides.

Best edge quality is obtained when using carbide saw blades with alternating flat-trapezoidal tooth FZ/TR. The saw should be guided with constant speed. The condition to obtain good cutting quality is optimization of the projection W of the circular blade over the board surface - its increasing improves the quality of upper edge of the cut material and deteriorates the lower one, and vice versa.

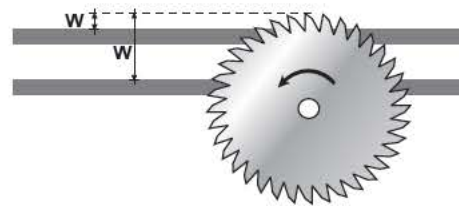


Fig. Optimization of projection W - improvement of cutting quality of the panel edge.

Panel feed speed is 6-10 m/min and depends on the panel thickness.

Technical parameters of circular saw blades

Tooth shape	Trapezoidal-flat or alternating
Tool	Hard alloy or diamond
Cutting angle	Entrance angle 45°

Tab. Recommended machining parameters.

Diameter [mm]	Number of teeth	Speed [rpm]	Saw blade thickness [mm]	Projection [mm]
300	72	6000	3.4	30
350	84	5000	4.0	35
400	96	4000	4.8	40

Tab. Parameters of saw blade for laminate panels.

Technical parameters of drills

HSS drills; cut 60 - 80°, drill blade ≤90°.

In the case of using a drill from hard metals use the upright drilling machines.

Drill diameter [mm]	Speed [rpm]	Entrance speed [rpm]
5	3000	60-120
8	2000	40-80
10	1500	30-60

Tab. Parameters of drills.

The drills cannot go out into empty space.

If necessary cut a block to avoid cracking when the drill exits the panel.

Application of panels

The **Kronoart** panels are designed especially for external applications and are used as:

- decorative facade facings,
- balcony panelling and covers,
- linings for attics and roof windows,
- stops and pavilions,
- composite elements and built into the facade and window panelling,
- panelling in stair balustrades.

Dimensions of panels

Kronoart panels are manufactured in following basic dimensions:

Dimensions [mm]	Surface area [m²]
5600 x 2040	11,42
2800 x 2040	5,71
3050 x 1300	3,96
2800 x 1300	3,64
4200 x 1300	5,46

Tab. Dimensions and surface area of the offered **Kronoart** panels.

Tolerance of dimension: lengthwise / crosswise: -0 / +10 mm.

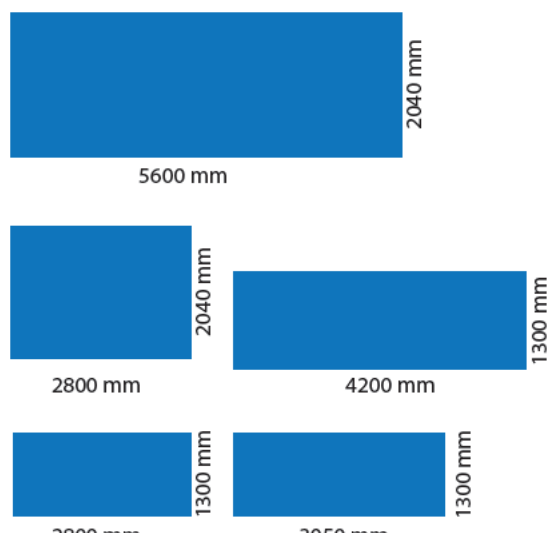


Fig. Dimensions of the **Kronoart** panels.

Division with regard to colours

Kronoart

The **Kronoart** panels are offered according to our programme of colours with mono-colour decors, wood-like and fanciful.

The panels have special surface filtering UV rays. This surface is covered with protective foil which should be removed immediately after installation and which constitutes the external, visible side.

Kronoplan

The **Kronoplan** panels are offered according to our programme of colours.

They have, as a standard, the surface that filters UV rays. They do not require of using the protective foil.

Standard surface texture - "BS".

Fire resistance rating

Kronoart

The **Kronoart** plates are of type EDS according to the standard EN 438.

They are classified with regard to fire resistance as follows:

Standard	Fire resistance class	Panel thickness [mm]
EN 13501	up to the class D-s1, d0	6-9
	up to the class C-s1, d0	10-15
DIN 4102	up to the class B2	-

Tab. Fire resistance rating for **Kronoart**.

Kronoart

The **Kronoart** panels are of EDF type according to the standard EN 438.

They are classified with regard to fire resistance as follows:

Standard	Fire resistance class
EN 13501	up to the class B-s2, d0
DIN 4102	up to the class B1

Tab. Fire resistance rating for **Kronoart**.

Standard thickness of panels: 6, 8 and 10 mm.

