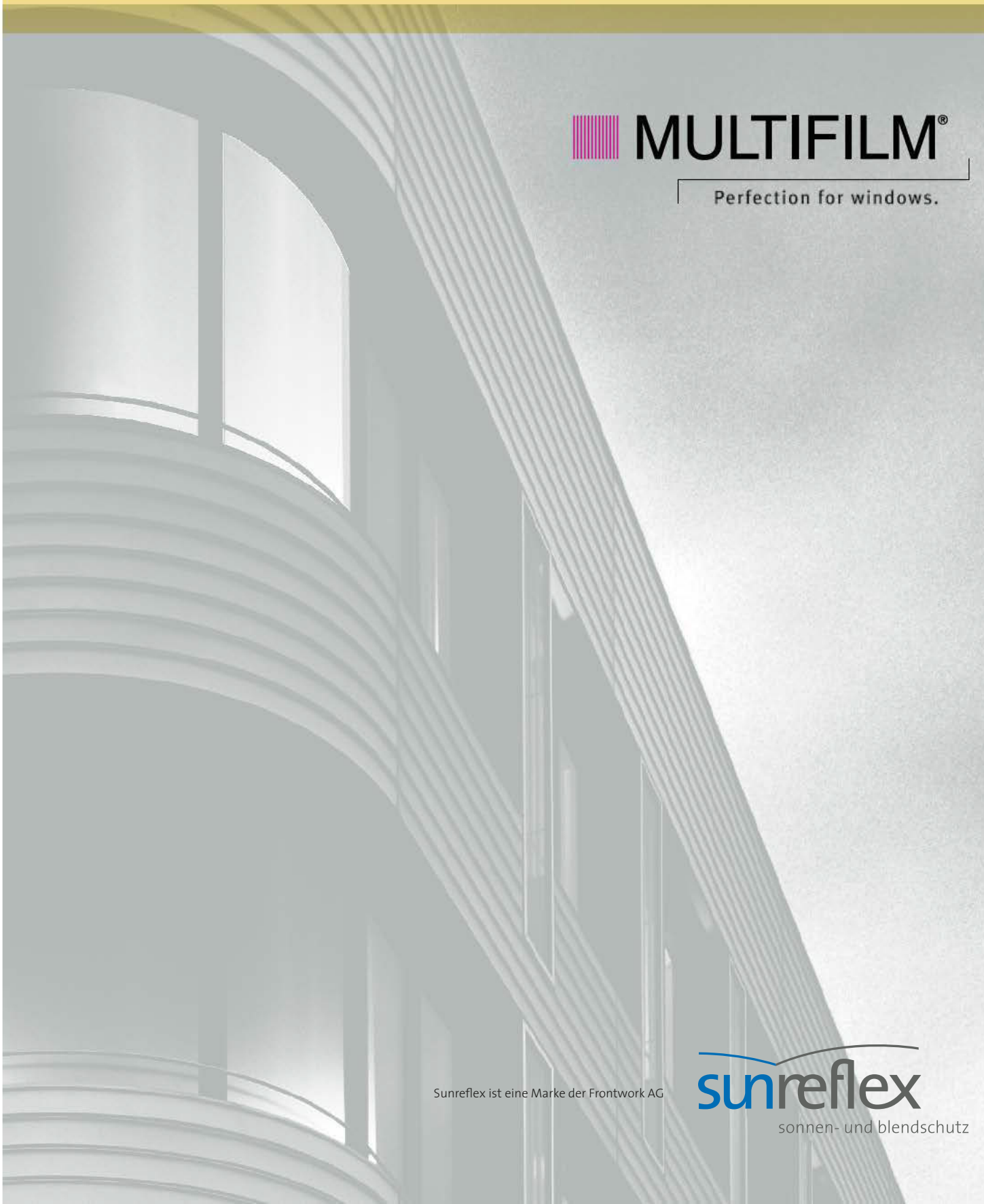
Sun and glare protection with no drawbacks



MULTIFILM®

Perfection for windows.

Sunreflex ist eine Marke der Frontwork AG

sunreflex

sonnen- und blendschutz

Centre for Virtual Engineering (ZVE), Stuttgart

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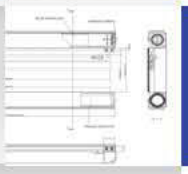

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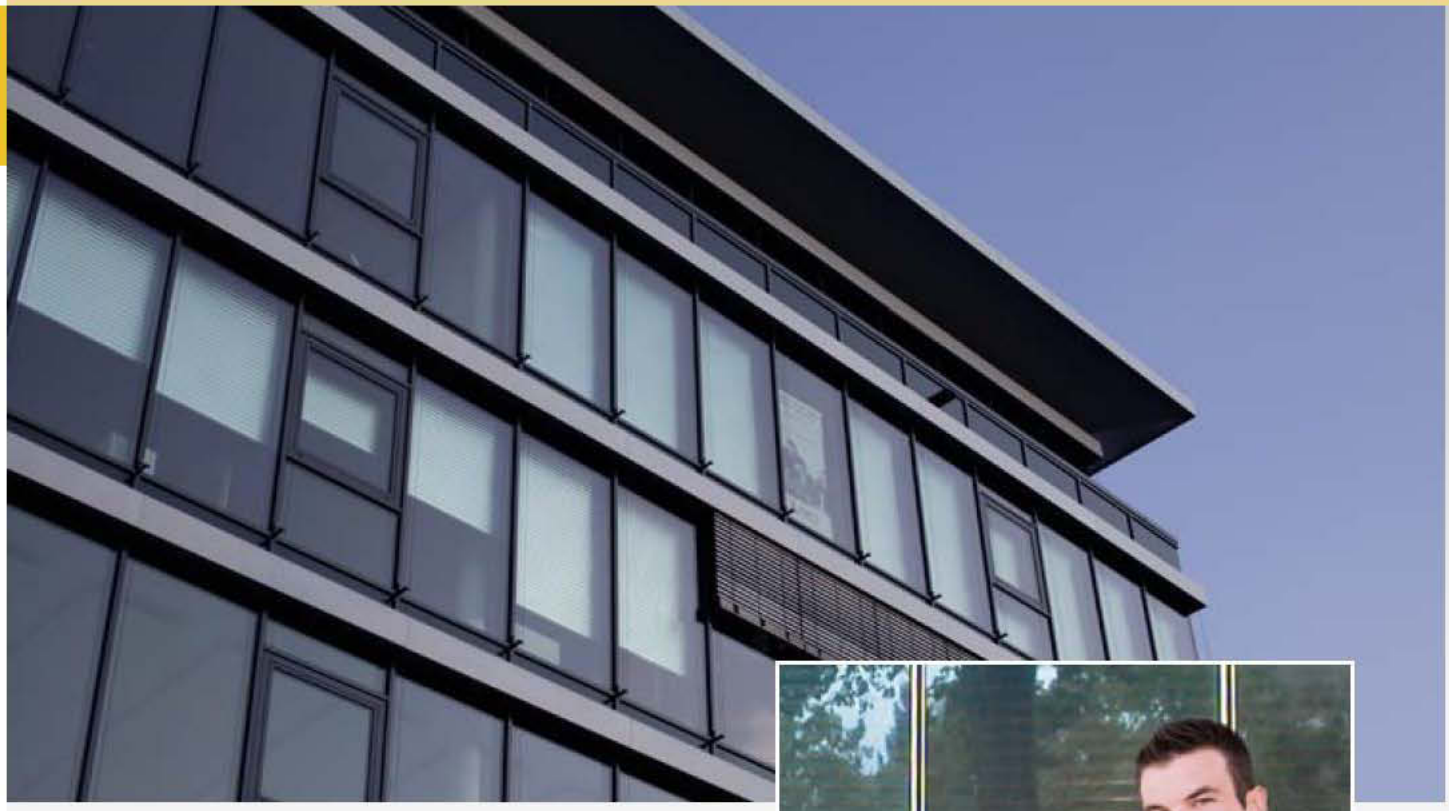
About MULTIFILM®



MULTIFILM Sonnen- und Blendschutz GmbH of Limbach-Oberfrohna near Chemnitz, Germany has been producing since 1993 sunscreen systems using a not-so-common material, namely a **transparent, highly reflective polyester film** which was originally developed for the space travel. Now this material is being used for interior roller blinds. The film **provides effective protection against heat and glare** and, thanks to its excellent transparency, **clear view to the outside.**

The product range includes a **variety of roller blinds, opposite pull systems, large format Film-Façade-Systems, vertical blinds** and **panel glide systems.**

In the product development and designing, we are guided by the contemporary architectural trends and latest façade modelling technologies, as well as by the principles of energy management and ergonomics. In this regard, we endeavour to integrate the design and functionality of our products optimally.
MULTIFILM® products not only shield the glare, but also verifiably ward off the heat from the room, thus, saving energy and safeguarding the environment. Moreover, as a result of careful selection of the materials used, they are very reliable and durable.

PERSONALIZED CUSTOMER SUPPORT

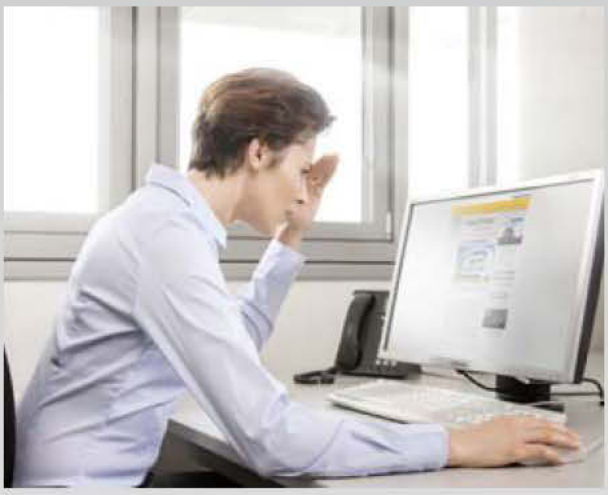
Every product is manufactured individually according to the customer's requirements. Therefore, we are in a position to undertake customer-specific product adaptation and even to offer special solutions for particularly challenging situations of installation and façades.

