PEI

Protezioni
E laborazioni
I ndustriali

Welcome to P.E.I.

The strategy of success of the **P.E.I.** emerged from the intuition of the founding partners in recognising the importance of workplace safety, which has led, since the 1980s, to the significant development of the market for protective covers in machine tools.

Research, innovation and **quality** are the driving values of the **P.E.I.** Group, a leading manufacturer in Italy and Europe of protective covers for machine tools.

By striving for constant technical innovation, the Group has succeeded in attaining over **70 international patents** up today.

In order to offer bellows, aprons, roll-up and telescopic covers suitable for the continuously evolving customer or market requirements, the Company invests more than 4% of its annual turnover in Research and Development.

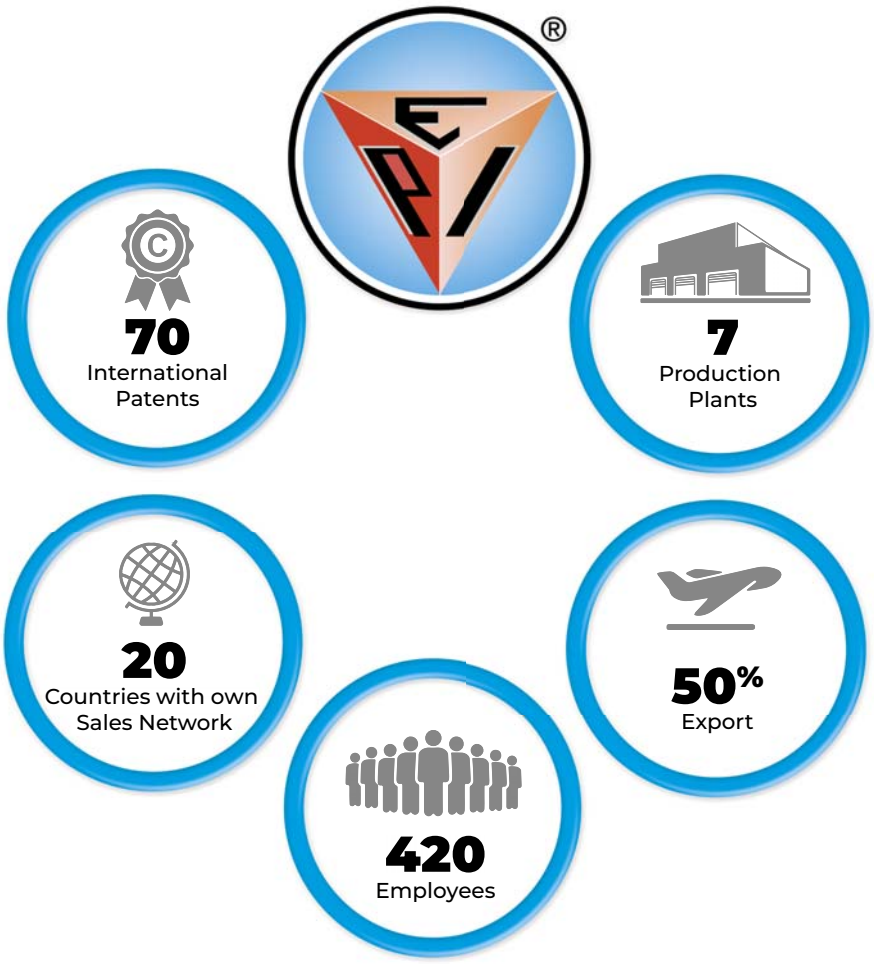
The commercial structure consists of a widespread network of commercial technicians and thus guarantees coverage across the whole of Italy and Germany as well as a major part of the rest of Europe.

Products "**made by P.E.I.**" are distributed worldwide by a network of dealers.

The past few years the Company has experienced a strong growth and turnover abroad has reached 50% of the total turnover.

The Bologna-based Group now has 420 employees who operate at seven production sites.

P.E.I. in numbers



Our marks

PEI MOBILITY
Performing gangway

PEI Mobility, a brand of P.E.I. Srl, is specialised in the production and sale of articulated bus bellows for 15 years and since 2022 has extended its production range by introducing articulated joints and becoming a partner of the world's leading articulated vehicles manufacturers.

www.peimobility.com

PEI VM
VIBRATION MONITORING

PEI VM S.r.l. with its 20-years experience in the NVH (Noise, Vibration & Harshness) provides consultancy and vibration diagnostics systems in many application areas, such as power transmission automotive, motorcycle, powertools, packaging.

www.peivm.it

nuova metal

Nuova Metal S.r.l. is an ISO 9001:2015 certified company with 30-years experience in light metal carpentry sector, specialised in designing and manufacturing metal furniture for different purposes, in particular for medical and food sectors.

www.nuovametal.com

ZANINI

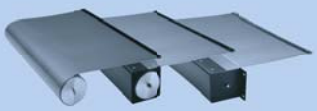
Zanini S.r.l. is a UNI EN 3834-2 certified company with great experience in the field of medium and light metal carpentry, specialised in metal machining for the railway and packaging sectors.

www.zaninisrl.net

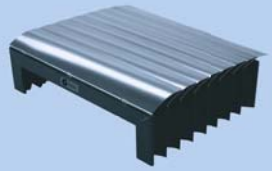
TELESCOPIC STEEL COVERS

WIPERS AND BRUSHES

ROLL-UP COVERS

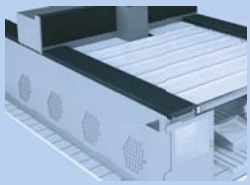


PROTECTIVE BELLOWS



MODULAR X-Y SHIELDS

OVERHEAD PROTECTIVE COVERS



GENERAL INFORMATION

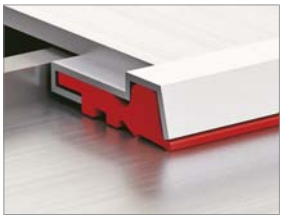
TELESCOPIC STEEL COVERS

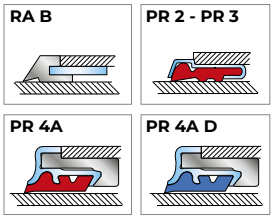
For all types of machine tools

The steel used is extremely high quality in terms of flatness, corrosion resistance and wear resistance. Sheet thickness ranges from 1.5 to 3 mm.

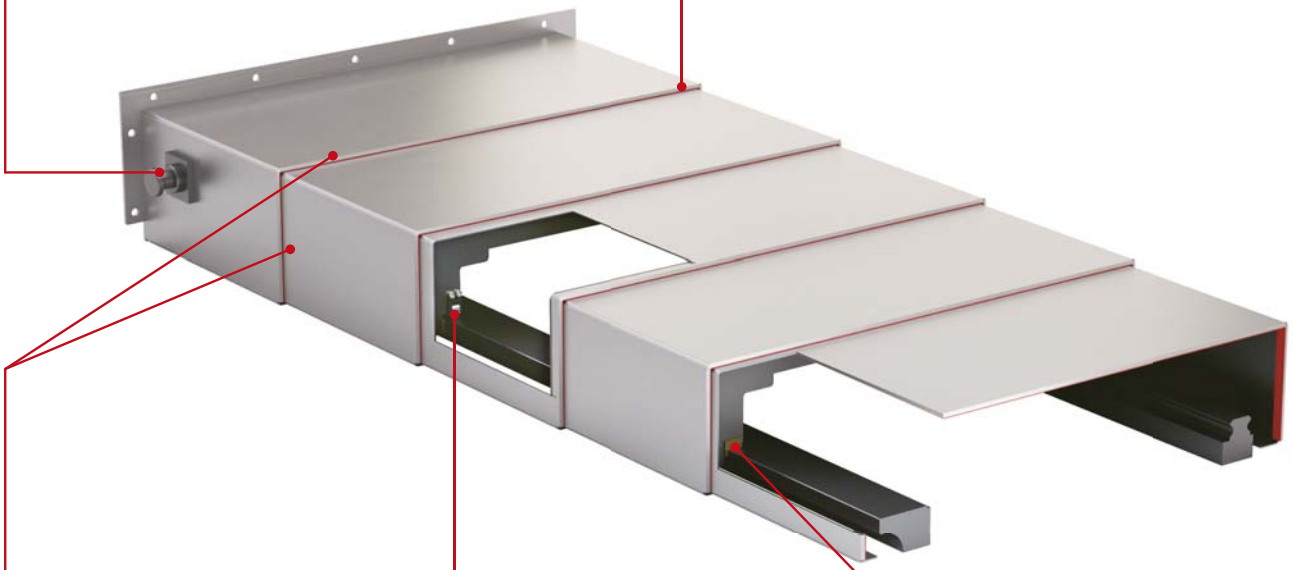
Telescopic Steel Covers may also be made of stainless steel.

Lifting systems can be applied to telescopic covers of various forms and have different characteristics according to customers' needs and the weight of the protection.



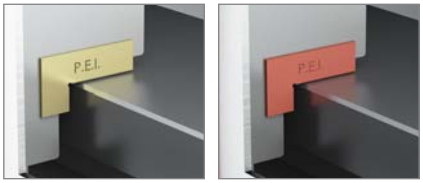


Wipers keep the surface clean and prevent chips from getting under the plates.
They are made of polyurethane to resist against heat and coolants, with or without a protective stainless steel chip guard.



In case of high speed, (patented) **shock absorbers** reduce noises and oscillations.
Made of polymer that does not deteriorate in contact with coolants.
They are very effective in reducing impact between boxes during movement.

Rollers and **bearings**, in case of high speeds or loads, are inserted to preserve safe and noiseless running.
Both rollers and bearings are assembled on bolted housings allowing correct alignment as well as quick and easy maintenance.



Special anti-friction **sliders**, made of brass or non-metallic material, do not wear out the guideways of the machine on which they run.
Available in many sizes and cross-sections.

Working Positions

Horizontal

For horizontal working positions. This is the most common solution for small to very large covers with very long travel.
Few limits for the shape.
In most cases, mounting in the machine is done by lowering the cover from above, thus handling is easier even in narrow spaces.

Transverse

For frontal working positions and in case of small to large covers.
To prevent the cover boxes from jumping out of the guideways, on the upper side special retaining slides are mounted, designed for fitting exactly the profile of the guideways.
Depending on the space available and the shape and position of the guides, the cover can be mounted frontally from above or it may be necessary slided onto the guides.
In case of frontal covers between two carriages, their design must consider the frontal mounting from above.

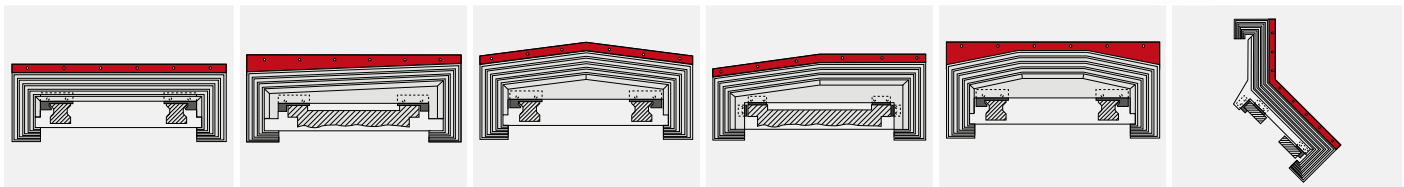
Vertical

For vertical working positions and for small to medium-sized covers.
To prevent the cover boxes from jumping out of the guideways, special retaining slides are mounted to fit exactly the profile of the guideways.
For larger dimensions it is possible to fit retaining slides that allow the cover to be mounted directly onto the guides from the front, without inserting it.
If desired, plates can be worked out inside the cover particularly to prevent lubricants from leaking onto hydrostatic guides.