Technical parameters of Kronoart

Parameter	Unit	Standard	Required value		EDS	EDF
Tolerance of thickness	mm	EN 438/2–5	0,40 (for 5–7 mm)		–	–
			0,50 (for 8–11 mm)		–	–
Density	g/cm³	EN ISO 1183–1:2004	1,35		1.4	1.4
Abrasion resistance	number	EN 438/2–10	min. 3		4	4
Bending strength	MPa	EN ISO 178:2003	80	220 (lengthwise)		212
				184 (crosswise)		167
Tensile strength	MPa	EN ISO 527–2:1996	60	187 (lengthwise)		156
				111 (crosswise)		104
Modulus of elasticity	MPa	EN ISO 178:2003	9000	16.000 (lengthwise 13.000)		–
				11.000 (crosswise 10.000)		–
Impact strength	kJ/m²	DIN 53453	–	18 (lengthwise)		15
				13 (crosswise)		11
Hit strength						
• Large ball	mm	EN 438/2–21	1800/ 6 mm		1800	1800
• Imprint diameter	mm		max. 10		3	3
Pull out strength	N/mm²	EN 320	–		417	409
Water swelling at 20°C						
• 24 h	%	DIN 53495	–		0,3	0,5
• 100 h	%		–		1,1	1,6
• 500 h	%		–		3,2	3,7
Dimensional stability at elevated temperature	%	EN 438/2–17	0,3	max. 0,16 0,013 (lengthwise)		0,02
			0,6	max. 0,21 0,026 (crosswise)		0,026
Thermal conductivity	W/mK	DIN 52612			0,2076	
Thermal elongation index	ppm/K	DIN 52328	–	93,83 (thickness)		92,5
			–	8,48 (lengthwise)		9,4
			–	20,64 (crosswise)		23,88
Resistance to UV rays	scale of grayness	DIN 20105–AO2	–		5	5
	scale of grayness	EN 438/2–28	3/1500 h		min. 4	min. 4
Resistance to acid rains	–	DIN 50018	–	without changes		–
Staining resistance	grade	EN 438/2–26	5/4.		5/5.	5/5.
Fire resistance rating	class	DIN 4102	–		B2	B1
		EN 13501–1	–		D–s1,d0	B–s2,d0

Tab. Technical parameters of facade panels.

Technical remarks

Fixed point / Non-fixed point

To assure a possibility of uniform extension of panels one fixed point should be made in the central part of the panel.

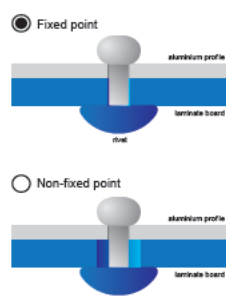


Fig. Fixed point and non-fixed point.

Other fixing points should be made as non-fixed-points.

Thickness [mm]	max. D [mm]	max. B [mm]	a [mm]	b [mm]
6	400	400	20-40	20
8	550	500	20-50	20
10	700	600	20-60	20

Tab. Distribution of joints - one-span fixing.

Thickness [mm]	max. D [mm]	max. B [mm]	a [mm]	b [mm]
6	550	400	20-60	20-50
8	700	500	20-80	20-60
10	800	600	20-100	20-80

Tab. Distribution of joints - multi-span fixing.

Fixed point always guarantees even facing of panels both lengthwise and crosswise.

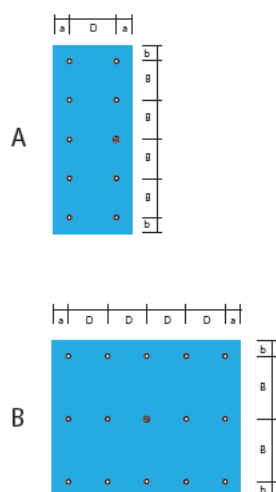


Fig. One-span fixing (A) and multi-span fixing (B).

The fixed point for multi-span fixing should be made in the center of the panel and for one-span fixing in the centre part of panel edge.

The diameters of fixing holes

The diameter of the fixed-point hole should be the same as the diameter of fixing element. The diameters of holes for non-fixed points should be 1,5 times larger than the diameter of the fixing element.

Bending

The Standard **Kronoart** panels can be bent without preliminary preparation in order to obtain required shape. The physical and chemical properties make that possible. Minimum bend radius: $R = 2$ m.

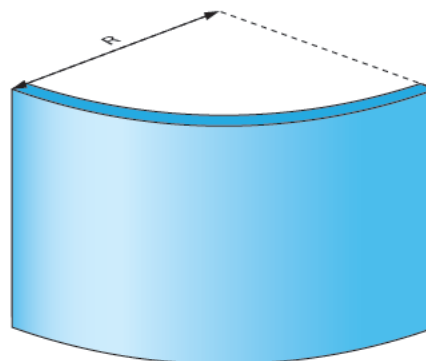


Fig. Bending of balcony panels.

balconies

Balcony corners

There are a lot of possibilities of finishing the balcony corners.

Open corners

The front panel placed over the side panels and faced. Lack of any form of finishing makes that the brown colour of the panel core is visible.

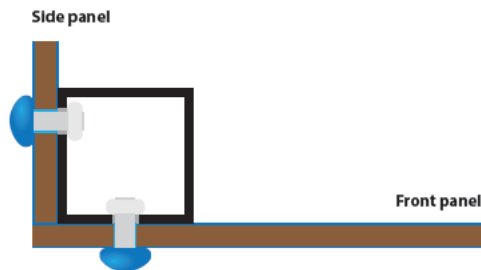


Fig. Open corner.

Corners finished with a profile

The joints of side and front panels are masked with special powder varnished profiles in colour from the RAL palette assures perfect final effect.

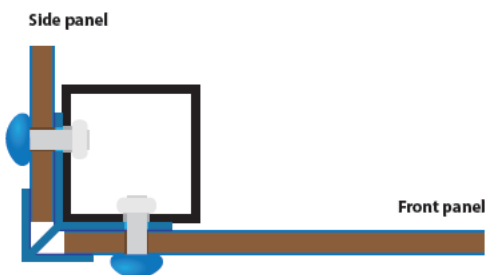


Fig. Corner covered with a profile.

Corners joined slantwise

Connection of this type requires precise cutting of the panels at the angle 45°.

It assures most uniform visual effect.

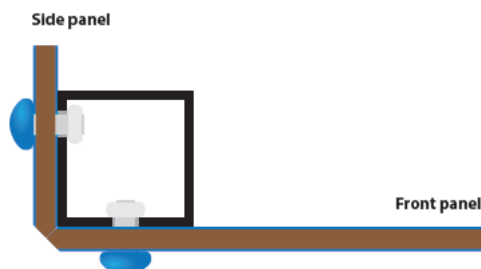


Fig. Slantwise corner.