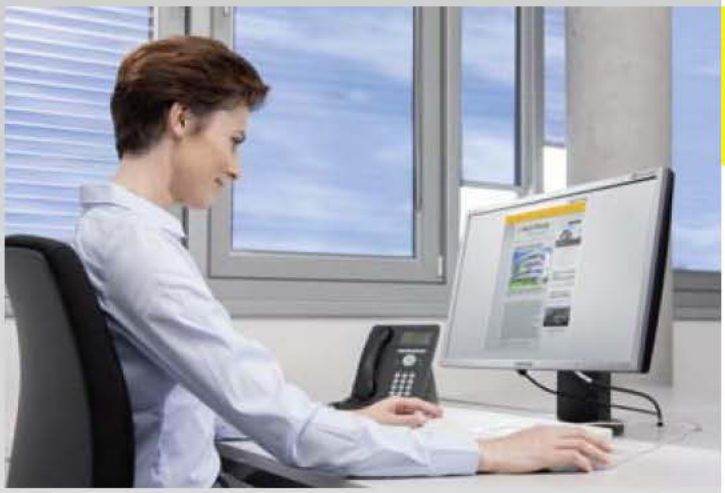
Simply ask us for:

- Technically competent advice and customer support
- Consulting, estimates, installation – all at one source
- Individualized product customization and special solutions
- Consulting on energy management

Send the sun into shade

Protection against heat and glare at work





Expansive glazing creates a bright and friendly atmosphere in the interiors of a building. However, without a sunscreen the **glass façade** quickly turns into **heat trap**: the short-wave solar radiation is absorbed inside the room and converted into long-wave heat radiation which cannot escape into the outside through the glazing. As a result the building heats up uncontrollable.

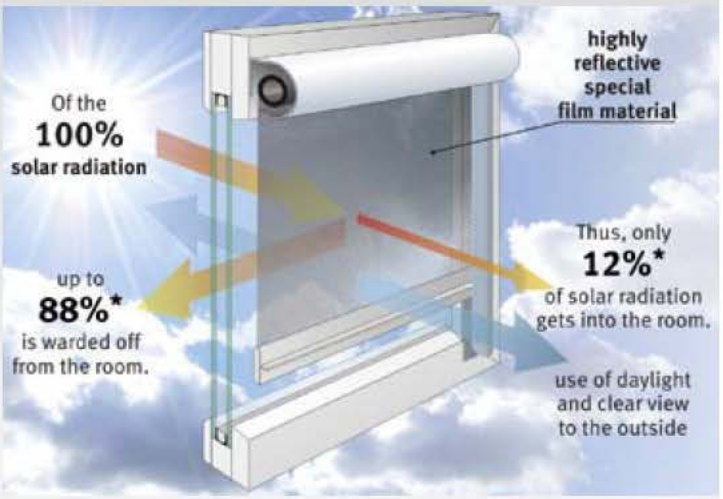
Besides the undesired heat, the unduly high incidence of light gradually makes the surroundings at the workplace unbearable.

Glare, mirror effect and annoying reflections on computer screens detract the employees during their work, make them tired quickly and cause headaches or tension due to cramped sitting position. This leads to an increased rate of errors and rising costs due to absenteeism.

MULTIFILM® sun and glare protection systems made of highly reflective polyester film provide a remedy:

- They soften the incoming daylight and protect the surroundings against glare.
- Thanks to the film's transparency the clear view to the outside is ensured.
- They effectively ward off heat from the room and provide pleasant room temperatures.

HOW MULTIFILM® FILM ROLLER BLINDS WORK



The multi-layered film is centrally provided with an extremely **thin coating of aluminium**, facing the outside in the film roller blind.
This coating acts like a **mirror**: it **reflects** the **solar radiation** back to the outside before it can turn into heat inside the room. In this way, up to 88 %*) of the incidental solar radiation is warded off from the room which perceivably minimizes heat build-up inside the room.
Moreover, the film reliably provides protection against glare without curtailing the clear view to the outside, thanks to its transparency.

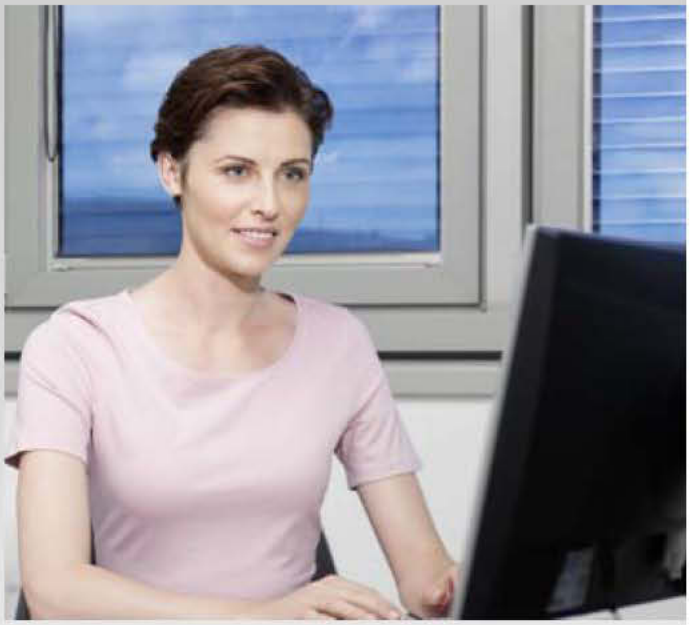
*) Film SiAt012 and sun protection glazing Sunbelt Polaris 65/34 according to the certification by the Technical University, Berlin

For health and wellbeing at workplace

Optimum glare protection

Office work often means working in front of the computer screen for hours. Ideal conditions of light and pleasant room temperatures ensure a healthy working atmosphere and enhance the employees' performance abilities. The conditions for a glare-free, relaxed working ambience are created by the film roller blinds from MULTIFILM® which:

- Soften the incidental daylight
- Reduce extremes of differences in light density
- Prevent annoying glare, mirror effects and reflections
- Provide natural room lighting with daylight
- Provide good contrast on the computer screen
- Protect the eyes
- Ensure clear view to the outside



In addition to this, the MULTIFILM® sun and glare protection systems comply with a number of statutory provisions:

- Regulation for work at Visual Display Units (VDU; EU Directive 90/270/EEC)
- Directive governing workplaces (daylight at workplace, view to the outside)
- DIN 5034-1 (daylight in interiors)
- DIN EN 14501 (performance requirements and classification of sunscreen systems)

COMPARISON OF VARIOUS SUN PROTECTION SYSTEMS AS PER DIN EN 14501

The DIN EN 14501 standard classifies the performance requirements for sun protection systems, among other things, with regard to their antiglare characteristics, visual contact to the outside and achievable g-value. In the combination of these criteria the film roller blind is superior to all other products.

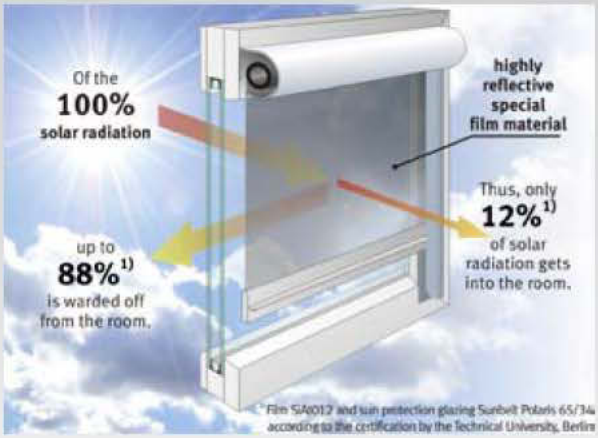
Sun protection system	g-value	Glare protection system	View to the outside	Total
Film roller blind with side guides	3	3	2	8
Fabric roller blind with side guides	2	1	1	4
Fabric roller blind without side guides	2	1	1	4
Vertical blind – fabric	2	1	0	3
Aluminium jalousie – internal (closed 90°)	2	3	0	5
Aluminium jalousie – internal (cut-off position 45°	1	0	3	4
External venetian blinds aluminium (closed 90°)	4	3	0	7
External venetian blinds aluminium (cut-off position 45°)	3	0	3	6

Thermal insulating glass (g-value 0.50; U-value 1.1 W/m²K); 0 = not complied ... 4 = fully complied

Energy savings with MULTIFILM® film roller blinds

By using film roller blinds from MULTIFILM® energy savings can be achieved throughout the year: in summer cooling energy and in winter heating energy.

SAVING COOLING ENERGY IN SUMMER



In summer, the film's aluminium coating repels the solar radiation, as in the case of a mirror, back to the outside before it can turn into heat inside the room. This perceivably minimizes heat build-up inside the room, while the temperatures inside remain pleasant.

A study on the utilization of daylight and on the thermal room atmosphere made a comparison of several interior and exterior sunscreen systems and arrived at the following findings:

- By using MULTIFILM® film roller blinds nearly 30 %*) cooling energy can be saved on a non-shaded window. As against this, fabric vertical blinds achieved only 10 %.
- In terms of energy saving potential, exterior venetian blinds have a slight edge over film roller blinds; however, they offer only 90 % availability when it comes to cutting off wind. On the other hand, interior film roller blinds are in action all through the 365 days of the year.

*) Film SiAt023 with thermal insulating glass Climaplus 1.1N
(Source: ALware)

SAVING HEATING ENERGY IN WINTER

In winter, MULTIFILM® sun and glare protection systems contribute much to save thermal energy. They improve the U-value of the glass by up to 31 %.

In this respect, film roller blinds offer triple benefits:

- The roller blind with side guides acts against the thermal loss through the window due to its insulating properties.
- The aluminium coating reflects the heat radiating from inside to the outside back into the room.
- The air cushion between the roller blind and the window perceivably reduces the thermal loss.

(Source: Fraunhofer-Institut)

Energy saving with MULTIFILM® film blinds

Improvement of g- and U-values

By using MULTIFILM® film roller blinds, the total solar energy transmittance (g-value) as well as the U-value of the window and façade can be significantly reduced. Depending on the type of film and glass, the g-value is improved by nearly 70 % and the U-value up to 31 %. Effectively, this means energy savings for cooling and heating.