Multi-axis for lathe

Telescopic cover for lathes Z-axis or axes that run parallel to the Z-axis, such as counter spindles, lathe centres and steady rests.
Based on the axis involved, the shape of the telescopic elements, the shape and position of the guides, mounting can be done from the front or it may be necessary to slide the cover onto the guides.

Configurations



Form 1 | Form 2 | Form 3 | Form 3, variant | Form 4 | For lathe

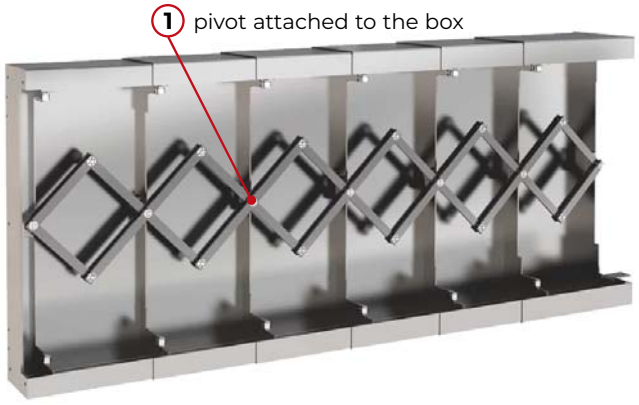
We invite you to fill in the questionnaire available on our website: you will receive a targeted offer for telescopic steel covers

click here

Pulling System

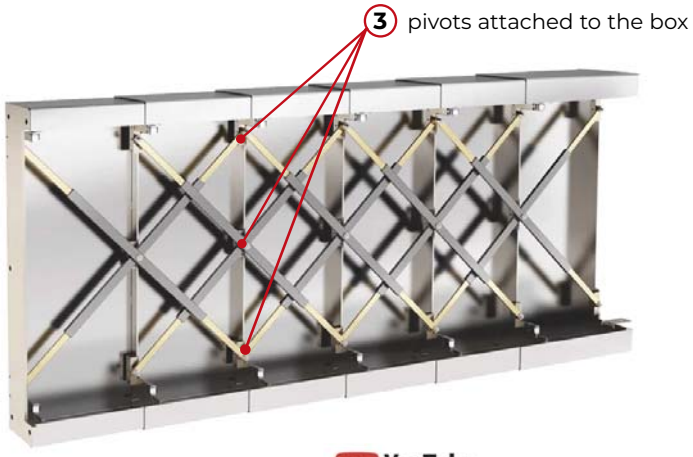
TRADITIONAL PANTOGRAPH

Our traditional scissor system is designed for synchronised movement of all cover boxes of a telescopic cover. This allows all boxes to move together and evenly.
As there is no stop between the cover boxes, the system runs independently of the drive speed and thus enables high travel speeds.
Proper sizing of the components of the scissor system, as well as proper design concerning dimensions and shape of the cover boxes, make this system robust and durable.
The machine must provide the drive force to move all the cover boxes simultaneously, even for short strokes.
The pantograph supports constant keeping of roughness in high-finish machining.



SYNCHRO-TEL TECH (Patented)

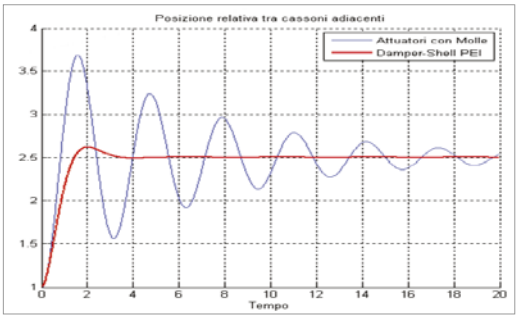
The system harmonises opening and closure of medium-sized telescopic covers and is suitable for high speeds and accelerations.
The coupling tolerance between the metal rods is reduced to a minimum.
Unlike a normal pantograph, it can have up to three pivots attached directly to the boxes, thus avoiding vibrations.
Mathematical calculations and operating tests guarantee that **SYNCHRO-TEL TECH** is the most reliable and durable solution, compared to known synchronisation mechanisms.



watch on YouTube

DAMPER-SHELL EVO (Patented)

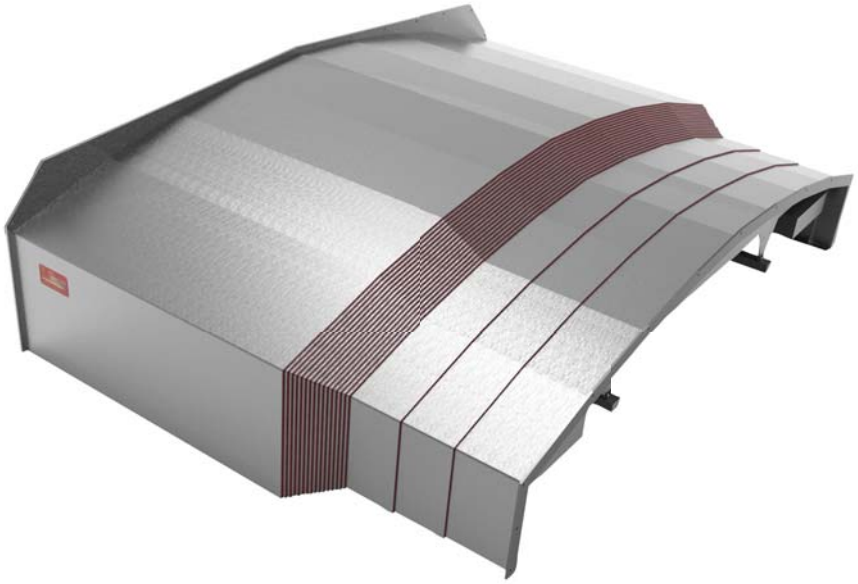
Viscoelastic shock absorbers for energy dissipation in large scale telescopic covers working in horizontal and frontal positions.
Made of polymer of a special **P.E.I.** formulation, it is manufactured in two geometric dimensions.
DAMPER-SHELL guarantees up to 2.000.000 cycles and is ideal for working speeds up to 100m/min and acceleration up to 1g.
Free from boost residue whether the telescopic cover is closed or in resting position, it opens smoothly during expansion without causing friction on the boxes.
This damper is ideal for long strokes being a silent, durable, reliable and maintenance-free solution.



MULTIBEND

The A++ telescopic cover for horizontal axes

The telescopic cover **MULTIBEND** has a weight reduction by up to 50 percent compared to a standard telescopic cover. Calculation software has been specially developed by **P.E.I.** to calculate bending of the boxes and consequently to optimise geometry and cost savings.
Reduction of the power required for driving the machine tool results in abatement of CO_2 emissions, thus saving raw materials and resources.



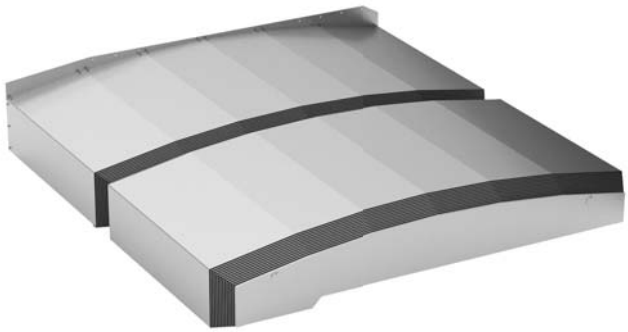
Weight reduction

Mathematical model

Energy saving

Some examples of our special telescopic covers:

Two telescopic covers joined together for long strokes.



Stainless steel aspirator with telescopic column synchronised by pantograph.

Double telescopic cover with rectangular shape.

Double telescopic vertical protection especially suitable for worm gears and screws.

SHEET-POCKET™ (Patented)

The **SHEET-POCKET™** Telescopic Steel Cover is the most effective solution for shielding the Y-axis (vertical) in horizontal machining centers and in boring machines, even in case of very large strokes.
It is supplied in a fully enclosed frame that is independent from the machine structure: the self-contained steel cover is easy to install and remove for maintenance or inspection.
The rigid and steady geometry of the elements ensures that they keep fastened together and well aligned.
This allows perfect scraping and extends the life of the **SHEET-POCKET™** even with large quantities of chips.
Minimal maintenance required.
The double-stepped version provides maximum retention against the penetration of fluids during machining.
Speeds up to 150 m/min. Accelerations of 2 g.
The **SHEET-POCKET™** Telescopic Steel Cover can be easily combined with SURE-SPRING® roll-up covers or with protective shields with laminations.

Frame box designed for:

- Stiffening the structure
- Making the coupling between metal structure and **SHEET-POCKET™** easier
- Allowing easy assembly and quick disassembly in case of maintenance
- Making transport safer in case of large dimensioned covers.

Moving panels, made of special, very resistant steel, that slide over each other to prevent chips from penetrating into the cover.

Spindle **opening** with edges protected by **protected wipers**, with polyurethane profile.

SHEET-POCKET™ PROSHD (Patented)

The compact double telescopic cover **SHEET-POCKET™ PROSHD** is a protective shield which separates the working area from the motor in a machine tool while allowing the spindle to move freely.

The special design keeps even the smallest chips, usually produced when machining hard metals, brass alloys or aluminium, from penetrating.

The wiper between the elements especially prevents the penetration of liquids.

These covers are suitable for medium-size horizontal machining centres.

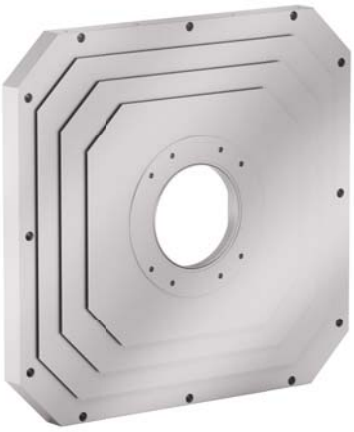
In horizontal installation position, equipped with wipers and pressurisation system, the cover prevents the penetration of coolants and oils.

TELESCOPIC STEEL COVERS ▪ Compact round and square

The telescopic steel covers **ROUND SLIDING COVER™** and **SQUARE SLIDING COVER™** were designed to meet special needs that frequently arise on special or transfer machines and small machining centers.