Masking the unevenness of substructure

In the case of installation carried out on the older substructure which is uneven it is recommended to project the front panel by about 10 mm outside what allows to optically improve any imperfections.

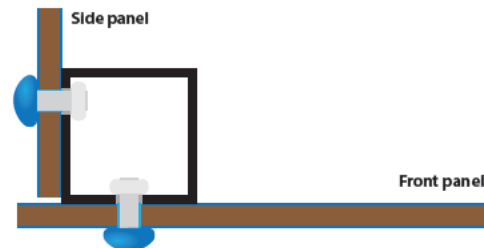


Fig. Method of installation of the corner on older, uneven substructure.

Compensation of panel dimension change

Because of its base material the panels behave in variable climate just like wood that is they expand under the influence of humidity and shrink when it is dry.

Therefore, during installation it is necessary to provide the appropriate compensation gaps - expansion gaps between the panels:

- minimum 8 mm, 2,5 mm per every meter of the panel both lengthwise and crosswise,
- 5 mm around the panel for installation in profiles.

If the joining profiles are used allow for the thickness of their body.

Balustrades

The balustrade system used together with the **Kronoart** panels should have enough strength and be sufficiently durable.

The height of balcony balustrades should conform to local building regulations. It should be not less than 100 cm, and for the buildings higher than 12 m it should be at least 110 cm high.

Fixing of bearing posts

Stability of balustrades is assured by bearing posts to which the banister is fitted and the paneling.

The metal posts are usually in the form of pipes or profiles of rectangular cross-section.

To be safe, the balustrade should be well attached to the substrate. The mounting screws fixing the balustrade to the base are selected with regard to strength requirements and static of the structure.

The banisters can be mounted in three ways:

Upper mounting (1) - traditional method of installation of barriers consists in point fixing of posts from the top of the balcony plate.

Side mounting (2) - an interesting method is fixing of the barriers to the front of the balcony plate. This solution eliminates successfully the risk of leakages and thermal bridges.

Lower mounting (3) - this method has many advantages: among others it allows to keep untouched the insulation protecting against water and also it does not "take away" the balcony surface.

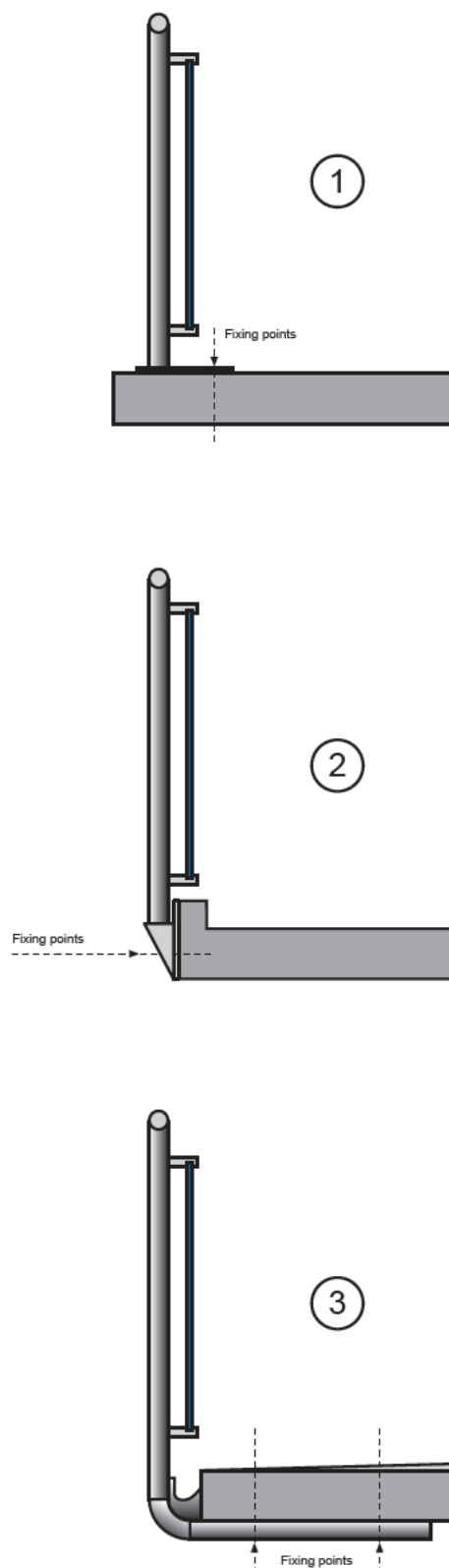


Fig. Fixing of balustrade banisters - division.

balconies

Installation of balcony panelling

Variant 1

Visible fitting to posts using connectors or clamping brackets

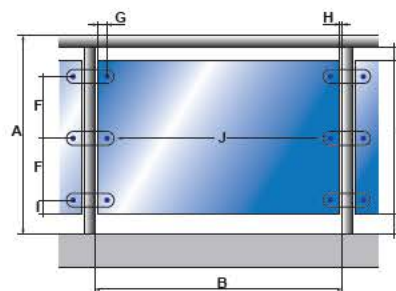


Fig. Visible fitting using connectors.