Glass			*Film*	*Glass with shade film*				
Type/ structure	**g-value**	**U-value**	**Type**	**Total g-value**	**g-value improvement**	**F_c-value**	**Total U-value**	**U-value improvement**
Double **thermal insulating glass** Climaplus Ultra 1.1 N (4/16Ar/4)	0,63[4]	1,10[4]	SiAt01	0,21	67 %	0,33	0,76[1]	31 %
			SiAt02	0,26	59 %	0,41	0,76	31 %
Double **thermal insulating glass** Climaplus V 1.1 N (4/16Kr/4)	0,54[2]	1,10[4]	SiAt01	0,17[2]	69 %	0,32[2]	0,76	31 %
			SiAt02	0,25[2]	54 %	0,46[2]	0,76	31 %
			SiAt07	0,29[2]	46 %	0,54[2]	0,76	31 %
			SiWt00	0,18[2]	67 %	0,33[2]	0,76	31 %
Double sun protection glass Sunbelt Polaris 65/34 (6/16Kr/4)	0,38[2]	1,10[4]	SiAt01	0,12[2]	69 %	0,31[2]	0,84	24 %
			SiAt02	0,14[2]	63 %	0,37[2]	0,85	23 %
Triple **thermal insulating glass** (6/12Kr/4/12Kr/6)	0,43	0,51	SiAt01	0,26	40 %	0,60	0,44	14 %
			SiAt02	0,28	35 %	0,65	0,44	14 %
Triple **sun protection and thermal insulating glass** Solawer Neutral STW 12 VSG (10/12Ar/6/12Ar/6)	0,27[4]	0,70[4]	SiAt01	0,17[3]	37 %	0,63	0,57	19 %
			SiAt02	0,18[3]	33 %	0,67	0,58	17 %
Triple **thermal insulating glass** (4/16Ar/4/16Ar/4)	0,48	0,70	SiAt01	0,28	42 %	0,58	0,58	17 %
			SiAt02	0,30	37 %	0,63	0,59	16 %

[1] Fraunhofer-Institut for building physics, Stuttgart; [2] Technical University, Berlin; [3] Institute for Windowing, Rosenheim; [4] Manufacturer's details; All other values: calculations

Savings on cooling and heating energy

To what extent power savings for cooling and heating can actually be achieved with MULTIFILM® film blinds has been investigated on the basis of a calculation model.[1]

THE APPROACH

- Estimation of annual power requirement for a non-shaded office space and comparison with that of a shaded room
- Comparison of four different sun protection systems

BASIC DATA

- Office space (19.4 m²) with 2 persons and 2 PCs
- Window (5.4 m²) facing the south and thermal insulating glass according to DIN EN 14501-C (g-value: 59 %; U-value: 1.2 W/m²K)
- Rated temperature: between 20 and 26 °C
- Geographical location: Munich
- Period of study: 1 year

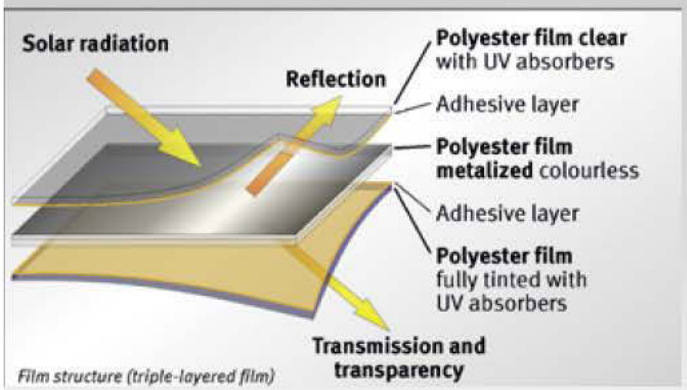
RESULTS

- By using film roller blinds, **37 % energy savings on cooling and heating** can be achieved as against a non-shaded window. The film roller blind takes up the top position among comparable systems.
- The F_c-value of the studied film-glass combination is at 0.44. This corresponds to energy efficiency class 2 ("high").[2]

Sun protection system	**Roller blind**	**Roller blind**	**Venetian blind**	**Venetian blind**
Position	internal	internal	internal	external
Hangings	film SiAt01	fabric Verosafe 12.228/1	horizontal slats Turnils 17 Aluminium blank	aluminium slats
Remarks	side guides	without side guides	vertical blinds in cut-off position	vertical blinds in cut-off position
Total U-value	0,89	1,11	1,17	
Total g-value	0,26	0,41	0,51	
F_c-value	0,44	0,70	0,86	
Total cooling and heating energy requirement without sun protection in kWh	998	998	998	998
Total cooling and heating energy requirement with sun protection in kWh	625	775	845	670
Total cooling and heating energy savings with sun protection in %	37	23	15	33

[1] Computations done with software application Parasol, V 6.6, University Lund/Sweden [2] According to energy efficiency classification by association of internal sunscreen (ViS)

MULTIFILM® shade films



Film structure (triple-layered film)

Structure

MULTIFILM® shade films consist of a **double or mostly triple-layered polyester film.** In the case of triple-layered films, the third layer provides much higher stability of the film in the system. Due to the aluminium coating they are **highly reflective.**
The films differ in their thickness, the strength of the aluminium coating, the colour and in the photometric properties.

Film conditioning

By means of further processing the raw films of MULTIFILM® are better conditioned.

THERMAL FLAT- EMBOSSING

By this unique embossing method the film receives a close-textured impression. This provides:

- High resistance against mechanical stresses (e.g. scratches)
- Diffused light dispersal into the room
- Reduction of reflection to outside
- Preservation of excellent transparency

MULTIWAVE® PLEATING

In order to further improve the films visually, the flat embossing is followed by a patented MULTIWAVE® pleating to render:

- Soft arched pleating
- A harmonious internal and external view and a high surface stability of the film
- Freely selectable fold distance of the MULTIWAVE® pleats between 30 and 100 mm
- Pleating up to 3 m film width by which shading of large format façade elements is possible with just a single system (Film-Façade-System).

FILM WELDING

- Special joining method by ultrasonic welding for super-strong adhesion of individual film pieces up to a format of 3 x 8 m
- This enables shading of large surface glazing with just a single system
- Inconspicuous, fully resilient seam

MULTIFILM® shade films

Film conditioning

MULTIDECOR SCREEN+

The innovative method of full surface film colouring sets new standards in sun protection systems: it combines protection against heat and glare effectively with decorative chic.
Roller blinds with MULTIDECOR film in pleasing designs and colours are the eye-catching element that makes any office space alluring.
The choice is vast: decors are available ranging from modern to classic in various colour renditions and structures, including a wide range of plain colours. Also individualized motifs, such as company logos or photos can be implemented.

Yet, MULTIDECOR Screen+ has not only visual advantages:

- The colouring is 100 % abrasion-resistant and highly light-fast.
- The film's transparency and, thus, the clear view to the outside remains unaffected.
- The excellent reflection-values and properties of heat protection remain nearly unchanged.
- All other film conditioning methods like flat embossing, MULTI-WAVE® pleating or ultrasonic welding can be carried out easily.

Range of films

The range of films from MULTIFILM® offers a vast choice of various types of films in different colour renditions, number of layers, light transmission and solar reflectance.

Film	Colour outside/inside	Light transmission T_{VL}*	Solar refletance*	g-value*	Suitability in respect of		
					heat protection	glare protection	view to the outside
SiAt01	silver/anthracite	1 %	79 %	5 %	++	++	++
SiAt02	silver/anthracite	2 %	74 %	7 %	++	++	++
SiAt07	silver/anthracite	7 %	61 %	17 %	+	+	++
SiBc02	silver/bronze	2 %	75 %	8 %	++	++	++
SiBc09	silver/bronze	9 %	59 %	19 %	+	o	++
SiSi02	silver/silver	2 %	79 %	9 %	++	o	+
SiSi18	silver/silver	16 %	67 %	18 %	+	o	++
GyGy03	grey/grey	1 %	30 %	27 %	-	++	++
GyGy07	grey/grey	7 %	17 %	40 %	-	+	++
SiBk00	silver/black	0,01 %	84 %	3 %	++	++	-
SiWt00	silver/white	0,1 %	84 %	5 %	++	++	-

*All technical specifications are subject to manufacturing related tolerances. ++ very suitable + suitable o partly suitable - not suitable

- **MULTIFILM® shade films are hardly inflammable according to ÖNORM A 3800 Part 1, non-trickling and weakly smoky.**
- All MULTIFILM® shade films provide excellent protection against UV rays at less than 1 % UV transmission.

Special quality films

Film	Explanation	Colour outside/ inside	Light transmis-sion T_{VL}*	Solar reflec-tance *	g-value*	Suitability in respect of		
						heat protection	glare protection	view to the outside
SiAt1V2 MULTIFLEX®	with 2 sections of different light trans-mission	silver/ anthracite	2 %/6 %	85 %/70 %	6 %/ 13 %	++	++	++
SiAt023SN	extra strong triple-layered film for improved surface stability	silver/ anthracite	2 %	74 %	7 %	++	++	++
GyGy033SR	film with single-side scratch resistant surface	grey/ grey	3 %	16 %	35 %	-	++	++

*All technical specifications are subject to manufacturing related tolerances. ++ very suitable + suitable o partly suitable - not suitable

Fabrics

In all MULTIFILM® products, as an alternative to film, highly efficient technical textiles of following quality can be used:

- Mainly Trevira CS fabrics
- Fire protection class B1 (“hardly inflammable”)
- High light-fastness (mainly class 5 and 6)
- Different types of coating with appropriate functionality and appearance (aluminium, nacre or polyurethane coating etc.)
- Opaque to partially transparent fabric (screen fabrics)
- 0 % to 50 % light transmission depending on the type of fabric and colour
- PVC-free (odourless) and tested for harmful substances according to OEKO-TEX Standard 100
- Partly sound-proofing and antimicrobial

Large-format draperies and panel glide curtains are tailored under conditions using the in-house cutting and stitching machines.