ROUND SLIDING COVER™ and SQUARE SLIDING COVER™

- For dual-axis operation
- High speed
- Compact size
- Easy to install

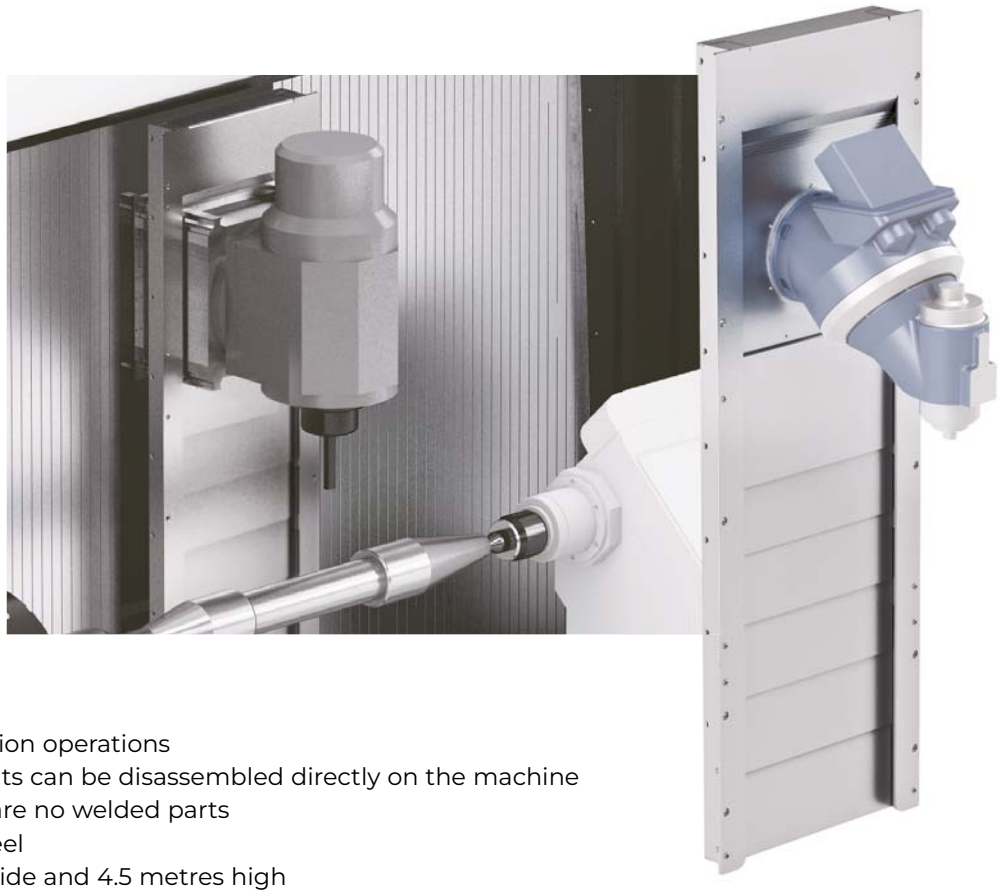


SNAP TELESCOPIC COVER (Patent Pending)

The “EASY-ACCESS” Cover

This innovative cover can be totally dismantled and is ideal for protecting frontal and vertical axles in small to medium working centres, transfer machines, lathes and milling borers.
Easy access to both the whole cover and machine tool: maintenance works can be carried out quickly, while the overall time required for all steps is minimized.
Due to the "modular" design of this cover, individual damaged elements can be replaced without use of special tools.
The cover is assembled weldless and can therefore be completely disassembled into its individual parts.
This telescopic cover is made of highly resistant steel, the recommended maximum dimensions are one metre in width and 4.5 metres in height.
This new telescopic cover is characterised by a closed design that is independent of the supporting machine structure.
The passage of the work spindle can be sealed with PU wipers. Equipped with a synchronisation mechanism, the cover reaches speeds of up to 150 m/min and accelerations up to 2g.

watch on YouTube



Features

- MAINTENANCE: quick inspection operations
- DISASSEMBLY: the components can be disassembled directly on the machine
- ASSEMBLY: manual, as there are no welded parts
- MATERIAL: highly resistant steel
- DIMENSIONS: up to 1 metre wide and 4.5 metres high
- SPEED: up to 150m/min and acceleration up to 2g.

Disassembly

TELESCOPIC COVER OVERHAULING

- Overhaul of all types of telescopic covers for machine tools
- Renew or replacement of damaged sections
- Replace riders or guide rollers
- Replace brass or PU wear strips
- Cleaning and buffing to original finish
- On-site inspection of **P.E.I.** staff: if the telescopic cover cannot be repaired, we can offer you a completely new one
- The **P.E.I.** staff are also able to provide in-depth technical consultancy and recommend any changes or make suggestions for improvement
- Short delivery time.

INSPECTION OF P.E.I. STAFF FOR FIELD SURVEYS

DUAL BARRIER SYSTEM

A complete protection system consisting of a telescopic cover with integrated bellow sections.

The "double insulation" system is mostly used, that is a thermic-welded bellows underneath a telescopic cover.

In the **DUAL BARRIER SYSTEM** the telescopic cover and the thermic-welded water-repellent bellow are combined to form an absolutely leak-tight protective cover.

The bellow conveys the coolant to the conveyor or to the cooling tank, thus preventing the coolant from mixing with the hydrostatic oil.

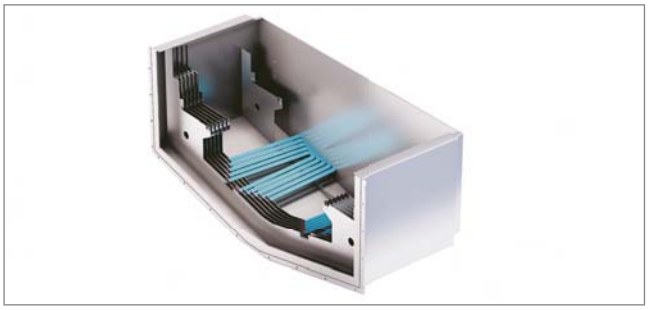
For applications in the field of occupational safety, the **DUAL BARRIER SYSTEM** telescopic covers can also be offered in walk-on version.

DUAL BARRIER - 2EVO (Patented)

DUAL BARRIER 2EVO features an innovative system: each cover box of the telescopic cover contains a bellows segment. In this way, the machine manufacturer obtains a complete cover and only has to mount one guideway, onto which the bellows is guided by the telescopic cover.

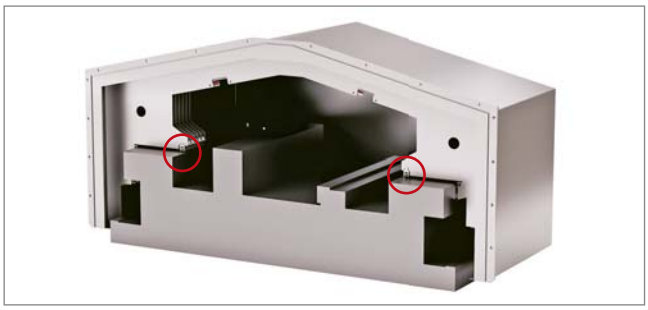
watch on YouTube

Closed length



The closed length dimension is greater than that of a normal telescopic cover: the difference varies depending on the space conditions in the machine and the specific requirements.

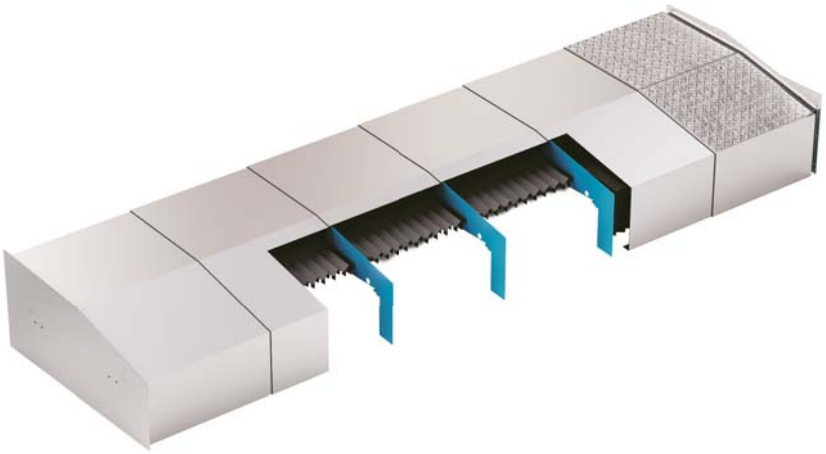
Features



DUAL BARRIER - 2EVO has only the telescopic cover running on the 2 slideways, the bellow sections are sustained by brackets integrated in the cover.

DUAL BARRIER - 4SPC

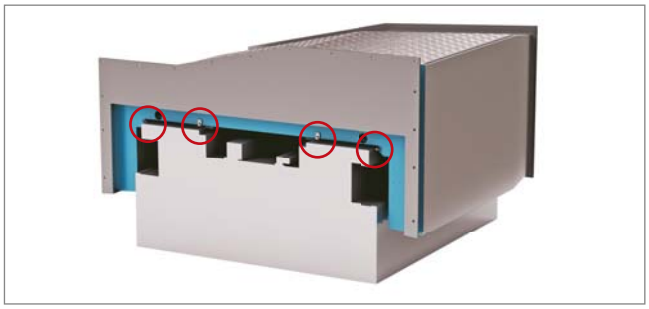
A complete protection system consisting of a telescopic cover with integrated bellow sections.
Bellows sections are combined with the telescopic boxes, to form a single leak-tight cover system.
To access the guides of the machine, easy unscrew only the fastening flange of the telescopic cover.
To remove or install the cover, simply lift it.



Closed length

The closed length is made up of the sum of the closed length of the telescopic element and a part of the closed length of each bellow inserted between the telescopic elements.

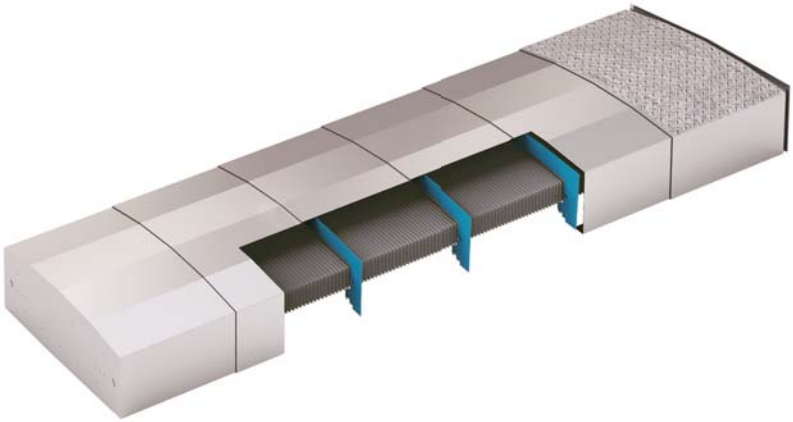
Features



DUAL BARRIER - 4SPC requires 2 slideways with 2 bearings for the telescopic cover and further 2 bearings for the bellow sections.

DUAL BARRIER - 4STD

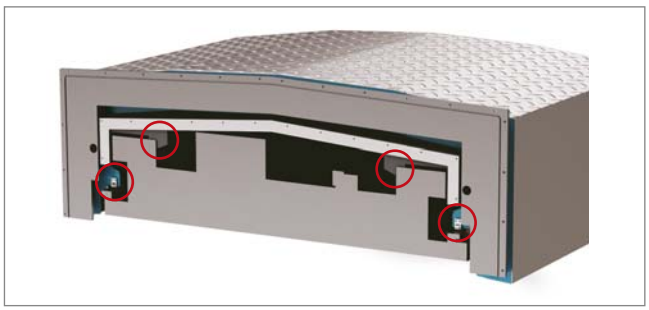
The complete cover consists of a thermic-welded bellow and a telescopic cover.
To access the guides of the machine, remove both the cover and the bellow mounting flanges.
To remove or install the cover, both the bellow and the telescopic cover must be lifted in two steps.



Closed length

Same closed length dimension as the telescopic cover.