Panel Thickness [mm]	Balustrade height A [cm]	Fixing distance B max. [mm]	Panel height C min./max. [mm]	Upper limit distance D min./max. [mm]	Lower limit distance E [mm]	Distance between connectors F max. [mm]	Panel projections G min./max. [mm]	Limit distance H min./max. [mm]	Free projections I min./max. [mm]	Fixing points J
6	90	600	700 - 780	40 - 120	40	300	20 - 40	20 - 40	50 - 90	3
	110	600	900	40 - 120	40	300	20 - 40	20 - 40	20 - 150	3
	110	600	905 - 980	40 - 120	40	300	20 - 40	20 - 40	20 - 40	4
8	90	700	700 - 780	40 - 120	40	300	20 - 40	20 - 40	50 - 90	3
	110	700	900	40 - 120	40	300	20 - 40	20 - 40	20 - 150	3
	110	700	905 - 980	40 - 120	40	300	20 - 40	20 - 40	20 - 40	4
10	90	950	700 - 780	40 - 120	40	300	20 - 40	20 - 40	50 - 90	3
	110	950	900	40 - 120	40	300	20 - 40	20 - 40	20 - 150	3
	110	950	905 - 980	40 - 120	40	300	20 - 40	20 - 40	20 - 40	4

Tab. Spacing of connectors - recommendations.

Variant 2

Visible fitting to posts in sections

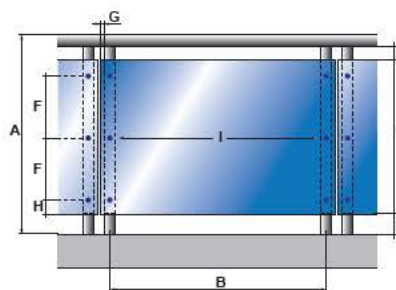


Fig. Visible fitting to posts in sections.

Panel Thickness [mm]	Balustrade height A [cm]	Fixing distance B max. [mm]	Panel height C min./max. [mm]	Upper limit distance D min./max. [mm]	Lower limit distance E [mm]	Distance between connectors F max. [mm]	Panel projections G min./max. [mm]	Free projections H min./max. [mm]	Fixing points I
6	90	600	700 - 780	40 - 120	40	300	20 - 40	50 - 90	3
	110	600	900	40 - 120	40	300	20 - 40	20 - 150	3
	110	600	905 - 980	40 - 120	40	300	20 - 40	20 - 40	4
8	90	700	700 - 780	40 - 120	40	300	20 - 40	50 - 90	3
	110	700	900	40 - 120	40	300	20 - 40	20 - 150	3
	110	700	905 - 980	40 - 120	40	300	20 - 40	20 - 40	4
10	90	800	700 - 780	40 - 120	40	300	20 - 40	50 - 90	3
	110	800	900	40 - 120	40	300	20 - 40	20 - 150	3
	110	800	905 - 980	40 - 120	40	300	20 - 40	20 - 40	4

Tab. Spacing of connectors - recommendations.

Variant 3

Visible fitting to posts passing through panel

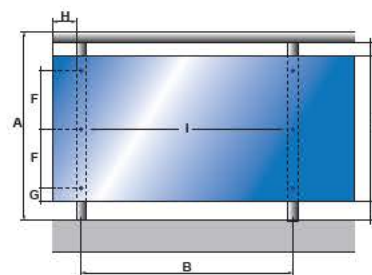


Fig. Visible fitting - passing through panel

Panel Thickness [mm]	Balustrade height A [cm]	Distance between posts B max. [mm]	Panel height C min./max. [mm]	Upper limit distance D min./max. [mm]	Lower limit distance E [mm]	Distance between connectors F max. [mm]	Panel projection G min./max. [mm]	Limit distance H min./max. [mm]	Fixing points I
6	90	600	700 - 780	40 - 120	40	300	50 - 90	20 - 40	3
	110	600	900	40 - 120	40	300	20 - 150	20 - 40	3
	110	600	905 - 980	40 - 120	40	300	20 - 40	20 - 40	4
8	90	700	700 - 780	40 - 120	40	300	50 - 90	20 - 40	3
	110	700	900	40 - 120	40	300	20 - 150	20 - 40	3
	110	700	905 - 980	40 - 120	40	300	20 - 40	20 - 40	4
10	90	800	700 - 780	40 - 120	40	300	50 - 90	20 - 40	3
	110	800	900	40 - 120	40	300	20 - 150	20 - 40	3
	110	800	905 - 980	40 - 120	40	300	20 - 40	20 - 40	4

Tab. Spacing of connectors - recommendations.

Variant 4

Visible fitting to posts - in sections

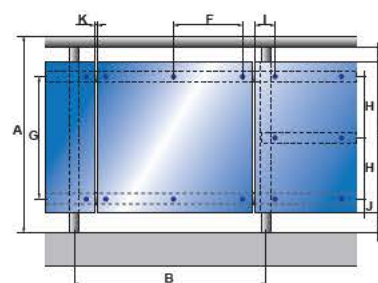


Fig. Visible fitting to posts - in sections.

Panel Thickness [mm]	Balustrade height A [cm]	Distance between posts B max. [mm]	Panel height C min./max. [mm]	Upper limit distance D min./max. [mm]	Lower limit distance E [mm]	Distance between connectors F max. [mm]	Distance between locks G min./max. [mm]	Distance between locks H min./max. [mm]	Panel projection I [mm]	Panel projection J [mm]	Distance between panels K [mm]
6	90	600	700 - 780	40 - 120	40	300	600	-	20 - 40	20 - 40	6
	110	600	900	40 - 120	40	300	-	430	20 - 40	20 - 40	6
	110	600	905 - 980	40 - 120	40	300	-	470	20 - 40	20 - 40	6
8	90	700	700 - 780	40 - 120	40	300	700	-	20 - 40	20 - 40	8
	110	700	900	40 - 120	40	300	-	430	20 - 40	20 - 40	8
	110	700	905 - 980	40 - 120	40	300	-	470	20 - 40	20 - 40	8
10	90	800	700 - 780	40 - 120	40	300	700	-	20 - 40	20 - 40	8
	110	800	900	40 - 120	40	300	-	430	20 - 40	20 - 40	8
	110	800	905 - 980	40 - 120	40	300	-	470	20 - 40	20 - 40	8

Tab. Spacing of connectors - recommendations.