Fabric	Material	Thick-ness	Coating	Specifica-tion	Light transmis-sion T_{VL}*	Solar re-flectance*	Suitability in respect of		
							heat protec-tion	glare protec-tion	view to the out-side
T01SiGy11	Trevira CS	0,36 mm	aluminium	screen	11 %	50 %	+	-	o
T02SiGy08	Trevira CS	0,44 mm	aluminium	screen	8 %	51 %	+	o	o
T03SiGy07	Trevira CS	0,43 mm	aluminium	sound-absorbing	7 %	52 %	+	+	-
T08SiGy08	Trevira CS	0,20 mm	aluminium	dimout	8 %	50 %	+	o	-
T22SiGy06	Trevira CS	0,18 mm	aluminium	screen	7 %	66 %	+	+	o
T22SiGy03	Trevira CS	0,18 mm	aluminium	screen	4 %	60 %	+	++	o
T50SiGy12	Trevira CS	0,19 mm	aluminium	screen	12 %	55 %	+	-	o
T41PmGy02	Polyester	0,40 mm	pearlised	dimout	2 %	77 %	++	++	-
T27GyGy05	Polyester	0,30 mm	-	dimout	5 %	51 %	+	+	-
T26WtGy00	Polyester	0,35 mm	Acrylat	blackout	0 %	70 %	+	++	-

All fabrics comply with the fire protection class B1 (“hardly inflammable”). *All technical specifications are subject to manufacturing related tolerances.

++ very suitable + suitable o partly suitable - not suitable

Innovations & Patents – our potential

Besides constant further development of our products, the innovative power of our company is also apparent in many patents and in continuous investments in the latest technical equipment.

TECHNICAL EQUIPMENT

- Pleating machine for the patented MULTIWAVE® pleating
- Film welding machine for joining the films for producing large-format Film-Façade-Systems
- A worldwide unique flat embossing machine that is one of its kind and size

TECHNICAL INNOVATIONS AND PRODUCT DEVELEOPMENTS (SELECTION)

- Development of a technology for manufacturing large-format Film-Façade-Systems up to a size of 3x8 m
- Roller blinds Lux-Line with direction of closing from bottom to top
- Film with two light transmission levels (MULTIFLEX®)
- Roller blinds Compact-Line with very small head box (35x35 mm)
- Development of a patented pleating method to increase the film stability (MULTIWAVE® pleating)
- Patented adjustable bottom rail for extra wide roller blinds Lux-Line
- Development of a method for total area colouring of polyester film (MULTIDECOR Screen+)

GUARANTEED QUALITY

- Warranty for all products
- Quality Management according to ISO 9001:2008
- Compliance with requirements for computer workstations as per regulation for work at Visual Display Units (VDU; EU Directive 90/270/EEC)
- Member of the European Association for glare protection at Computer Workstations (EFfB)
- Above average compliance with DIN EN 14501 (performance requirements for sun protection systems) in respect of glare protection, heat protection and view to the outside

Glare-free working conditions and pleasant room temperatures

MULTIFILM® sun and glare protection systems

PRODUCT RANGE

- Film roller blinds
- Film-Façade-Systems
- Vertical blinds and panel glide systems
- Textile roller blinds

USER BENEFITS

- Custom-made systems
- Optimal protection against annoying glare and reflections on the computer screen
- Excellent protection against solar heat
- Pleasant room atmosphere and natural room lighting with daylight
- Clear view to the outside thanks to uniform transparency
- Improvement of the g- and U-value for the window and façade
- Savings on cooling and heating energy
- Variable and individualized setting option for the user
- Reduction of extreme differences in light density
- Weather-independent interior installation
- Conditioned multi-layered film in different light transmission levels, colours and designs, including highly efficient technical textiles
- For new constructions and renovations equally suitable
- All-year availability without restrictions (no wind cut-off)
- Low acquisition costs
- Mostly no maintenance and repair costs
- Tested product quality

Shading options in comparison

	Film roller blinds	Fabric roller blinds	Vertical blinds (fabric)	External venetian blinds	Internal venetian blinds
Glare protection	++	o	o	o	o
Summer solar protection	+	-	-		o
U-value improvement in winter	+	o	o	o	o
View to the outside	++	-	-	o	o
Long-term behaviour / Wear & tear	++	+	+	o	+
Daylight utilization	+	o	o	o	o
Independent of weather	++	++	++	o	++
Maintenance costs	++	++	-	o	o

++ very suitable + suitable o partly suitable - not suitable

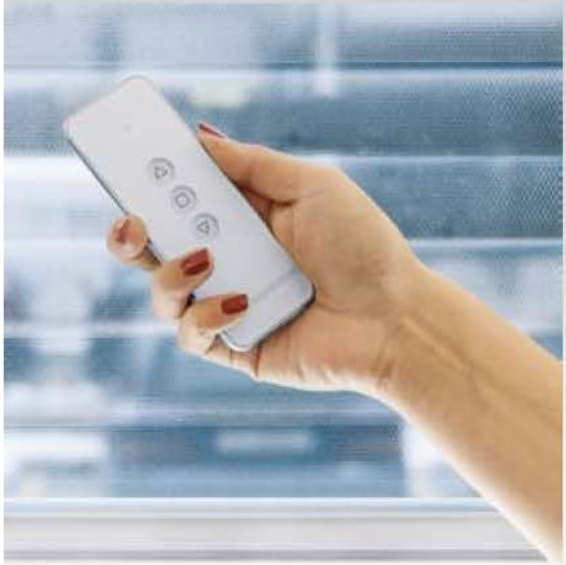
Excerpt from the AGI worksheet F20, September 2004

Film roller blinds

The product benefits of film roller blinds

- All profile components are made of stable extruded aluminium
- Closed head box with side covers
- Different side guides to guide the roller blind at the window and to cover the lateral light gaps
- All visible profile parts with RAL powder coating on request
- Manual or electrical operation

Classic-Line Classically versatile



PRODUCT PROPERTIES

- Most varied product group in terms of operation, hanging material, window geometry and window inclination
- Wide choice of side guides, blinds and bottom rails

USE

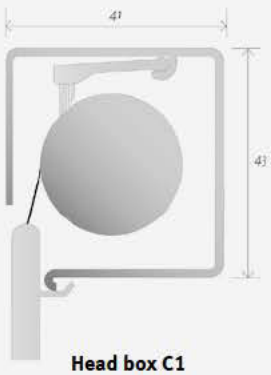
- Industrial, commercial, administrative and private buildings

OPERATION AND DRIVE VARIANTS

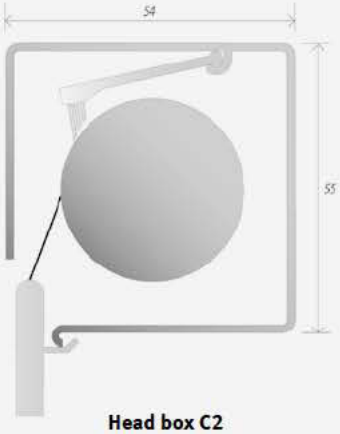
- Manual: chain loop, Multi Stop, spring traction
- Electrical: 24 V motor, rechargeable battery motor, BUS-capable SMI motor

HEAD BOX TYPES

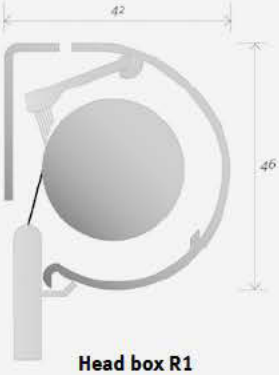
- Invisible opening on window side for rear ventilation
- For taking up the winding tube with the film, the drive system and the cleaning brush
- Acts as stopper to limit the top position of the blinds



Head box C1



Head box C2



Head box R1

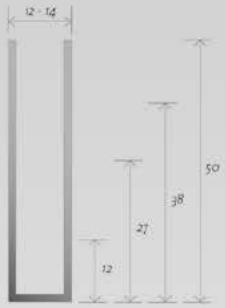
Film roller blinds

Classic-Line

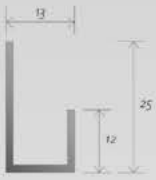
SIDE GUIDES

- Optimal lateral guide for the film and the bottom rail with plastic gliders
- For covering the lateral light gaps
- For protection of the film edges against damage

Different U-side guides

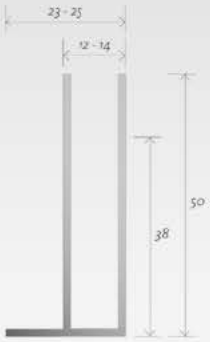


U 12, U 27, U 38, U 50



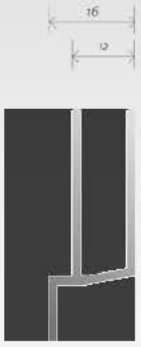
U 12/25

Side guides for installation into frame

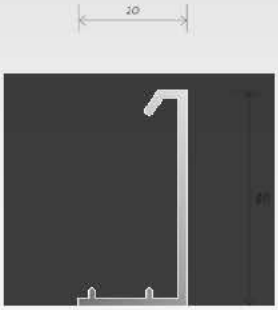


UL 38, UL 50

Side guides for special applications



Y 32



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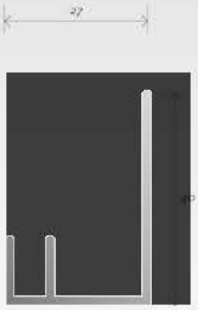


DF 4

MAXIMUM SIZES

	Element width	Element height	Element height
		chain loop	electrical
Head box C1, R1	1,500 mm	3,400 mm	2,300 mm
Head box C2	2,200 mm	3,400 mm	3,400 mm

Element height depend on the type of film, MULTIWAVE® pleating and pleat distance.