Features



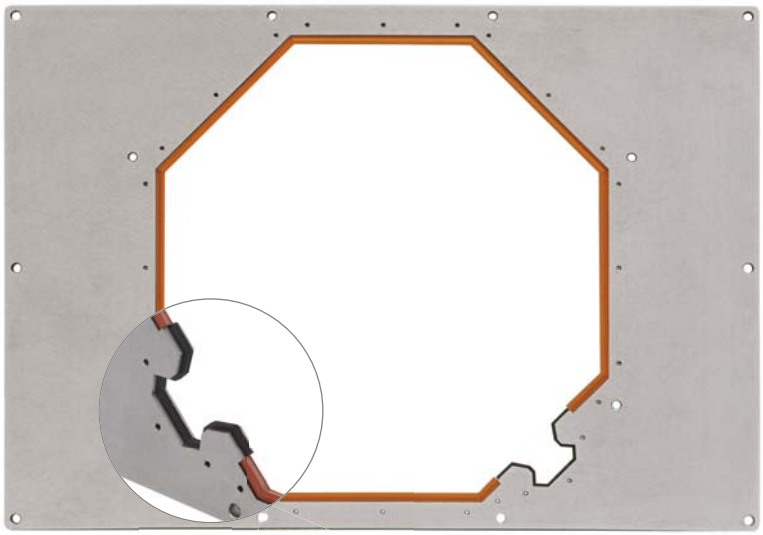
DUAL BARRIER - 4STD requires 2 slideways for the support of the telescopic cover and further 2 slideways for the bellow.

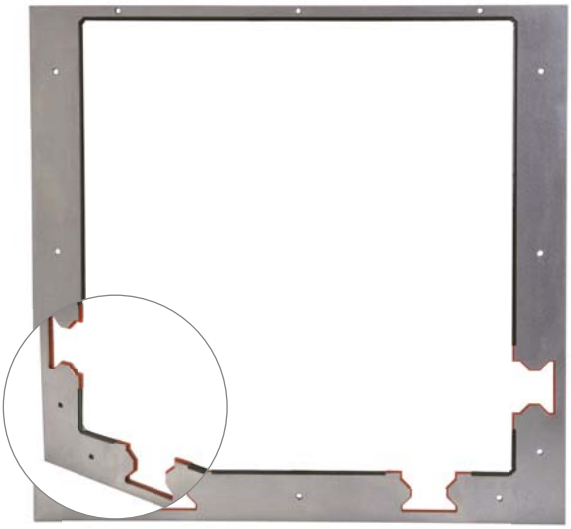
WIPERS

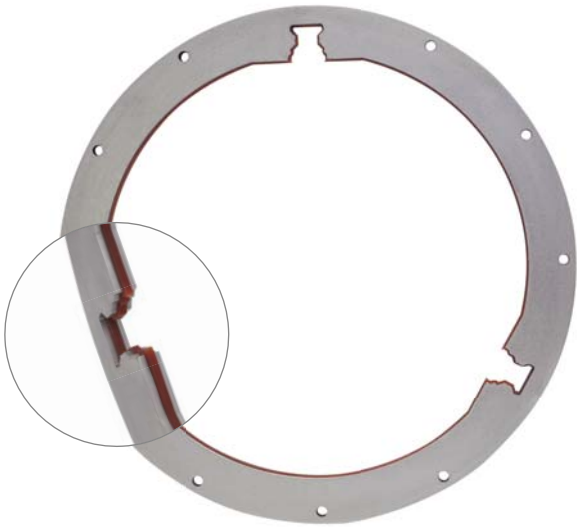
Wipers keep machine tool guides clean of chips, metal dust and abrasive substances.

PROFILED WIPERS

They are suitable for work environments with a heavy concentration of sharp shavings: their polyurethane profile resists against abrasion and can be easily replaced.
Any shapes and dimensions available according to customer drawings.
There are no equipment costs, so they can be produced in small series.
For fastening them, we recommend counter-sunk hex screws.







The profiled wipers can be manufactured by using traditional technology or innovative additive technology.

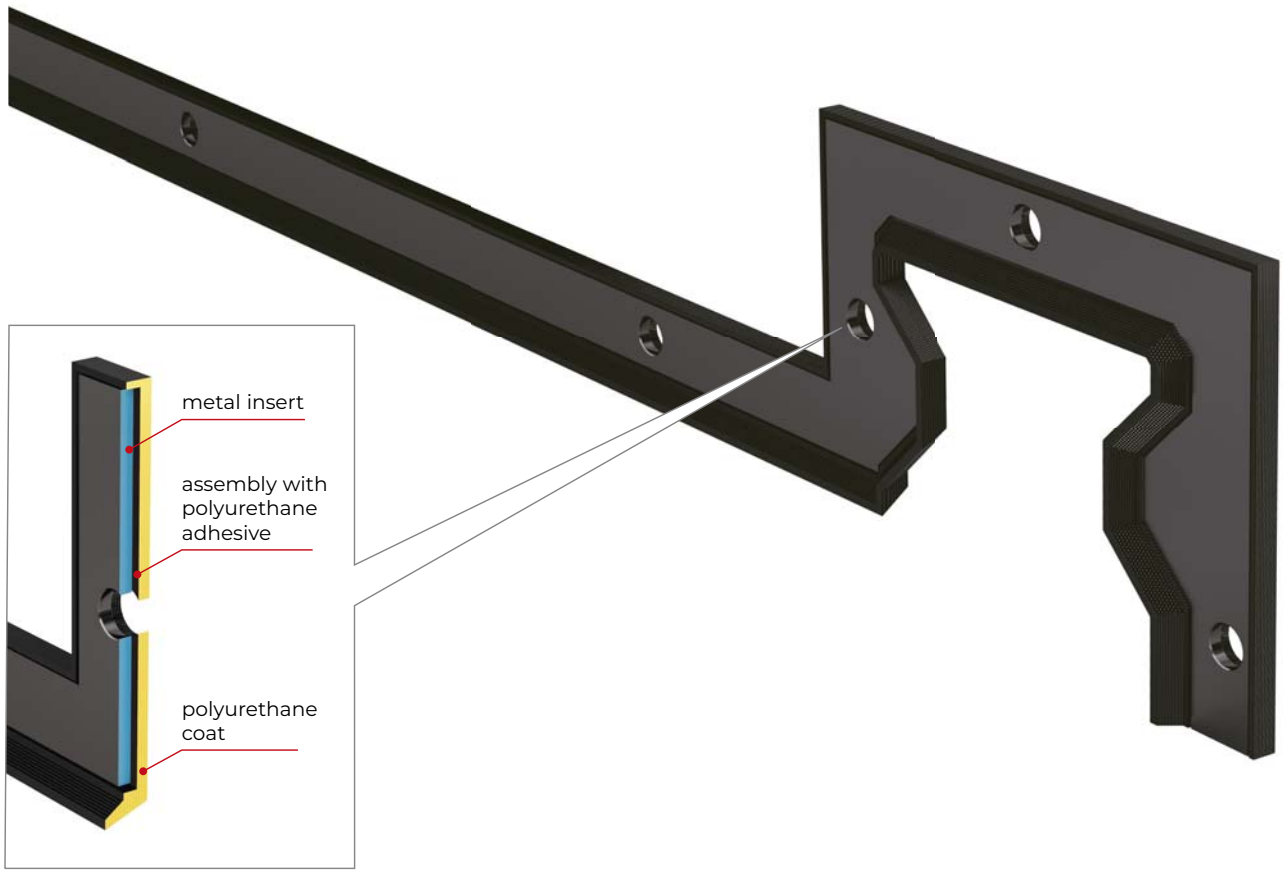
3D WIPER NEW

The new line of P.E.I. wipers with polyurethane coat produced by additive technology.

P.E.I. has developed its own additive, unique on the market technology and built its own printers to produce optimally functioning wipers that can match the properties of pressed wipers.

The **P.E.I.** technology can produce wipers up to 1,000 x 1,000 mm in a single piece, with no interruptions in the polyurethane element.

- Flexible dimensions
- No tools have to be made
- No minimum or maximum production batch sizes.



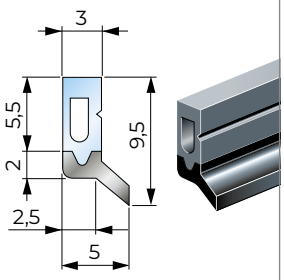
A detailed 2D drawing or a 3D model of the guideway in any CAD format (including bore coordinates for the connection) is sufficient for the design of conventional wipers as well as wipers manufactured by additive technology. Pre-loading is determined by our engineering department based on the shape of the wiper.

BIPLASTIC WIPERS

P.E.I. biplastic wipers are modelled on the client drawing. Strip-lengths are available in prompt delivery.

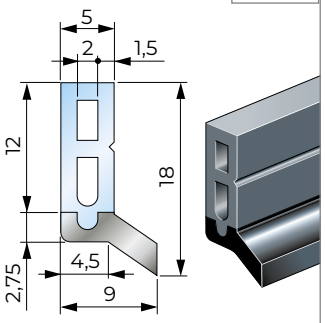
Also available via our online-shop: https://shop.pei.it/en/3-wipers

RA 01 BP



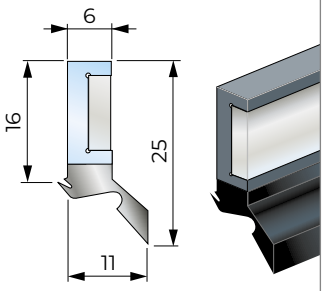
Profile:
Polyurethane
Length: **2000 mm**.
Rigid polymer insert

RA 03 BP



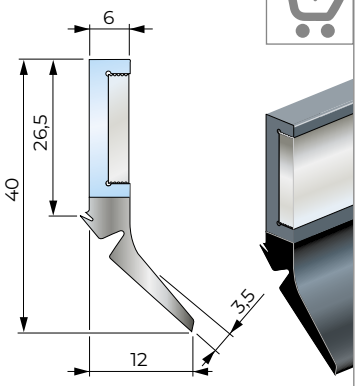
Profile:
Polyurethane
Length: **2000 mm**.
Rigid polymer insert

RA 05 BP



Profile:
Polyurethane
Length: **2000 mm**.
Steel insert 12x3

FB40FLEX

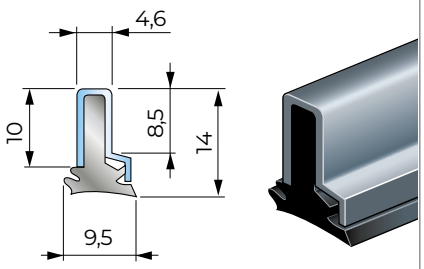


Profile:
Polyurethane
Length: **2000 mm**.
Steel insert 18x3

FB WIPERS

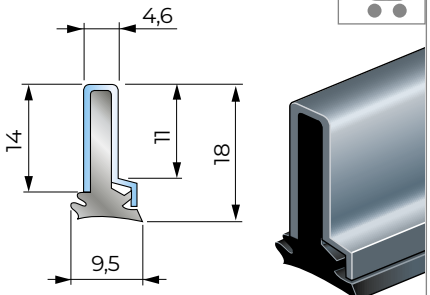
FB wipers are modelled on the client drawing or supplied in linear strips.