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Variant 5

Visible fitting to posts in profiles

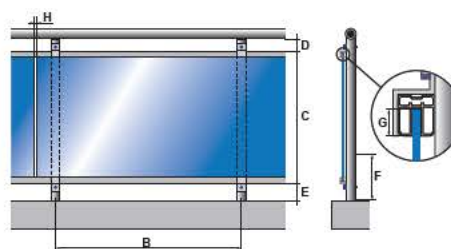


Fig. Visible fitting - profiles type Z.

Panel Thickness [mm]	Height of balustrade elements max. [cm]	Distance between posts B max. [mm]	Panel height C max. [mm]	Upper limit distance D max. [mm]	Lower limit distance E [mm]	Support of balustrade posts F [mm]	Depth of insertion into profile G min [mm]	Distance between panels H [mm]
6	131,5	1000	1045	120	40	300	20	6
8	156,5	1200	1100	120	40	300	20	8

Tab. Spacing of connectors - recommendations.

Variant 6

Visible fitting to posts - on additional profiles

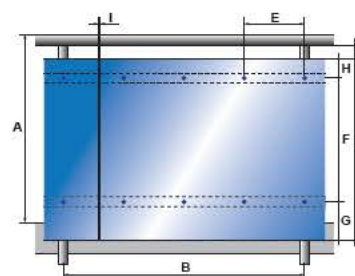


Fig. Visible fitting to posts - on additional profiles.

Panel Thickness [mm]	Balustrade height A [cm]	Distance between posts B max. [mm]	Panel height C max. [mm]	Upper limit distance D min./max. [mm]	Distance between connectors E max. [mm]	Distance between profiles F min./max. [mm]	Panel projection G max. [mm]	Panel projection H max. [mm]	Distance between panels I [mm]
6	110	1160	1050	40 - 120	300	820	150	80	6
8	110	1200	1180	40 - 120	300	950	150	80	8
10	110	1500	1280	40 - 120	300	1050	150	80	8

Tab. Spacing of connectors - recommendations.



Balcony partitions

A basic function of partitions in multifamily buildings is to assure (isolate) so called "balcony booths) on the supporting plate or on the terrace.

Next to the above-mentioned function of splitting the balcony space these partitions fulfill also other tasks such as protection against wind and rain, limitation of the sunlight falling inside etc. Moreover they can also compose an element of freestanding walls that is sheds, pergolas and shelters with the walls making possible separation of zones and communication routes.

One of the methods of making partitions is by using the **Kronoart** panels.

Method of completing and connecting the partition with the wall and balcony balustrade depends on the panel size. What variant to choose depends also on the positioning and function which the partition is going to fulfill.

Vast range of colours and patterns in our offer makes possible harmonious composition of the development into every type of facade and environment.

Method of partitions installation

The following methods of installation are recommended:

- Framing with a profile from all sides,
- Fitting to lacing from galvanized steel,
- Fitting to profiles using rivets and screws.

The balcony partitions from the **Kronoart** panels are fitted to the profiles using among others rivets, or balcony bolts.

balconies

Variant 1

Framing with profiles from all sides

The dimensions of profiles should match the thickness of panels taking into consideration the tolerance of dimensions and possible sealing with EPDM.

It is necessary to assure free panel movement by keeping the distance from the side and upper profiles - minimum 5 mm.

One should foresee water draining by matching the slotted holes or by drilling holes in lower profile.

Below are given recommended spacing of connectors where L_{max} is the largest admissible spacing of fitting elements for given height to width ratio (H/L) of the partition under design and for the selected panel thickness.

C_2 is the distance between the profile edge and the floor; it should be 20-fold of laminate thickness (maximum value).

	H / L	Panel thickness [mm]			
		6	8	10	13
Framing from 4 sides	0,98	765	1029	1284	1666
	1,18	725	960	1196	1558
	1,38	686	902	1127	1470
	1,58	647	853	1068	1392
	1,78	608	813	1019	1323
	1,98	578	774	970	1264
Framing from 2-3 sides	>2,48	559	745	931	1206
Max. spacing L_{max} [mm]					

Tab. Spacing of bearing profiles, maximum distances.

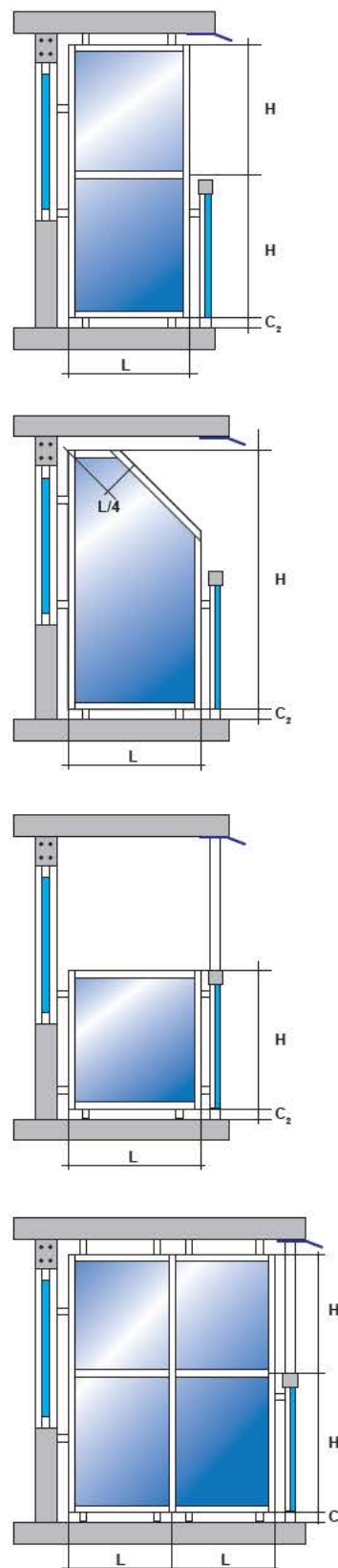


Fig. Fitting of partition - framing with profile.