Classic-Line with round head box

Rounded side guides

Cleaning brush

Lux-Line The roller blind from bottom to top

PRODUCT PROPERTIES

- Closing direction from bottom to top
- Patented bottom rail
- Enables daylight utilization in the window's top area and at the same time glare protection at eye level

USE

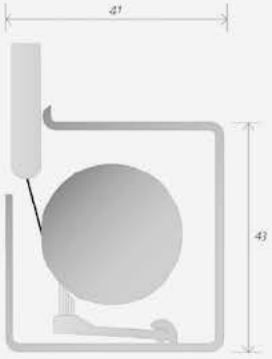
- Narrow, high or non-rectangular windows
- Inclined and horizontal windows

OPERATION AND DRIVE VARIANTS

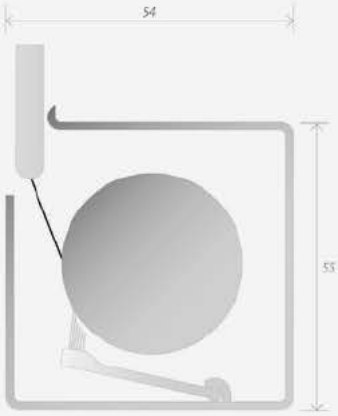
- Chain loop
- Pull cord

HEAD BOX TYPES

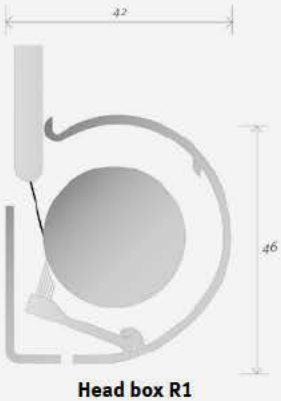
- Invisible opening on window side for rear ventilation
- For taking up the winding tube with the film, the drive system and the cleaning brush
- Acts as stopper to limit the top position of the blinds



Head box C1



Head box C2



Head box R1

Film roller blinds

Lux-Line

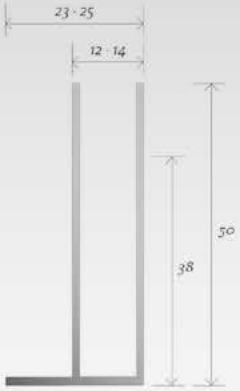
SIDE GUIDES

- Optimal lateral guide for the film and the bottom rail with plastic gliders
- For covering the lateral light gaps
- For protection of the film edges against damage

Different U-side guides

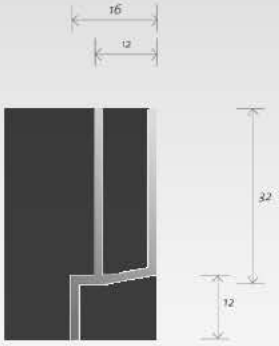
U 27, U 38, U 50

Side guides for installation into frame



UL 38 , UL 50

Side guides for special applications



Y 32

All dimensions in mm

MAXIMUM SIZES

	Width	Height
Head box C1, R1	1,500 mm	2,000 mm
Head box C2	2,200 mm	3,400 mm

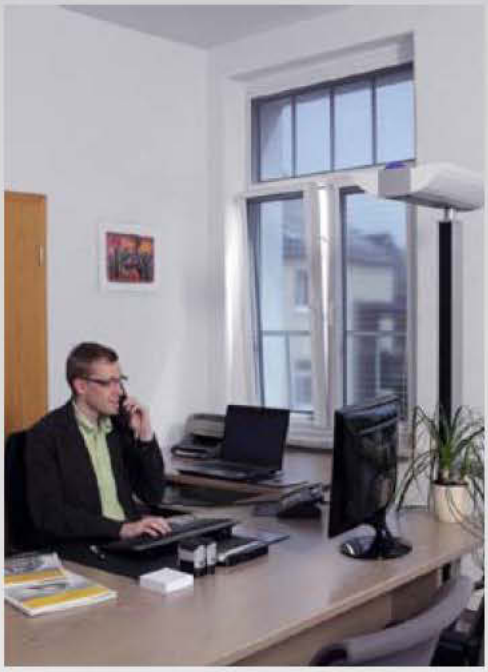
Element height depends on type of film, MULTIWAVE® pleating and pleat distance.

Cord lock

All visible profile parts available in RAL

C1 head box, Lux-Line chain loop

Compact-Line Smart and ideal



PRODUCT PROPERTIES

- Particularly small head box (35 x 35 mm)
- Different side guides available
- Quick and easy to install

USE

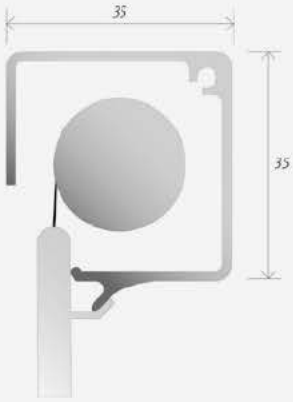
- Preferably in the object area

OPERATION VARIANTS

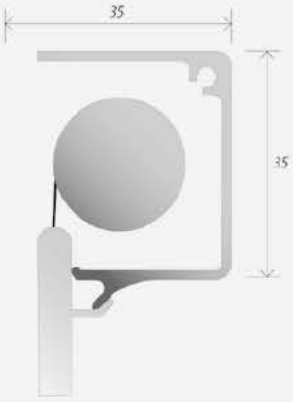
- Chain loop

HEAD BOX TYPES

- Invisible opening on window side for rear ventilation
- For taking up the winding tube with the film and the drive system
- Acts as a stopper to limit the top position of the blinds



Head box CO closed (installation into frame)



Head box CO open (installation on the frame)

Film roller blinds

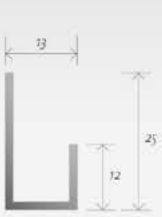
Compact-Line

SIDE GUIDES

- Optimal lateral guide for the film and the bottom rail with plastic gliders
- For covering the lateral light gaps
- For protection of the film edges against damage

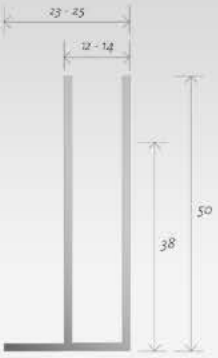
Different U-side guides

U 12, U 27, U 38 , U 50



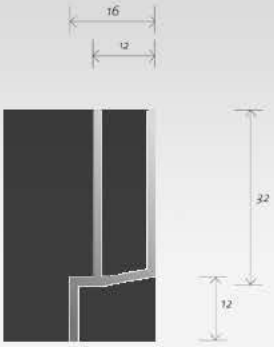
U 12/25

Side guides for installation into frame



UL 38, UL 50

Side guides for special applications



Y 32

All dimensions in mm

MAXIMUM SIZES

Width	Height
1,500 mm	3,400 mm

Element height depends on type of film, MULTIWAVE® pleating and pleat distance.

Opposite pull blinds

Effective for inclined and horizontal glazing

PRODUCT PROPERTIES

- System comprising two opposing blinds: spring-loaded roller blind and electrical counter traction
- Roller blind is always tight due to spring tension – inclined and horizontal installation positions realisable without problems

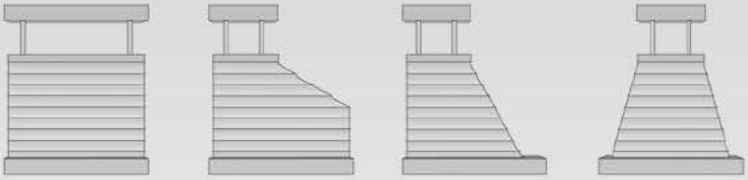
USE

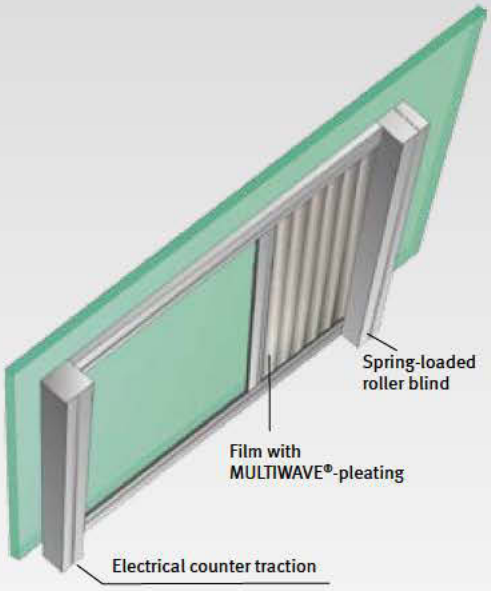
- Sloped glazing types
- Light dome and bands
- Winter gardens
- Atria

OPERATION AND DRIVE VARIANTS

- Electrical: 24 V motor, battery powered transmitter motor, BUS capable SMI motor

VARIANTS

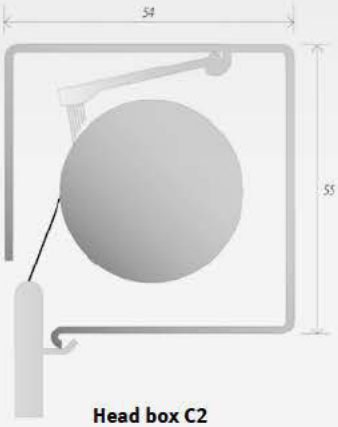




MAXIMUM SIZES

Width	Height
2,200 mm	3,400 mm

Element height depends on type of film, MULTIWAVE® pleating and pleat distance.