FB 14



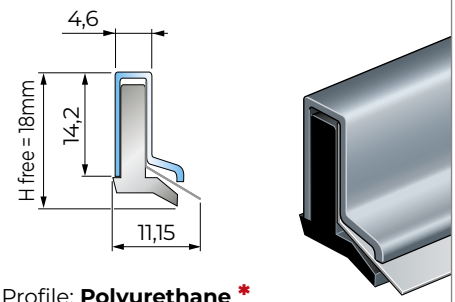
Profile: **Polyurethane** *
Length: **530 mm.**
Stainless steel reinforcement

FB 18



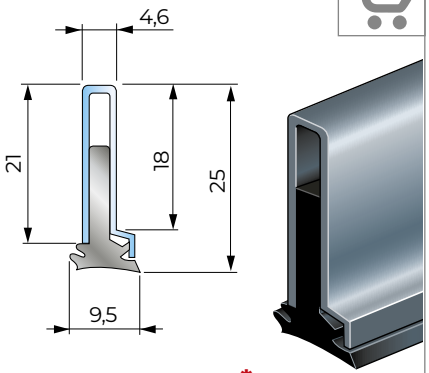
Profile: **Polyurethane** *
Length: **3000 mm.**
Stainless steel reinforcement

FB 18L



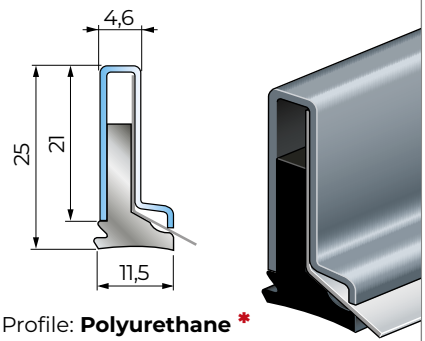
Profile: **Polyurethane** *
Length: **1000 mm.**
Stainless steel reinforcement
Shielding in stainless steel 301

FB 25



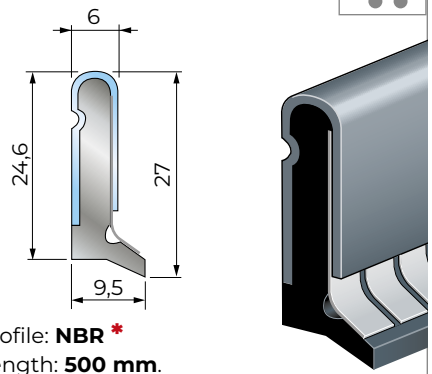
Profile: **Polyurethane** *
Length: **3000 mm.**
Stainless steel reinforcement

FB 25L



Profile: **Polyurethane** *
Length: **1000 mm**.
Stainless steel reinforcement
Shielding in stainless steel 301

FB 27



Profile: **NBR** *
Length: **500 mm.**
Stainless steel reinforcement
Shielding in stainless steel 301

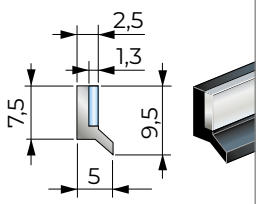
*** Prompt delivery**

Dimensions in mm.

RA WIPERS

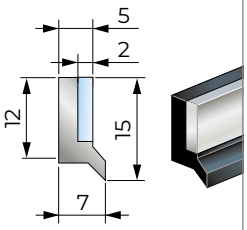
RA wipers are modelled on the client drawing or supplied in linear strips.

RA 01



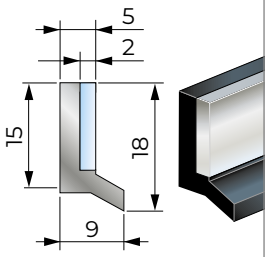
Profile:
NBR * or **Viton®** *
Length: **560 mm**.
Steel insert

RA 02



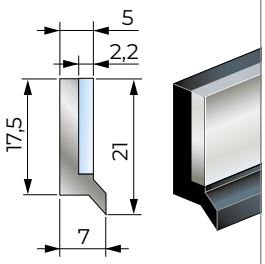
Profile:
NBR * or **Viton®** *
Length: **560 mm**.
Steel insert

RA 03



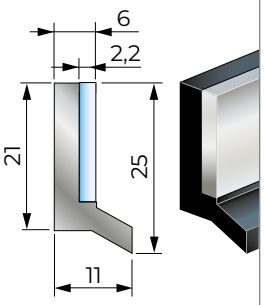
Profile:
NBR *
Length: **560 mm**.
Steel insert

RA 04



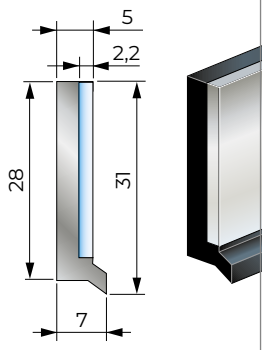
Profile:
NBR *
Length: **560 mm.**
Steel insert

RA 05



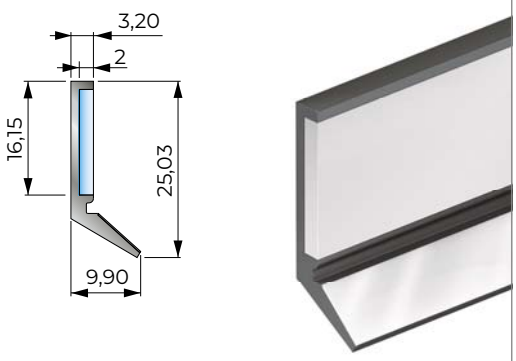
Profile:
NBR * or **Viton®** *
Length: **560 mm**.
Steel insert

RA 06



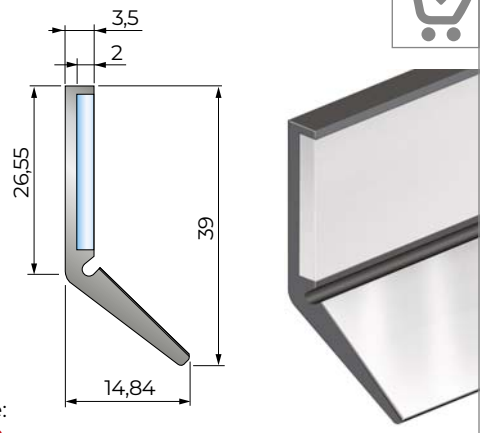
Profile:
NBR *
Length: **560 mm.**
Steel insert

RA 25L



Profile: **NBR** *
Length: **800 mm.**
Steel insert
Thin metal protective plate in stainless steel 301

RA 39L



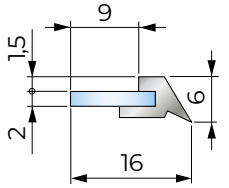
Profile:
NBR *
Length: **800 mm.**
Steel insert
Thin metal protective plate in stainless steel 301

*** Prompt delivery**

WIPERS FOR TELESCOPIC COVERS

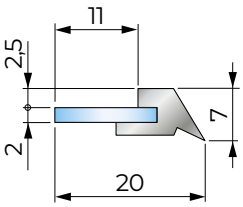
These types of wipers are normally applied to telescopic covers:
Codes **RA B1**, **RA B2** and **RA B3** consists of a metal insert to which an NBR profile has been vulcanized.
Codes **PR 2** and **PR 3** has steel reinforcement and polyurethane profile.
Codes **PR 4A** and **PR 4A D** can be instantly replaced on the telescopic cover, without disassembling the cover itself.
They have a metal reinforcement with a seal designed to clean the cover.

RA B1



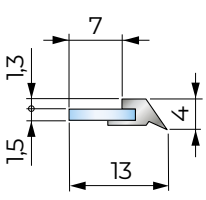
Profile: **NBR** *
Length: **560 mm.**
Steel insert

RA B2



Profile: **NBR** * or **Viton®** *
Length: **560 mm.**
Steel insert

RA B3

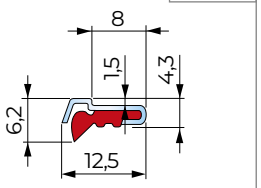


Profile: **NBR** *
Length: **560 mm.**
Steel insert

*** Prompt delivery**

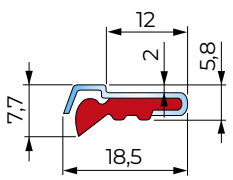
Dimensions in mm.

PR 2



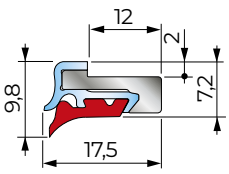
Profile: **Polyurethane** *
Length: **3000 mm.**
Steel reinforcement

PR 3



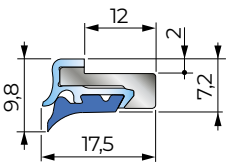
Profile: **Polyurethane** *
Length: **3000 mm.**
Steel reinforcement

PR 4A



Profile: **Polymer GM2319**
Length: **3000 mm.**
Steel reinforcement

PR 4A D



Profile: **Polymer GM2357**
Length: **3000 mm.**
Steel reinforcement

*** Prompt delivery in strips**

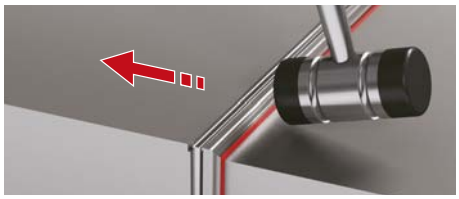
For working with COOLANTS

For DRY working

PR 4A, the instantly replaceable and easily dismantable wiper (Patented)

It is made of 3 independent elements: a solid metal profile on the telescopic cover box, then a removable metal profile and finally a seal designed to clean the cover.

The seal offers various technical features depending on the working conditions to which it is subject.



Telescopic covers equipped with **WIPER PR4A** allow the user to independently replace the wiper profile.

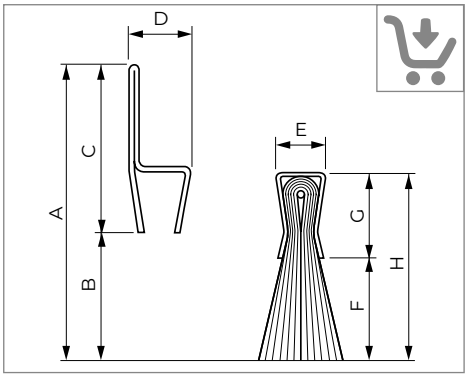
MATERIALS	HEAT RESISTANCE		SYNTHETIC OIL RESISTANCE			MINERAL OIL RESISTANCE			VEGETABLE OIL RESISTANCE			WEAR RESISTANCE		
	Momentary contact °C	Continuous °C	Excellent	Good	Poor	Excellent	Good	Poor	Excellent	Good	Poor	Excellent	Good	Poor
NBR	250	-20 ÷ +100		•			•			•			•	
Polyurethane	200	-30 ÷ +90	•			•				•		•		
VITON®	1000	-20 ÷ +280	•			•				•			•	
Polymeric GM2319 (red) for working with coolants	200	-30 ÷ +90	•			•				•		•		
Polymeric GM2357 (blue) for dry working	280	-30 ÷ +120	•			•				•		•		

LINEAR BRUSHES WITH SUPPORT FRAME

Also available via our online-shop: https://shop.pei.it/en/4-brushes

- Safe sealing against dust from base
- Prevention of system malfunctions due to overheating
- Long service life
- Special dimension and design possible
- Special shapes may be created
- The brush is easy to replace
- The support frame is made of galvanized steel
- Prompt delivery in strips.