Variant 2
Fitting to steel lacings

Below are given the recommended spacing for connectors where: D_1 is maximum distance between the fitting elements - for one-span fitting, and Z_1 is the largest admissible spacing of fitting elements for multi-span fitting for the selected panel thickness:

- C_1 - distance between the holder and the laminate edge, 20 -150 mm,
- C_2 - distance between the lower edge and the floor, min. 149 mm,
- C_3 - distance between the edge of upper profile and the holder, 20-150 mm.

Panel Thickness [mm]	8	10	13
D_1 [mm]	588	735	931
Z_1 [mm]	735	882	1176

Tab. Spacing of bearing profiles, maximum distances.

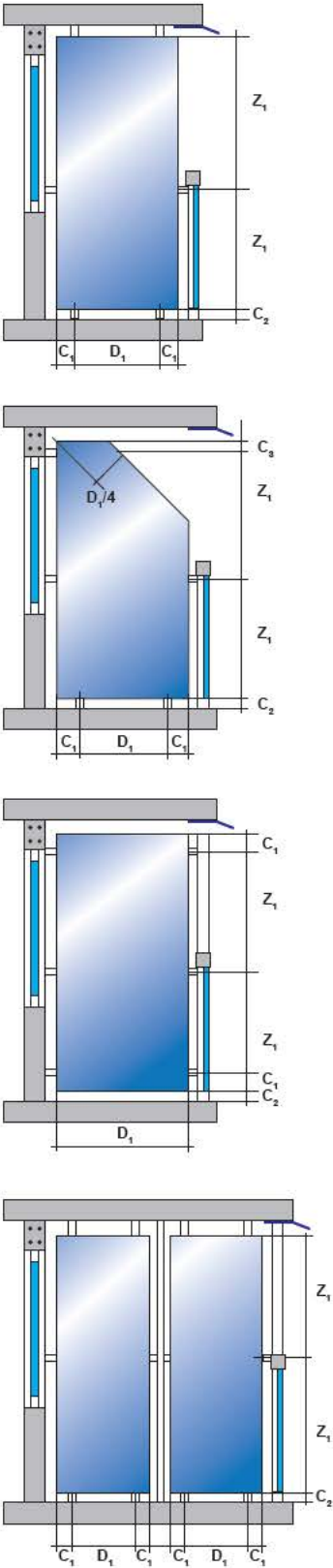


Fig. Fitting the partition to the lacings from galvanized steels.

balconies

Variant 3

Fitting to profiles with rivets or balcony bolts

Below are given the recommended spacing of connectors where L_{max} is maximum distance between the fitting elements depending on the panel thickness and number of fitting spans.

- C_1 - 149 mm (minimum value),
- dimension = 20 fold of laminate thickness (maximum value).

Panel Thickness [mm]	6	8	10	13
L_{max} (single span) [mm]	539	539	931	1176
L_{max} (multi span) [mm]	686	882	1127	1470

Tab. Tab. Spacing of bearing profiles, maximum distances.

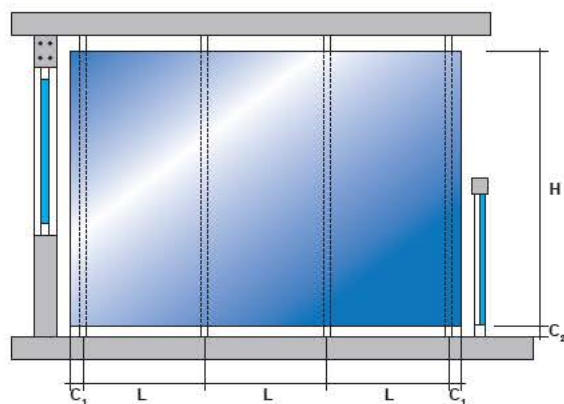


Fig. Fitting the partition to profiles.

Installation - remarks

Before and during the installation a few rules should be observed that are listed below.

Fixing elements should be placed so that the plate can freely move (appropriate arrangement of fixed and non-fixed holes).

Fixing elements should be placed starting from the center of the panel.

The head of the fixing element should have such size that the hole in the panel is always covered. The fixing elements of the sliding point should be placed so as the plate can move.

Fixing elements should be of the same colour as the laminate or to be covered with a cap of matching colour.

Rivets should be put using the articulated fixtures.

The set distance from rivet head should make possible movement of elements in the drilled hole (clearance: +0,3 mm).

It is a good practice guaranteeing flexible fixing to make precise preliminary drilling with exactness to one millimeter.

The center of the hole in the supporting structure should line up with the center of the hole in the plate. The holes should be drilled using the centering sleeve.

In order to obtain better cooperation in places of connections one can use rubber profiles from flexible EPDM.

Screws cannot be tightened using excessive torque. The HPL laminates used for balustrade filling cannot be press fitted as it can cause uneven cooperation with substructure and lead up to breaking the rivets or screws.

Do not use the sunk head screws!

The spacers should be mounted only when necessary.

No formats can be fixed at the same time with two different profiles of the substructure and fixed one on top of another with expansion joint as the facing panels should have a possibility of making the same movements.

For rivets the recommended hole diameter in the facade panel for the non-fixed point is: Ø 8,5 mm, and for the fixed point: Ø 5,1 mm. the diameter of the hole in the structure: Ø 5,1 mm. For torx screws the recommended diameters for non-fixed points are Ø 8 mm, and for fixed points Ø 5,7 mm.