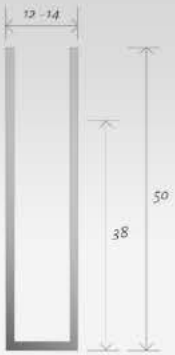
Head box C2

Film roller blinds

SIDE GUIDES

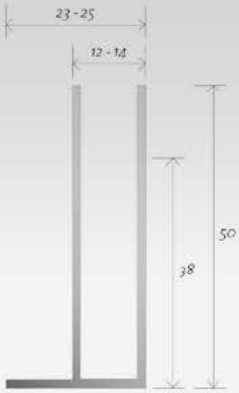
- Optimal lateral guide for the film and the bottom rail with plastic gliders
- For covering the lateral light gaps
- For protection of the film edges against damage

Different U-side guides



U 38, U 50

Side guides for installation into frame



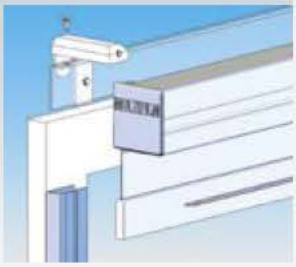
UL 38, UL 50

All dimensions in mm

Installation variants for all types of roller blinds

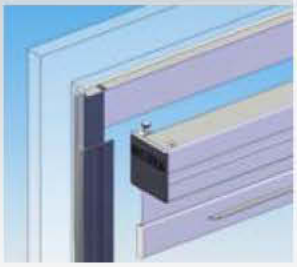
- Screw-fitting on the frame

- Installation with clamps on the frame (no drilling)



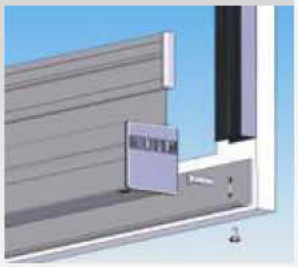
- Adhesive installation on the frame (no drilling)

- Adhesive installation into frame (no drilling)

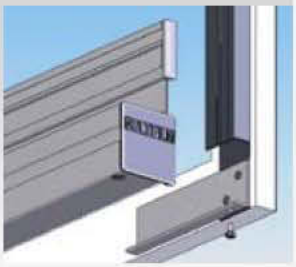


Suitable for product line Classic-Line

- Screw-fitting on the frame

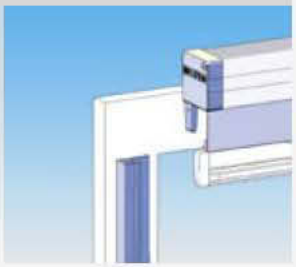


- Adhesive installation on or into frame (no drilling)



Suitable for product line Lux-Line

- Adhesive installation on or into frame (no drilling)



Suitable for product line Compact-Line

Film roller blinds in practice

Giesecke & Devrient GmbH, Munich

Technology Centre of the international system provider for telecommunications, electronic payment transactions, registration and identification, including banknote processing

SYSTEM REQUIREMENTS

- Effective and inconspicuous sun and glare protection for presentation rooms
- Homogeneous interior and exterior view
- Glass surface of each window to be shaded: 1,250 x 3,400 mm

TECHNICAL REALISATION

- Installation of nearly 300 film roller blinds of the type Classic-Line
- Aesthetic interior and exterior view thanks to MULTIWAVE® pleating
- Triple-layered film for high surface stability
- Use of a silver-anthracite coloured film with 2 % light transmission
- Electrical KNX-BUS control system

Karstadt department store, Stuttgart

Wide surfaced glazing is not only the method of choice in office buildings when it comes to maximum utilization of daylight. In the Karstadt department store in Stuttgart's Koenigstrasse large glass frontages and a glass dome roof flood the shopping rooms with daylight. In the course of its renovation work, the glass roof was completely refurbished and the existing external shade replaced by internal sun protection systems from MULTIFILM®.

SYSTEM REQUIREMENTS

- Effective thermal insulation and antiglare system for the glass dome roof (35 x 13 m)
- Screw-less installation of fixtures to arched double T-beam construction
- Aesthetic interior view

TECHNICAL REALISATION

- Use of MULTIFILM® opposite pull blinds: spring-loaded roller blind with opposing electrical counter traction
- Installation of 80 electrical opposite pull blinds (1,700 x 2,200 mm) to arched glass dome roof
- Automatic control of the blinds from the building utilities management
- Use of a triple-layered film with MULTIWAVE® pleating for more surface stability for the inclined blinds
- Use of a highly efficient heat protection film with 74 % solar reflectance
- Development of a sub-structure for holding the head box, the side guides and additional supporting shafts
- Subdivision of hangings into segments for creating a ceiling like visual effect

Film roller blinds in practice

Office complexes “Le Dôme” and “Îlot A”, Luxembourg City

The office complexes of “Îlot A” and “Le Dôme” are captivating due to their imposing architecture and most modern interior decoration. “Le Dôme“ has more than 21,000 m² of utility area which has been planned to become an “Open Office”. The floors can be divided flexibly and individually into single and open plan offices.

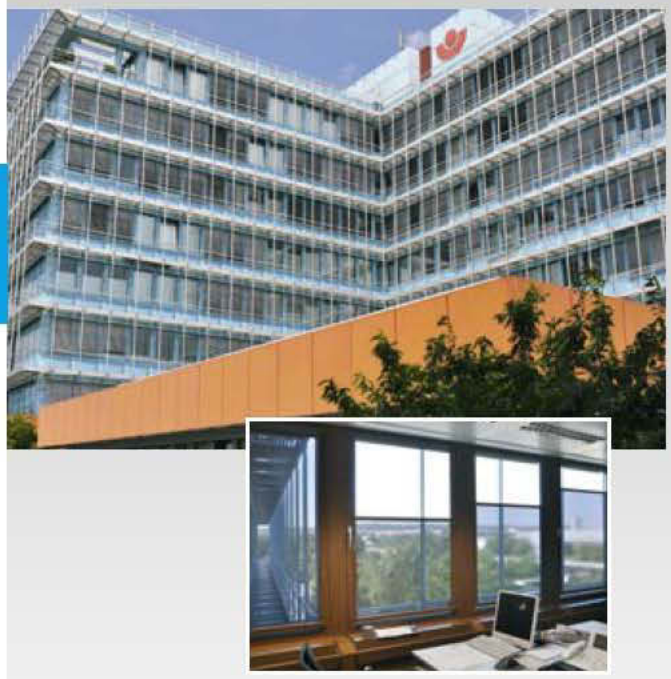
SYSTEM REQUIREMENTS

- Internal, individually adjustable sun and glare protection systems
- Electrical operation following inconspicuous integration of installations and cable routing
- Clear view to the outside
- Inconspicuous appearance on the office windows

TECHNICAL REALISATION

- Installation of nearly 1,000 film roller blinds each of the type Classic-Line with motor
- Use of a multi-layered silver-grey coloured film with 2 % light transmission
- Rerouting the cable exits on the blind’s rear or top side (Îlot A)
- Power transmission through contact bridge in all tilt and turn sashes in order to ensure cable-free power transmission to the closed window (Îlot A)

Employer’s Liability Insurance Association Metal North South, Mainz



The Employer’s Liability Insurance Metal North South with headquarters in Mainz is one of more than 20 employer’s insurance organizations in Germany. By law, it covers the liability for nearly 96,000 companies in the metal processing industries in many parts of northern and southern Germany and, thus, handles insurance policies of more than 2.7 million workers.

SYSTEM REQUIREMENTS

- Optimal antiglare system at computer workstations
- Clear view to the outside
- Window surface of about 1,000 x 2,500 mm to be shaded

TECHNICAL REALISATION

- Installation of nearly 900 film roller blinds of the type Lux-Line
- Customer-specific solution for installation
- Use of a multi-layered silver-anthracite coloured film with 7 % light transmission
- Aesthetic interior and exterior view thanks to MULTIWAVE® pleating

Brahms Kontor, Hamburg

The heritage-protected building ensemble is a remarkable part of Hamburg's skyline. The Brahms Kontor was Germany's first steel frame construction in the style of American skyscrapers. In 2005, the building was completely gutted and elaborately renovated. The resulting office spaces have the latest equipment and pleasant room atmosphere.

SYSTEM REQUIREMENTS

- Internal antiglare system at computer workstations
- Electrical operability
- Clear view to the outside
- Hardly inflammable material as per DIN EN 13501-1
- Installation of roller blinds between double-paned glazing into lateral guiding slots

TECHNICAL REALISATION

- Fabrication of an object-related bottom rail
- Customer-specific special solution for installation and for the interfacing to electrical drive
- Installation of nearly 1,400 film roller blinds of the type Econo- Line with motor
- Integration of the systems between double-paned glazing
- Use of a hardly inflammable film with fire protection classification B-s1, d0

Centre for Virtual Engineering (ZVE), Stuttgart

The working human being is in the centre of the research work at the Fraunhofer-Institut for industrial engineering and organization IAO in Stuttgart. The institute's new building, the Centre for Virtual Engineering (ZVE), is captivating due to its impressive look and its equipment with future-oriented labs and offices. Here, the scientists work on new solutions for the departments of innovative work organization, mobility in the future, visual technologies and digital engineering.

SYSTEM REQUIREMENTS

- Internal antiglare system at computer workstations
- Excellent view to the outside
- Inconspicuous appearance on windows
- No impairments to the façade view

TECHNICAL REALISATION

- Installation of 250 film roller blinds without head box into the ceiling
- Fabrication of a ceiling installation section for taking up the roller blind
- Use of a subtle grey antiglare film with colour-neutral outside for nearly invisible appearance on the façade
- Automatic control of the blinds through building utilities management

Film-Façade-Systems

Shade in the XXL format

Especially for shading large-surfaced glazing, Film-Façade-Systems have been developed. Surfaces up to 3 m width and 8 m height can be shaded with a single system. Single roller blinds installed next to each other are, thus, a thing of the past.