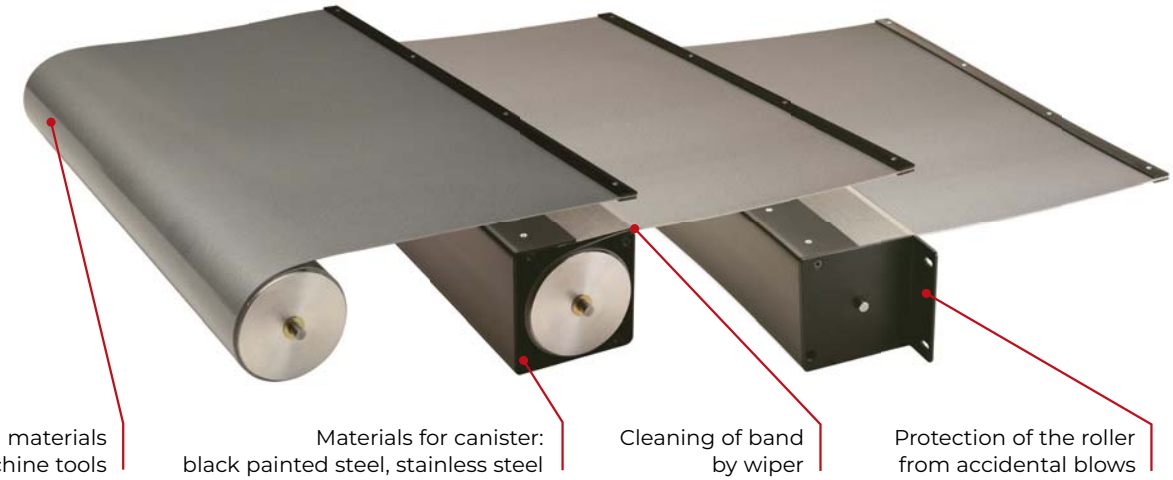
Code	A	B	C	D	E	F	G	H	Length	Bristle
SN1	32	11	21	17	14	9	9	18	1000	Nylon Ø 0,15
SN2	42	22	20	9	6	26	5	31	2000	Nylon Ø 0,15
SN3	72	40	32	15	10	40	10	50	2000	Nylon Ø 0,25
SN4	92	60	32	15	10	60	10	70	2000	Nylon Ø 0,50
SN5	112	80	32	15	10	80	10	90	2000	Nylon Ø 0,50
SN6	132	100	32	15	10	100	10	110	2000	Nylon Ø 0,50
S01	40	20	20	9	6	24	5	29	2000	Brass Ø 0,15
S02	70	50	20	9	6	54	5	59	2000	Brass Ø 0,15
S03	100	80	20	9	6	84	5	89	2000	Brass Ø 0,15



ROLL-UP COVERS WITH OR WITHOUT CANISTER

P.E.I. roll-up covers are normally equipped with our **patented system** of multiple springs.
This offers countless advantages:

- Extremely high speeds
- Resistance to high and low temperatures
- Up to 1,000,000 movements guaranteed
- Compact size
- Easy installation
- Constant tensioning.



CERAMIX BAND

Aerospace technology in machine tools: a potent and cost-effective innovation

Features of **CERAMIX** band:

- Band material covered by a high ceramic polymer coating
- It is highly resistant against the impact of hot shavings during dry-working
- It has an excellent abrasion resistance and shear strength and is recommended for the use of mineral oils
- CERAMIX band material has a thickness of 1,8 mm and weights 2 kg/sqm
- It is antistatic.

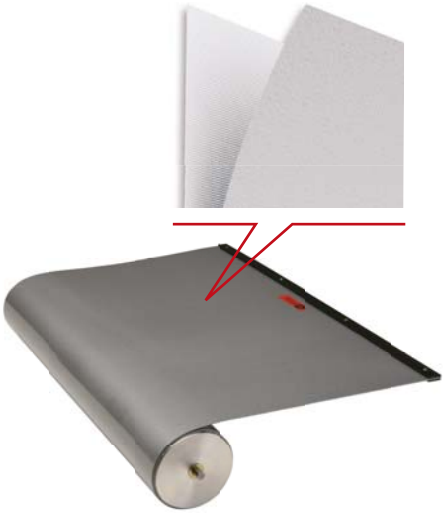
This kind of band can be used on all **P.E.I.** roll-up covers with mechanisms from 70 mm tube diameter.

CERAMIX LIGHT BAND

Identical resistance at half the weight

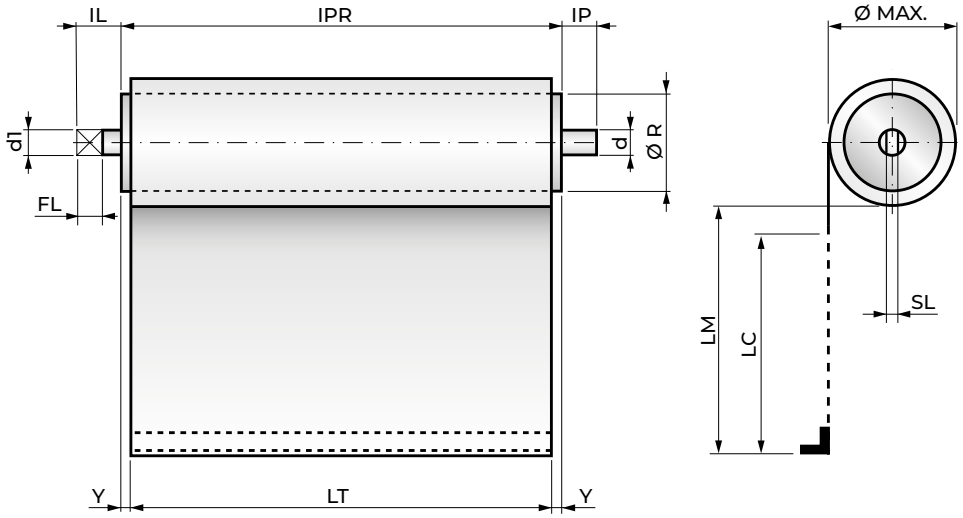
CERAMIX LIGHT offers all the characteristics of CERAMIX, but at a thickness of 0,9 mm and 1 kg weight per sqm.

- Antistatic
- Suitable for roll-up covers with mechanisms from 20 mm tube diameter.



watch on YouTube

ROLL-UP COVERS WITHOUT CANISTER



Ø Max = Wound-up maximum diameter
SL = Tab thickness
LC = Stroke length
LM = Max length
LT = Band width
Ø R = Winding roller diameter
IPR = Overall width

The IPR overall dimension of the roll-up cover depends on the Y dimension, which is calculated by our engineers. Contact our engineering department for any questions you may have.

LM		2 • Y =
from	to	
0	400	4
401	600	5
601	800	6
801	1200	8
1201	1600	10
1601	2400	14
2401	3000	18
3001	3850	22
3851	4700	26
4701	5550	32

SHAFT SIZES

Standard Roll-up Covers

Ø ROLLER	d1	IL	FL	SL	d	IP
30	6	8	8	2.6	7	8
40-50-60-70-80-90-100-120	10	15	12	4	10	10

P.E.I. manufactures shafts according to customer's drawing.

SURE-SPRING® Roll-up Covers

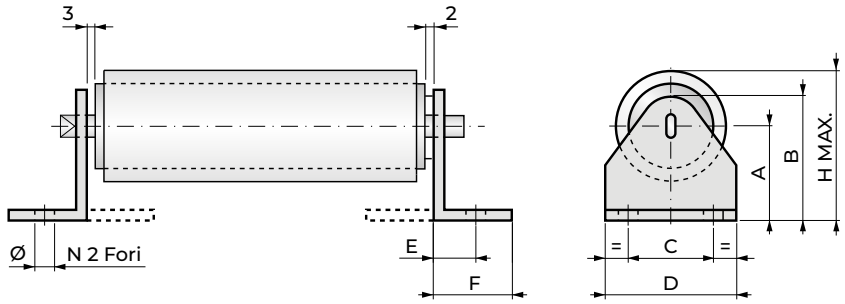
Ø ROLLER	d1	IL	FL	SL	d	IP
39-52-71	10	15	12	4	10	10

Formula for calculating the OVERALL WIDTH

$$IPR = LT + 2Y$$

Example:
LM = 1000 LT = 500 2Y = 8
OVERALL WIDTH = 508

DIMENSIONS FOR STANDARD SUPPORTS



Code	A	B	C	D	E	F	Ø	Hmax	Material
33	33	45	26	40	11	18	6,5	59	galvanized Fe 15/10
50	50	62	26	40	11	18	6,5	93	galvanized Fe 15/10
60	60	76	36	50	15	22	6,5	112	galvanized Fe 20/10
80	80	96	42	60	17	26	6,5	151	galvanized Fe 25/10
119	119	136	54	106	37	70	10	225	galvanized Fe 40/10

Dimensions in mm.

Formula for calculating max. Ø

$$Ø\ MAX. = 2 \cdot \sqrt{\frac{L \cdot s \cdot 1{,}20}{\pi} + r^2}$$

L = MAX. LENGTH TO WIND
s = BAND THICKNESS*
r = ROLLER Ø/ 2

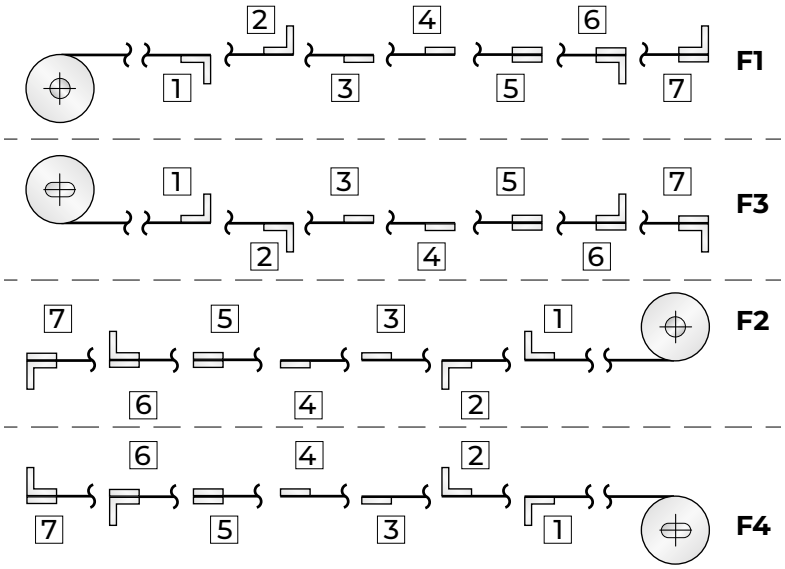
(* You find the materials list on our website www.pei.it)

Installation

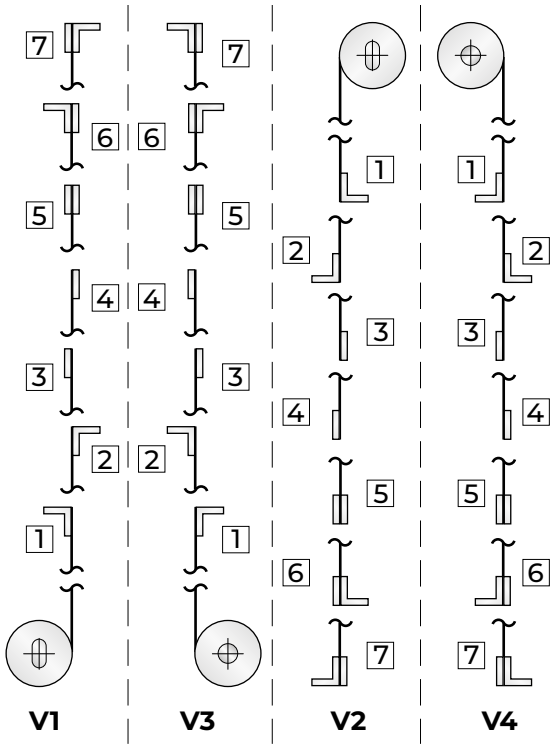
This diagram is valid for all Roll-up Covers without canister, and shows:

- Terminal type
- Terminal position on the band
- Band output direction
- View of shaft/tab

Horizontal and frontal work positions

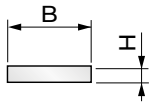


Vertical work positions

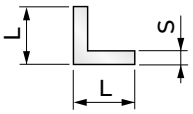


Fastening terminals

The terminals consist of strips and angles with holes according to the customer's requirements.
Terminal materials: Aluminum, Steel.