Distance between the edge and the hole center

cannot exceed 20 x panel thickness.

Dimensions of the profiles used depend on the thicknesses of panels (6, 8, 10 mm or more).

Only aluminum or from galvanized steel profiles should be used because of the resistance to corrosion and durability. In the case of other material of the substructure care must be taken to protect it appropriately against weather conditions.

When selecting a connector it must be taken into account the wind pressure to which the entire balustrade structure is exposed including its filling as well as the legal regulations in force.

Stability and durability of the structure and its anchoring should be demonstrated independently on the certificates of the facing panels. Correct spacing of connectors on the panel surface should be calculated based on the installation data for the high pressure laminates.

Installation of the laminate to balcony balustrades should be carried out by qualified gang of fitters.

Fixing elements

Painted rivets



Fig. Blind rivet, closed from one side, painted.

Rivets with large head, powder painted are used in the systems of visible fixing on balconies, to aluminum supporting elements to the extent allowed by certificates.

Element	Type of material	No of material
Sleeve	Al Mg 5	3.3555.10
Stem	stainless steel	1.4541 (Alfo®), 1.4301 (SFS)

Tab. Parameters of blind rivets.

Breaking force of the rivet is 4,4-5,2 kN.



Fig. Blind rivet - construction and dimensions.

Diameter Ø d / Lenght L [mm]	5 / 18	5 / 21
Max. Thickness of material [mm]	12	15
Diameter Ø d1 [mm]	2,7	2,7
Diameter Ø D [mm]	14	14
Catalogue no (Alfo®)	12250180/14	12250210/14
Quantity	500 / carton	500 / carton
Catalogue no (SFS)	AP14-50180-S	AP14-50210-S
Quantity	500 / carton	500 / carton

Tab. Technical data of the recommended connectors.

In most cases for fitting will be suitable the connectors recommended in the table above.

Most colours are available from our stock.

For fitting the fixtures PVC - catalogue no 0010000050 can be used.

The tools for riveting and accessories are available from the supplier of fixing elements. Among them there are tools for manual and machine riveting, distancing tips, positioner for centering during drilling and the positioning tip for centering during drilling of preliminary hole.

Facade screw with Torx 20

Application: for HPL panels in balconies, for supporting wooden elements. Material is an austenitic stainless steel with colour coating from powder paint.

The fixing screw without a washer from stainless steel with single or double thread.

No of material	1,4301
Diameter Ø d2 [mm]	12
Diameter Ø d1 [mm]	5,2
Lenght L [mm]	24
Screw driver tip	TORX T20W
Pitch of the screw P [mm]	2,2

Tab. Technical data of fitting screws Torx.

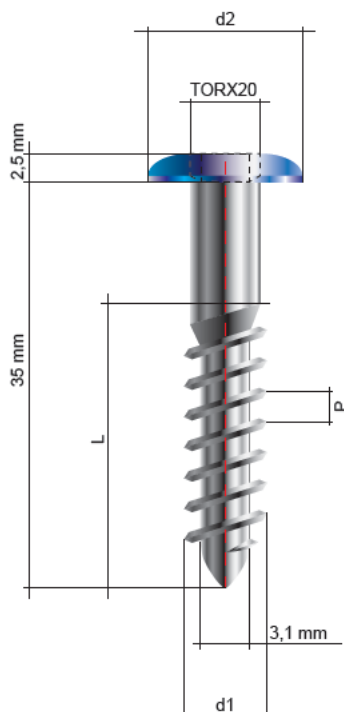


Fig. Construction and dimensions of facade screw.

Balcony screw

Special screw makes possible the fitting of the **Kronoart** panels without stress. It assures inherently safe screw joints with hermetic adhesive (dome nut cannot get loose).

M5 screw has a stem of length (L) from 20 mm to 55 mm. The head with multi tooth seat inside of Philips type, size 20, head diameter 16 mm.

Screw, special nut and washer are made from stainless steel, blank A2.

They are delivered with self-adhesive pad from Polyamide, washer type "U", spring ring and special dome nut with longer thread with a cap of the same colour.

They are packed in cartons containing 200 sets. Deliveries by our authorized dealers.

Customized length available on demand.

Supplier: MBE GmbH (Moderne Befestigungs-Elemente GmbH).

Catalogue no of the screw	Stud length of the screw [mm]
120 50 44 20	20
120 50 44 25	25
120 50 44 30	30
120 50 44 35	35
120 50 44 40	40
120 50 44 45	45
120 50 44 50	50
120 50 44 55	55

Tab. Catalogue numbers of balcony screws.

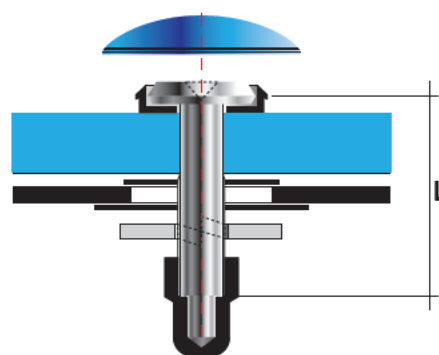


Fig. Construction and dimensions of balcony screw.

Self-drilling connectors from stainless steel

The screws SX-L12 (SFS) are designed in order to achieve best look of the fitted facade panels.



Fig. Self-drilling connector with head Torx.

Specials flat head L12 match in terms of colour to the facing assures aesthetic almost invisible fitting. Colour heads are powder painted.



Fig. Self-drilling connector with the head Irius®.

Element	Type of material	No of material
Connector SX	austenitic stainless steel	grade acc. to AISI 304 (1.4301 acc. to PN-EN)
Washer S	austenitic stainless steel	grade acc. to AISI 304 (1.4301 acc. to PN-EN)
Drilling tip	carbon steel hardened	-

Tab. Self-drilling connectors - materials used.