PRODUCT PROPERTIES

- Single films are joined together using ultrasonic welding technology into elements of maximum dimensions of 3 x 8 m
- Use of an extra strong triple-layered film with high surface stability which is additionally flat embossed and MULTI-WAVE® pleated.
- All profile components made of stable extruded aluminium
- All visible profile parts available RAL powder coated on request
- Inconspicuous integration of mechanism and sections into the façade construction

USE

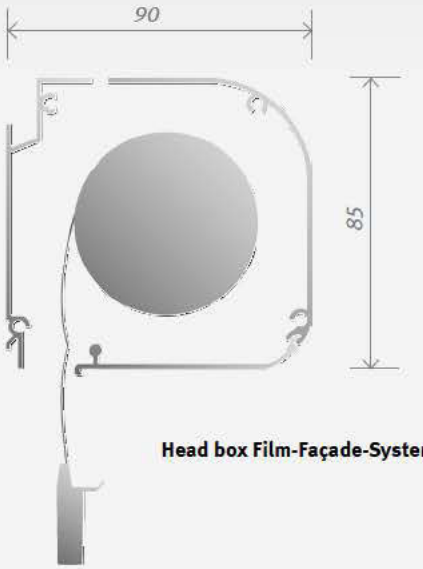
- In buildings with large surfaced glazing

OPERATING AND DRIVE VARIANTS

- Manual: chain loop, crank handle
- Electrical: 230 V motor

HEAD BOX

- Stable aluminium blind with viewing flap
- For taking up the winding tube with the film and the drive system
- Acts as a stopper to limit the top position of the blinds

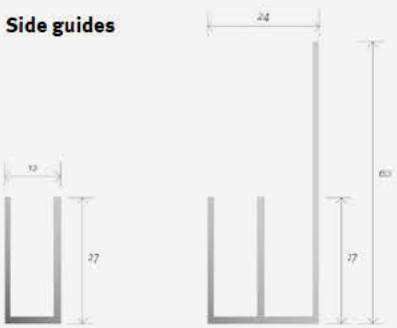


Head box Film-Façade-System

SIDE GUIDES

- Optimal lateral guide for the film and the bottom rail with plastic gliders
- For covering the lateral light gaps
- For protection of the film edges against damage

Side guides



U 27 **E 60/27**

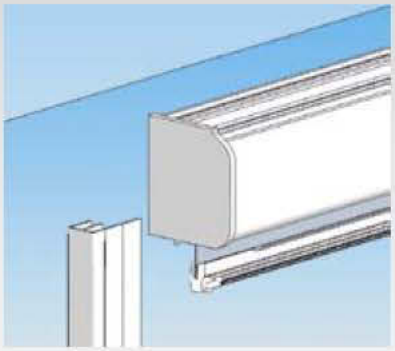
MAXIMUM SIZES

- 3,000 x 8,000 mm (width x height)

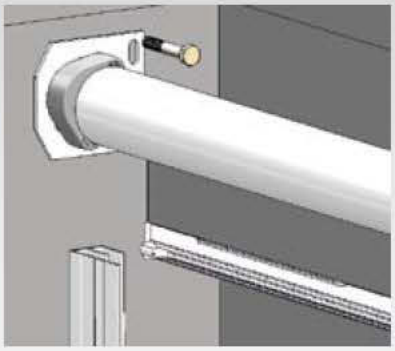
All dimensions in mm

Installation variants

- Screw fitting (wall/ceiling/corner)



- By use of mounting bracket into the façade



For XXL glare protection:
Film-Façade-Systems with sizes up to
3 m width and 8 m height

Film-Façade-Systems in practice

Daimler Van Technology Center, Stuttgart-Untertuerkheim

The Daimler Van Technology Center (VTC) combines since 2004 several functions of the business division for vans which till then were spread across many locations. With its elliptical shape and glass façade the building shows an emerging and dynamic structure.

SYSTEM REQUIREMENTS

- Internal sun and glare protection at more than 1,000 computer workstations
- Individualized regulation of the daylight incidence
- Integration of the mechanism and the side guides into the façade construction

TECHNICAL REALISATION

- Installation of more than 1,000 Film-Façade-Systems (2,500 x 2,650 mm) in vertical and inclinded installation position
- Use of a MULTIWAVE® pleated, triple-layered film with 2 % light transmission
- Systems electrically operable and integrated into BUS control system
- Nearly invisible integration of the systems into the post-and-beam construction of the façade

Control Tower, London Heathrow Airport

With more than 70 million passengers annually, London Heathrow is Europe's largest airport. Every year nearly 500,000 take-offs and landings are coordinated from the completely glazed platform of the Control Tower. The platform's glass surfaces are about 11 m high and are inclined outwards by several degrees.

SYSTEM REQUIREMENTS

- Reliable glare protection for the Tower's inclined, trapezoid glass surfaces
- Absolutely clear and distortion-free view of the airfield and the air space
- Electrical operation
- Exact positioning of the horizontal joining seams to achieve minimum interference of the open view

TECHNICAL REALISATION

- 48 trapezoid Film-Façade-Systems with electrical operation in dimensions up to 2,500 x 5,500 mm
- Lateral guiding through steel cords
- Bottom rail with both sides telescopic pullout for balancing the width difference in the windows when operating the Façade-Systems
- Fusion of 4 individual films each per installation by using a special ultrasonic welding process
- Use of a two-sided grey, outwards non-reflective film with 7 % light transmission
- Film of a non-embossed quality to ensure absolute clear and distortion-free view of the airfield

Woonconcept, Meppel (Netherlands)

The Woonconcept Company builds, leases and sells residential units to meet varying demands of the people. Besides its imposing architecture, the prestigious new construction at Meppel stands out due to its large glazing.

SYSTEM REQUIREMENTS

- Effective glare and heat protection
- Shading large format window surfaces
- Harmonious and subtle merging with the exterior view of the building
- Free view to the outside

TECHNICAL REALISATION

- Installation of totally 160 film roller blinds of the type Classic-Line, manually operable and Film-Façade-Systems (1,600 x 6,000 mm) with electrical operation and remote control
- Use of a MULTIWAVE® pleated silver-anthracite coloured film with 2 % light transmission

European Court of Justice, Luxembourg-city

The Palais de Justice was built in 1972 and has been since extended several times. The hitherto first extension involved the expansion of the existing structure and the new building of two office towers. A ring built on 14 m high stilts comprising offices now surrounds the Palais. The new façade consists of vertically arranged glass elements that give the building a modern look and at the same time protect the space behind it against overheating. Not far from the Palais two office towers of 100 m each have come up with 24,000 m² floor-space.
The towers received a golden hood made of anodized aluminium fabric which was installed between two glass panes likewise into golden frames. The fabric has a specific zigzag splay that renders a visual depth to the façade and artfully accentuates the light. Moreover, the fabric provides sunscreen and is still translucent and permeable to air.

SYSTEM REQUIREMENTS

- Internal glare protection
- Adjustment of the antiglare systems to the installation conditions on site (installation behind the suspended ceiling)
- Observance of grid positions of the offices which were conceived as “Open Office”

TECHNICAL REALISATION

- Installation of more than 1,000 Film-Façade-Systems with partly divided blinds, i.e. on a tube two blinds were placed in order to ensure the variability of the “Open Office”
- System dimensions of 1,000 x 3,000 mm to 2,400 x 3,500 mm
- Use of a triple-layered both sides grey film with 1 % light transmission
- Individually electrical operation through individual control or centrally through BUS control system

Vertical blinds and panel glide systems

Large glass surfaces stylishly shaded

Light-flooded rooms with large window frontages need efficient shading systems. Vertical blinds and panel glide systems are particularly suitable for this. Regardless of whether conference room or foyer – the blinds offer excellent protection against the sun's heat, ensure pleasant light absorption and reduce extremes of differences in light density. Thanks to the transparent film, the view to the outside is preserved.

Vertical blinds

PRODUCT PROPERTIES

- High stability due to flat embossed and MULTIWAVE® pleated film
- No disturbing light gaps thanks to adequate overlapping of the slats
- Individual arrangement and designing possibilities
- Refurbishment of existing installations with film slats possible
- Fixing of slats by using a clip system
- Shading of inclined or arched window surfaces is possible
- Rails and fixtures as standard in white (RAL 9016) or anodized, with RAL powder coating on request

OPERATING AND DRIVE VARIANTS

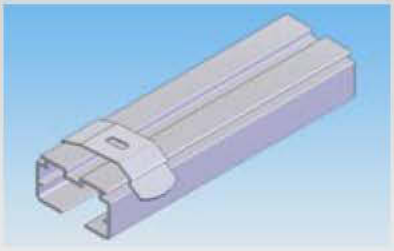
- Manual: chain loop, pull cord
- Electrical: motor drive 230 V

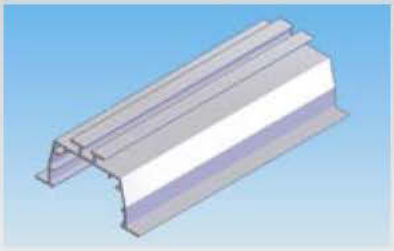
USE

- In industrial, commercial and administrative buildings, especially in conference rooms and foyers

INSTALLATION VARIANTS

- By use of ceiling beams in the ceiling
- By use of wall brackets on the wall
- Integration into suspended ceiling by recessed ceiling housing



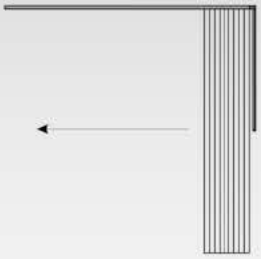


MAXIMUM SIZES

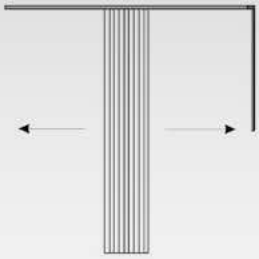
- 6,000 x 3,500 mm (width x height)
- Slat width: 89 or 127 mm

Vertical blinds

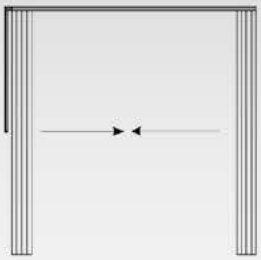
ARRANGEMENT POSSIBILITIES



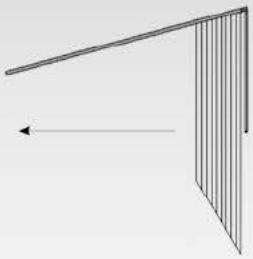
Variant A
Single-sided bundle, right or left, operation right or left



Variant B
Central bundle



Variant C
Divided bundle



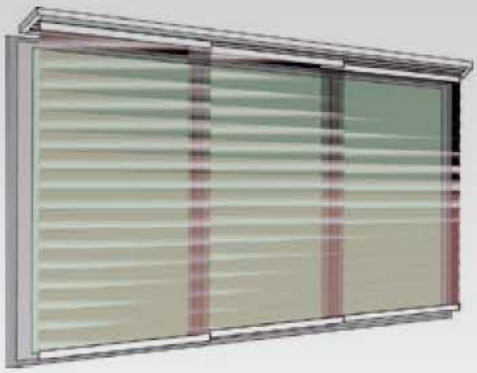
Variant D
Slope curtain, packet always right or left top