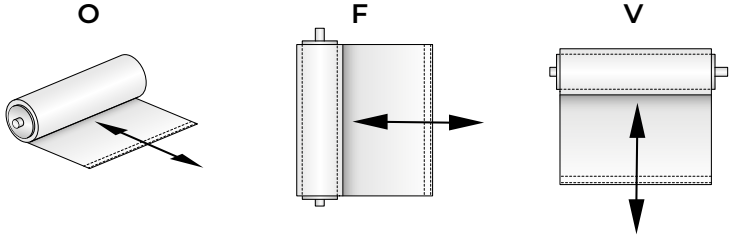


B x H	
14x2	25x3
14x3	25x5.5
15x2	28x2
15x3	28x3
18x2	30x2
20x2	30x3
20x3	40x3
25x2	50x8



L x L x S
15x15x2
15x15x3
20x20x2
20x20x3
25x25x2
25x25x3
30x20x5.5
30x30x2
30x30x3

Work positions



O = Horizontal

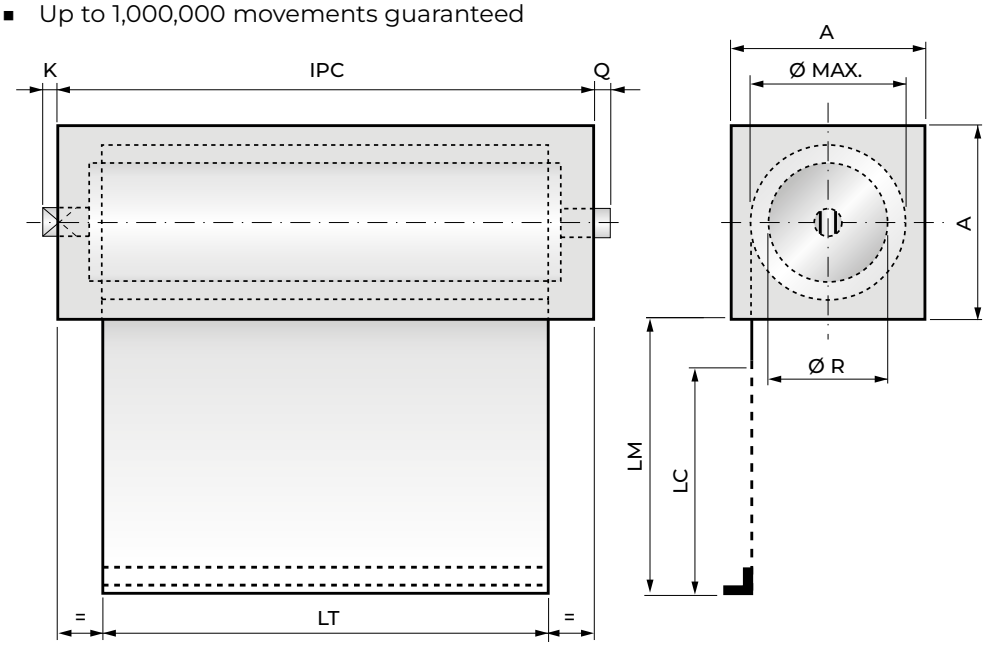
F = Frontal

V = Vertical

ROLL-UP COVERS WITH CANISTER

Enclosing the roller into a canister offers many advantages:

- Attractive appearance
- Wide variety of fastening systems
- Up to 1,000,000 movements guaranteed



Canisters A x A
40 x 40
50 x 50
60 x 60
70 x 70
80 x 80
90 x 90
100 x 100
110 x 110
120 x 120
130 x 130
140 x 140
150 x 150

A = Canister dimensions
Ø Max = Wound-up maximum diameter
LC = Stroke length
LM = Max length
LT = Band width
Ø R = Winding roller diameter
IPC = Overall width with canister

The IPC overall dimension of the roll-up cover depends on the K and Q dimensions, which are calculated by our engineers. Contact our engineering department for any questions you may have.

Formula for calculating the minimum canister size = DC

$$DC = Ø\ MAX + 8$$

Canister material	K	Q	Z*
Steel	10	7	13
Stainless steel	10	7	13

Z* = Fixed coefficient

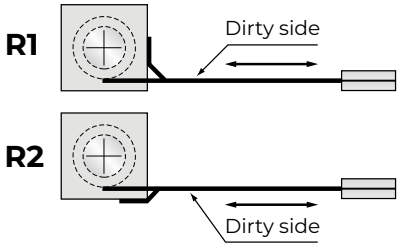
Formula for calculating the OVERALL WIDTH
with Steel and Stainless Steel canister

$$IPC = LT + Z + 2Y^* + \frac{(LM)}{100}$$

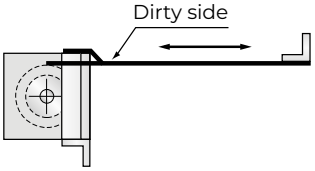
Example with Steel canister:
LT= 500 2Y= 8 LM =1000
LM/100 =10 Z= 13
IPC = 531
(* see 2Y table on page 20)

Wiper

This diagram shows the 2 ways to install the wiper to the canister:



Example for assembling code



Working position — F1
Terminal fastening — 2
Canister fastening — T5
Wiper position — R2

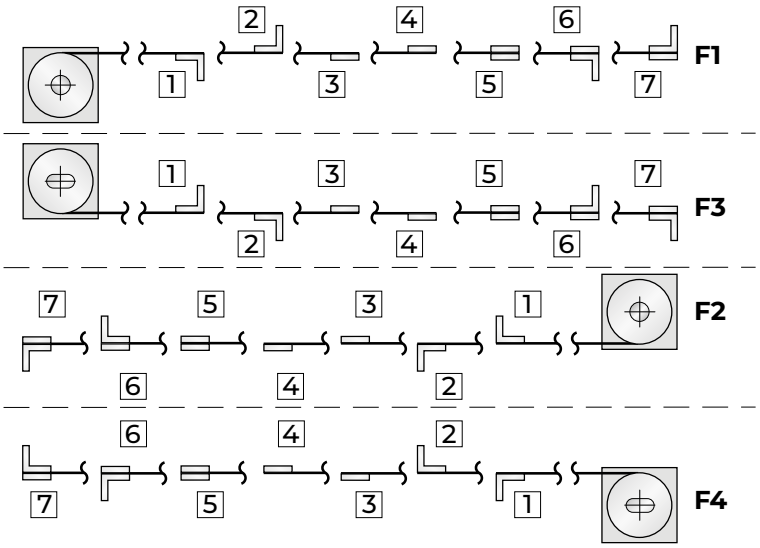
Dimensions in mm.

Installation

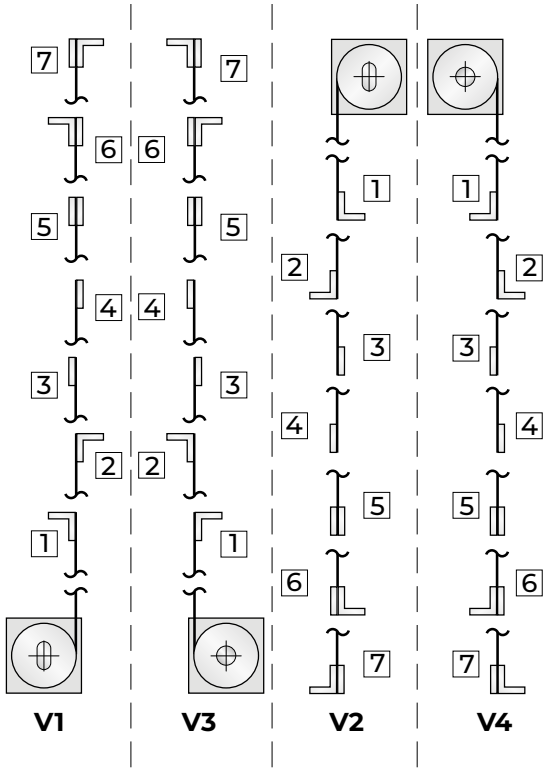
This diagram is valid for all Roll-up Covers with canister, and shows:

- Terminal type
- Terminal position on the band
- Band output direction
- View of shaft/tab

Horizontal and frontal work positions

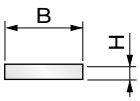


Vertical work positions

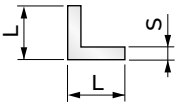


Fastening terminals

The terminals consist of strips and angles with holes according to the customer's requirements. Terminal materials: Aluminum, Steel.



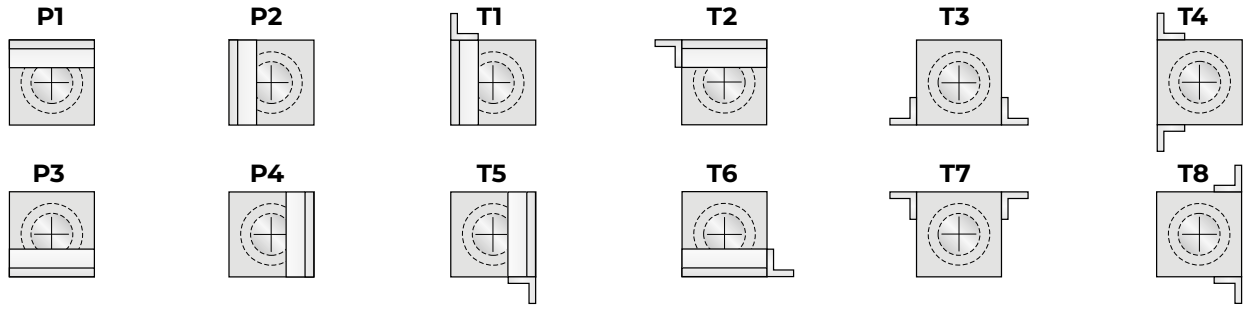
B x H	
14x2	25x3
14x3	25x5.5
15x2	28x2
15x3	28x3
18x2	30x2
20x2	30x3
20x3	40x3
25x2	50x8



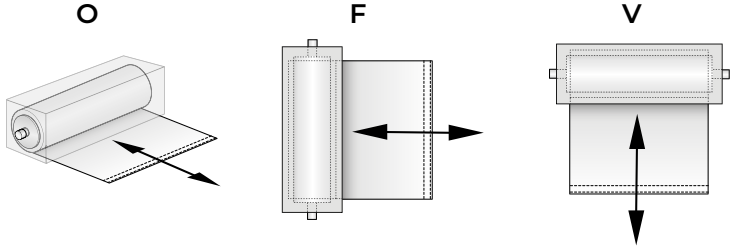
L x L x S
15x15x2
15x15x3
20x20x2
20x20x3
25x25x2
25x25x3
30x20x5.5
30x30x2
30x30x3

Standard canister mounting systems

To select the most suitable mounting system, we recommend placing the fastening variants shown over the selected roller variant you have chosen, without turning the former.