Heads of connectors, depending on version:

- L12 - irius® Ø 12 mm,
- D10 - flat head Ø 10 mm with a seat T20,
- D12 - flat head Ø 12 mm with a seat T25.

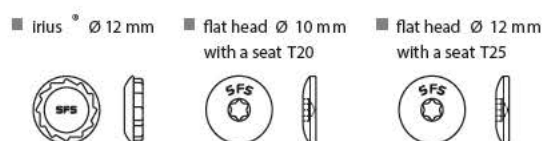


Fig. HD head / seat.

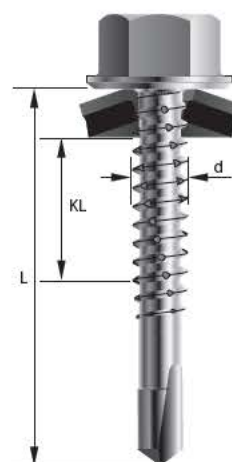


Fig. Self-drilling connector - construction.

- KL thickness of joined elements
d thread diameter
L total length
VD maximum drilling capability
HD type of head / seat
W material and washer diameter
t thickness of substrate

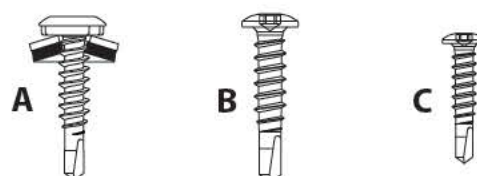


Fig. Self-drilling connector - types.

Product	Typ	VD	KL	HD	W	d	L	Application
A	SX	3/	15-	L12-	S16-	5,5x	32	VD max. steel: 3,0 mm t max. steel: 2,5 mm
B	SX	3/	15-	D12-		5,5x	30	VD max. steel: 3,0 mm t max. steel: 2,5 mm
C	SX	3/	15-	D10-		5,5x	24	VD max. steel: 3,0 mm t maks. steel: 2,5 mm t min. steel: 1,0 mm t min. aluminium: 2,0 mm

Tab. Symbols and parameters of connectors (SFS). All dimensions in mm.

Supplier: SFS Intec.

Exemplary designation of the connector:

SX3/9-L12-S16-6,0x29

Installation accessories

Profile U for framing of partition wall panels

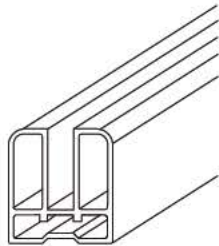


Fig. Profile U - cross section. Designation by the manufacturer (WIDO) - 00-100043.

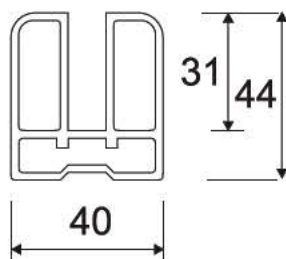


Fig. Profile U - dimensions.

Seals

Seal for the panels 6 mm

Profile A - 00-100076

Profile U - 00-100043

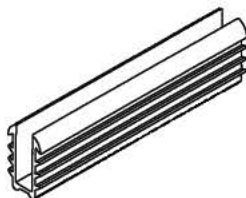


Fig. Seal for the panels 6 mm, designation by the manufacturer - 30-600038.

Seal for the panels 8 mm

Profile A - 00-100076

Profile U - 00-100043

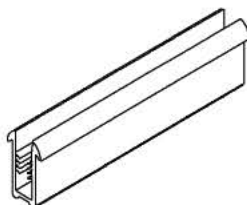


Fig. Seal for the panels 8 mm, designation by the manufacturer - 30-600039.

EPDM

Installation tape made from elastomer based on modified EPDM finds application as sealing of contact between the facade elements.

It is resistant to weather conditions and is very flexible. It keeps stability of shape in high temperatures.



Fig. Tape from EPDM.

It is also available as single-side adhesive what facilitates installation.

Item	DIN	Property
Class of building material	4102	B2 (normally flammable)
Water vapour diffusion resistance factor		- 40°C - +130°C
Temperature of use		+ 5°C - + 35°C
Durability		two years
Storage temperature		+ 5°C - + 25°C
Colour		black

Tab. Technical details of EPDM tape.

Type	Width [mm]	Thickness [mm]	m/roll
EPDM-	60/	0,7	25
EPDM-	100/	0,7	25
EPDM-Adhesive-	60/	0,7	25
EPDM-Adhesive-	100/	0,7	25

Tab. Types and designations of EPDM tapes (Supplier: SFS).

Exemplary designation: **EPDM-60/07.**

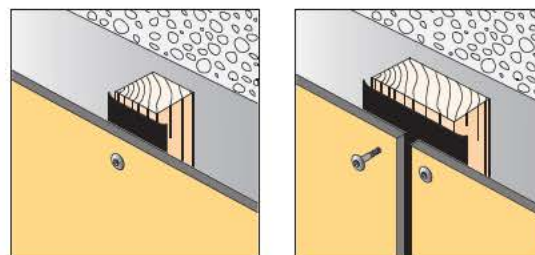


Fig. EPDM - examples of application.

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Suppliers of fixings and accessories

Moderne Befestigungs-Elemente (MBE) GmbH

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D-58706 Menden

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Fax: +49 (2373) 17430-11

<http://www.mbe-gmbh.com>

SFS Intec Sp. z o.o.

ul. Torowa 6,

61-315 Poznań

Telefon: +48 61 660 49 00

Fax: +48 61 660 49 10

<http://www.sfsintec.biz/pl>

Wido Profil Sp. z o.o.

ul. Na Dołach 4,

30-704 Kraków

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