Panel glide curtains

PRODUCT PROPERTIES

- High stability due to flat embossed and MULTIWAVE® pleated film
- No disturbing light gaps thanks to adequate panel overlapping
- Individual arrangement and designing possibilities
- Different panel widths in one system possible
- Optionally panels can be coupled or are freely movable
- By coupling individual installations varying possibilities of arrangement and large system widths available
- Aluminium rod at the top and bottom closures
- Suitable for curved tracks
- Rails and fixtures as standard in white (RAL 9010), anodized or with RAL powder coating on request

Panel glide systems



USE

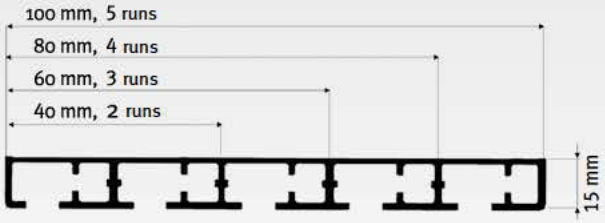
- In industrial, commercial and administrative buildings
- For flexible shading of very large glass surfaces and glass surfaces with wall separations
- Use as variable room partitioning systems

OPERATING AND DRIVE VARIANTS

- Lateral pull cord
- Operating rod

MAXIMUM SIZE

- Width: 12 m (pull cord); unlimited (operating rod)
- Width of the single panel: up to 3 m
- Height: 3.50 m
- 10 runs per curtain

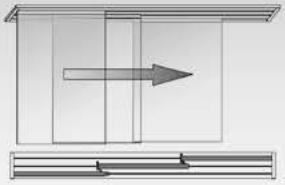


INSTALLATION VARIANTS

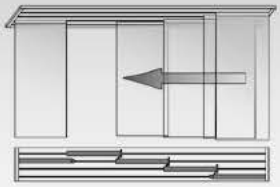
- By use of ceiling beams in the ceiling

- By use of wall brackets on the wall

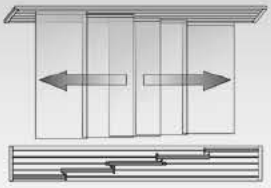
ARRANGEMENT POSSIBILITIES (CHOICE)



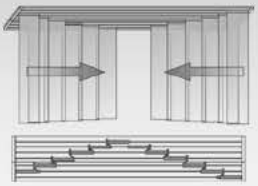
3 runs, single-sided, bundle left, one fixed panel



4 runs, single-sided, bundle right, two fixed panels



5 runs, central bundle, one fixed panel



7 runs (rails with 3 and 4 runs coupled), double-sided, two fixed panels

Vertical blinds and panel glide systems in practice

BAWAG P.S.K., Vienna

BAWAG P.S.K. (Bank for Work and Business and Austrian Postal Savings Bank) is one of the leading Austrian Universal Banks. The state-of-the-art office centre of the general financing concern reflects the open structures and the modernity of the company.

SYSTEM REQUIREMENTS

- Effective supplement to the already existing external shading
- Subtle and harmonious integration into the open and wide view of the outside
- Clear view to the outside
- Antiglare system at computer workstations

TECHNICAL REALISATION

- Installation of vertical blinds and film roller blinds (total number nearly 2,200)
- Use of a multi-layered silver-anthracite coloured film with 2 % light transmission
- Arched MULTIWAVE® pleating of films for a calm and aesthetic interior and exterior view

MAN Nutzfahrzeuge AG, Munich

MAN Nutzfahrzeuge AG, a manufacturer of utility vehicles, is one of the leading providers in the international vehicle industry. The company's broad-based product range includes trucks, long distance busses and special purpose vehicles as well as motors and components.

SYSTEM REQUIREMENTS

- Inconspicuous glare protection at computer workstations
- Subtle and harmonious integration into the post and beam construction of the façade

TECHNICAL REALISATION

- Installation of 600 running meter panel glide systems of which 50 running meters on arched rails
- Panel material: screen fabric
- Flexible arrangement of antiglare system through freely movable panels possible

INTERRA, Joure (Netherlands)

The headquarters of the engineering architecture's office INTERRA captures one's attention immediately due to its extraordinary design and colour including its location directly at the waterfront. Moreover, the futuristic new construction shows large glass surfaces.

SYSTEM REQUIREMENTS

- Optimum glare protection at computer workstations utilizing daylight
- Underlining the building's futuristic character without affecting the exterior view
- Prestigious, individualized solution
- Clear view to the outside

TECHNICAL REALISATION

- Installation of 10 slope panel glide systems to match with the shape of the external façade
- Use of a silver-anthracite coloured film with 2 % light transmission
- Aesthetic and calm façade view through arched MULTI-WAVE® pleating

Technical University of Saxony's Administration, Meissen

At the Technical University of Saxony's Administration at Meissen (FHSV) the next generation youth is trained for the higher non-technical services to be commissioned in Saxony's public administration and judiciary.

SYSTEM REQUIREMENTS

- Internal glare protection utilizing daylight in offices, lecture halls and conference rooms
- Shading large window surfaces with individual arrangement possibilities (conference rooms)
- Clear view to the outside
- Use of a film that complies with the requirements of fire protection class B1 ("hardly inflammable")

TECHNICAL REALISATION

- Installation of panel glide systems with freely movable panels in the conference rooms and about 400 film blinds of type Compact-Line in the office and lecture rooms
- Subtle visual appearance of the blinds thanks to minimal blind dimensions (35 x 35 mm) and powder coating for all visible profile parts in the colour of the window
- Use of a hardly inflammable, double-layered silver-anthracite coloured film with 2 % light transmission
- Aesthetic and calm view of the façade due to arched MULTIWAVE® pleating

E-Mail Fabrik, Amberg

REFERENCES

GERMANY | Airbus, Hamburg | AOK, Berlin | Arcor, Stuttgart | Ausländerbehörde, Hamburg | BASF, Ludwigshafen | Bayerischer Rundfunk, München | Bayerisches Rotes Kreuz, Augsburg | Berliner Congress Center, Berlin | Berufsgenossenschaft Metall Nord Süd, Mainz | Biomedizinisches Forschungszentrum Seltersberg, Gießen | Blohm + Voss, Hamburg | Daimler VAN Technology Center, Stuttgart | Delphi, Wuppertal | Der Spiegel, Hamburg | Deutscher Wetterdienst, München | Deutsches Institut für Normung (DIN), Berlin | Deutsches Museum, München | Du Pont, Hamm | EnBW-City, Stuttgart | Eurocopter Deutschland, Donauwörth | Europäisches Patentamt, München | Finanzamt Erding, Erding | Flughäfen Schönefeld und Tegel, Berlin | Fraport AG, Frankfurt/Main | Giesecke & Devrient, München | Hafencity Sandtorkai, Hamburg | HUK-Coburg, Berlin | Infraserv, Frankfurt | Karstadt Warenhaus, Stuttgart | Lufthansa City Line, Flughafen Köln-Bonn | Luft- und Raumfahrtzentrum, Berlin | Main-Kinzig-Forum, Gelnhausen | Mainova AG, Frankfurt | MAN, München | MID, Nürnberg | NRW Bank, Düsseldorf | ORACLE Deutschland, Potsdam | PCI, Hamm | Q-Cells, Bitterfeld-Wolfen | RHEINZINK, Datteln | Rienecker Protonen Therapiecenter, München | Schwarzkopf Henkel, Viersen | Stadtsparkasse, Köln | Stadtwerke Bochum | Stadtwerke Unna | Thyssen-Krupp, Essen | TU München, Weihenstephan, München | Universität Hohenheim, Hohenheim | Wirtschaftsbehörde, Hamburg | Zentrum für virtuelles Engineering (ZVE), Stuttgart

NETHERLANDS | Albert Heijn, Zaandam | De Friesland, Leeuwarden | Facilicom, Schiedam | FNV Bouw, Woerden | Gemeentehuis, Dordrecht | Gemeentehuis, Oudenbosch | Havendienst, Rotterdam | Interra, Joure | Luchtverkeersleiding Schiphol, Amsterdam | Nehalennia, Middelburg | Organon, Oss | ROC Leeuwarden | RUG, Groningen | Sandoz, Almere | Stadsdeelraad Noord, Amsterdam | Tweede Kamer, Den Haag | Universiteit, Amsterdam | Woonconcept, Meppel

LUXEMBOURG | Cour De Justice, Espace Pétrusse-Îlot A, Luxemburg-Stadt | Espace Pétrusse-Le Dôme, Luxemburg-Stadt

FRANCE | Banque de France, Paris | EBP, Rambouillet | Mairie de Paris, Paris | Ministere de l´ Économie et des Finances, Paris | Onisep, Paris | Pierre et Vacances, Paris | Price Water, Versailles | Universal Music, Antony

GREAT BRITAIN | B&Q, Southampton I London Heathrow Airport, London

AUSTRIA | BAWAG P.S.K., Wien | Bosch, Wien | Hellerpark, Wien | Klingerpark, Gumpoldskirchen | Millenium Tower, Wien | Nordbahnhof, Wien | Paketzentrum Post, Wien | TPA Zentrum, Graz

SWITZERLAND | Arbonia Forster, Arbon | Bahnmatt, Baar | Bundesamt für Bauten und Logistik (BBL), Bern | Haco AG, Gümligen | InfraPost AG, Basel | Marti Schweiz AG, Moosseedorf | Post-Finance, Bern | SIA-Gebäude, Zürich

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LITHUANIA | Apskrities viršininko administracija, Vilnius | Klaipédos Skuba, Klaipéda | Technologijos Universitetas, Kaunas

DENMARK | Glenco, Ålborg | Silhorko, Skanderborg | Stena Aluminium, Kolding

NORWAY | Bergen Museum, Bergen | Gardermoen airport, Oslo | Greverud Kjøpesenter, Oppegård | Holmenkollen World championship Center, Oslo | Hospital, Tromsø | Kjevik airport, Kristiansand | Nedre Bekkelaget school, Oslo | Norwegian Defense research institute, Kjeller | Olav Thon Eiendomsselskap ASA | Sandane airport | Sola airport | Stena Don Offshore drilling | Tromsø airport | Ullevål University Hospital, Ullevål |University of Bergen, Bergen | Værnes airport, Trondheim | Vika Atrium, Oslo | VM-huset, Oslo

FINLAND | Pohjola Versicherung, Helsinki

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