Work positions



O = Horizontal

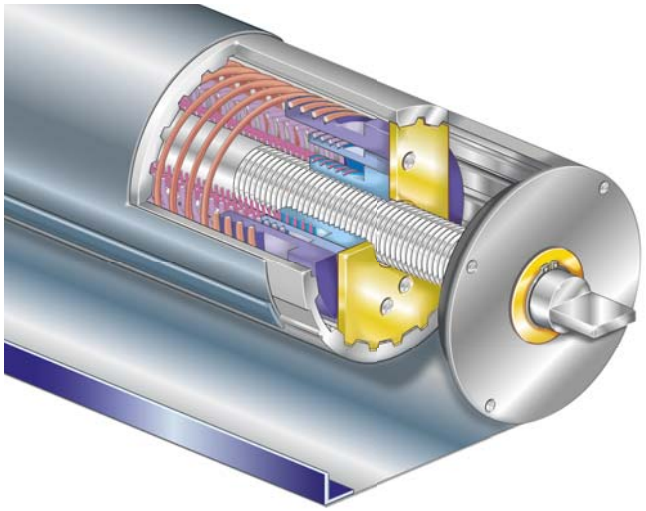
F = Frontal

V = Vertical

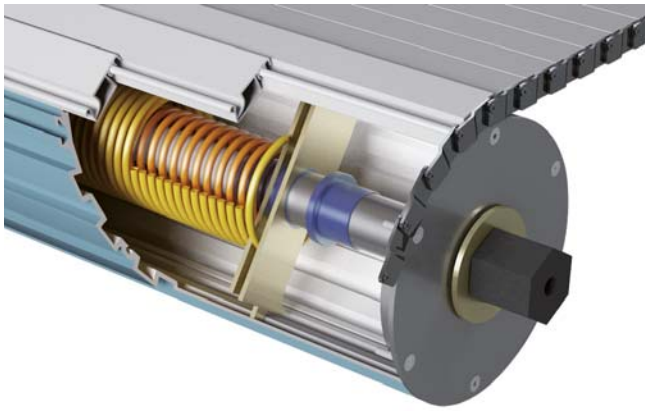
Dimensions in mm.

SURE-SPRING® MECHANISM (Patented)

The **P.E.I.** patented design known as **SURE-SPRING®** represents the most advanced level of technical innovation in the field of roll-up covers.



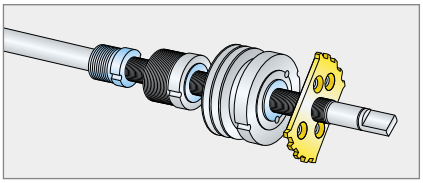
- Suitable for high speed operation
- The multiple springs remain coaxial
- The springs never intersect
- Reduced overall diameters
- Advancement speeds of up to 150 m/min
- Acceleration of up to 2 g
- 2,000,000 Movements guaranteed
- Secure attachment of the band to the tube, because no adhesive products are used
- Quick and easy maintenance
- Also suitable for use in work environments where strongly aggressive chemicals are applied.



SURE-SPRING® MECHANISM - HP VERSION

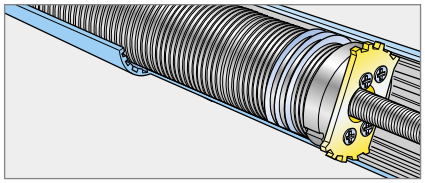
The **SURE-SPRING® HP** winding mechanism is the answer to the elevated power required to wind up large size protective covers.
An optimal dimensioning of the springs guarantees the tensile force required for moving "J"-series apron covers.

Transmission



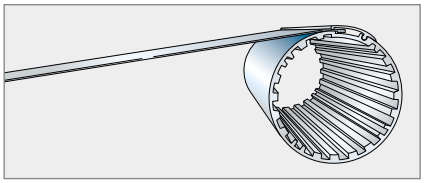
The rotary movement of the tube in relation to the fixed central shaft is transmitted by a sliding spline. This system compensates for the elongation of the multiple springs by moving the spring mounting point axially along a threaded shaft.

Innovative features



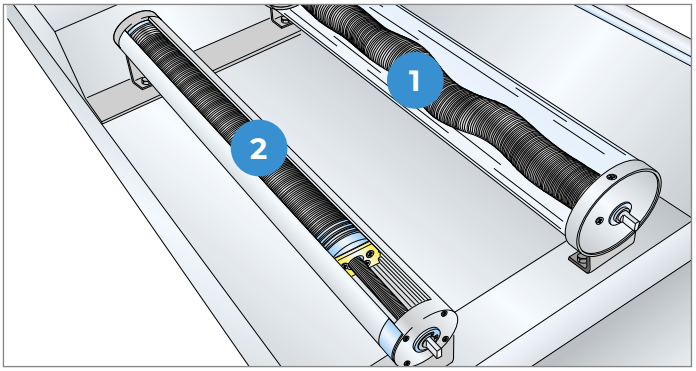
This new system allows the multiple springs to work according to an ideal geometry, keeping their coils properly spaced.

Fastening



This is the most reliable system for insuring a secure mechanical fastening between the band to the tube.

SURE-SPRING® Operating diagram



In **Mechanism 1 (traditional system)** the springs are rigidly attached to the fixed caps at the ends of the shaft.
In this system the springs helically twist and snake while winding or unwinding, causing obvious problems of friction and wear between the coils as well as between the coils and the central shaft.

In **Mechanism 2 (SURE-SPRING® system)** the springs are attached to a special moving cap, which slides lengthwise while winding and unwinding, keeping the spring coils packed and concentric at all times.
This spring configuration avoids most of the wear mentioned above, allowing better performance and a much longer operating life-span for the spring mechanism.

ROLL-UP COVERS FOR LATHES

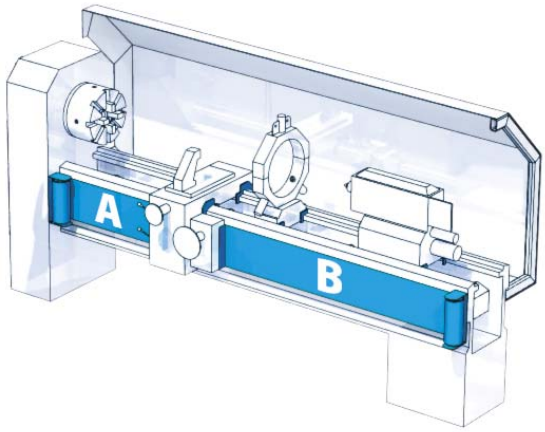
P.E.I. roll-up covers for lathes respond to the need to limit hazards caused by movement of the lead screw and/or spline shaft (Conforming to norm for Machinery Directives 2006/42/CE).

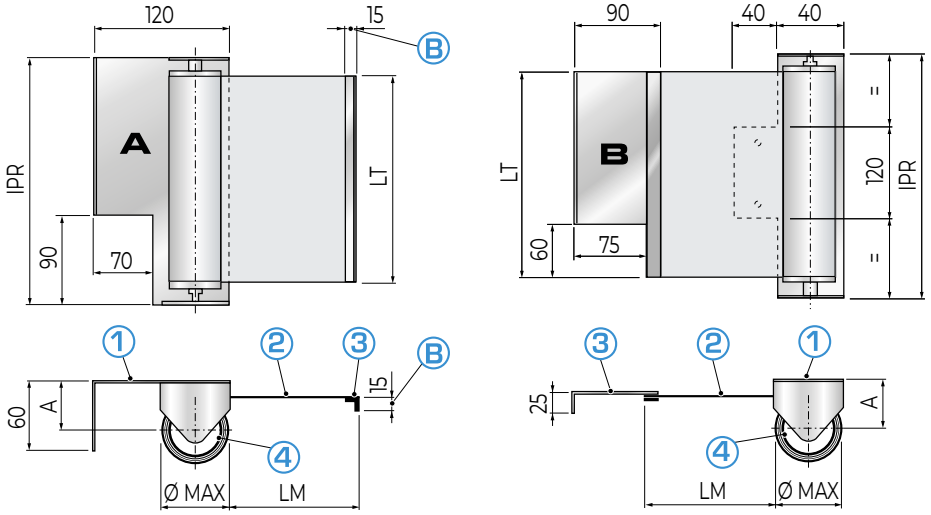
P.E.I. roll-up covers for lathes offer the following advantages:

- Ease of installation
- Adaptable to any type of lathe
- Compact size
- Shatter-proof in case of accidental breakage.

This is a kit designed to protect the machine operator from the lathe's lead and draw spindles and to prevent direct contact with the machine parts in motion.

The system consists of two separate roll-up covers that have to be attached to the two sides of the cross slide and to the machine base of the corresponding side.





① ③ **BRACKETS**
The ID codes:
LT150LM1200- LT200LM1500-
LT200LM2000- LT250LM3000
are of galvanized steel.
The ID codes:
LT300LM4000- LT350LM5000-
LT400LM6000-LT450LM7000
are black painted

② **BAND**
of coolant and oil resistant fabric

④ **RETURN MECHANISM**
with single or multiple springs

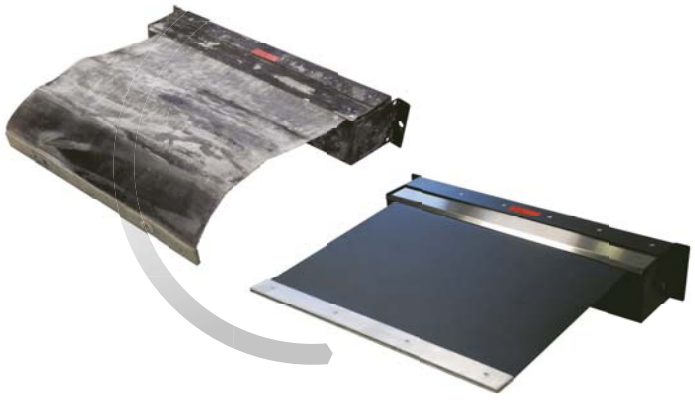
STANDARD SIZE

Legend	Description	ID code							
		LT150LM1200	LT200LM1500	LT200LM2000	LT250LM3000	LT300LM4000	LT350LM5000	LT400LM6000	LT450LM7000
LT	Band Width	150	200	200	250	300	350	400	450
LM	Max. Length	1.200	1.500	2.000	3.000	4.000	5.000	6.000	7.000
Ø MAX	Max. Diameter	48	52	62	83	100	121	141	144
A	Distance between supports	33	50	50	50	60	80	80	80
BxB	Raw aluminium corner	15x15x3	15x15x3	15x15x3	15x15x3	15x15x3	15x15x3	20x20x3	20x20x3

DIMENSIONS IN MM. ▪ OVERALL GUARD SIZE = LT + 30 ▪ PROMPT DELIVERY

ROLL-UP COVERS OVERHAULING

- Overhaul of all types of roll-up covers and shutterings with or without canister
- Replacement of the damaged flexible cover, shuttering or band
- Replacement of the mechanism
- Replacement of wipers or other components if worn-out
- Cleaning of all surfaces to original finish
- If the roll-up cover should be too damaged, we can build a new one.
- Short delivery time



INSPECTION OF P.E.I. STAFF FOR FIELD SURVEYS

We invite you to fill in the questionnaire available on our website: you will receive a targeted offer for roll-up covers

click here

X-Y 4R SHIELD

The **X-Y 4R** roll-up shield is a truly effective solution to the problem that occurs in horizontal machining centers when separating the tool working area from the motor area.
It allows the spindle to move freely in all directions and uses four (Patented) SURE-SPRING® roll-up covers.
The **X-Y 4R** shields are designed for accelerations up to 1,5g and speed up to 90 m/min.
For higher applications, please contact our engineering department.

watch on YouTube

APPLICATION EXAMPLES

X-Y SP-2R SHIELD

The **X-Y SP-2R** shield represents the most reliable system for protecting the work area, on the horizontal and vertical machining centers, in an environment where a large quantity of hot shavings is produced.
As shown in the picture, this system is mounted on a (patented) SHEET-POCKET™ Steel Cover on the Y-axis and two rollers on X-axis with Ceramix bands (other types of bands are available depending on requirements).
The design of this system takes into account ease of access for inspection as well as quick and easy assembly.

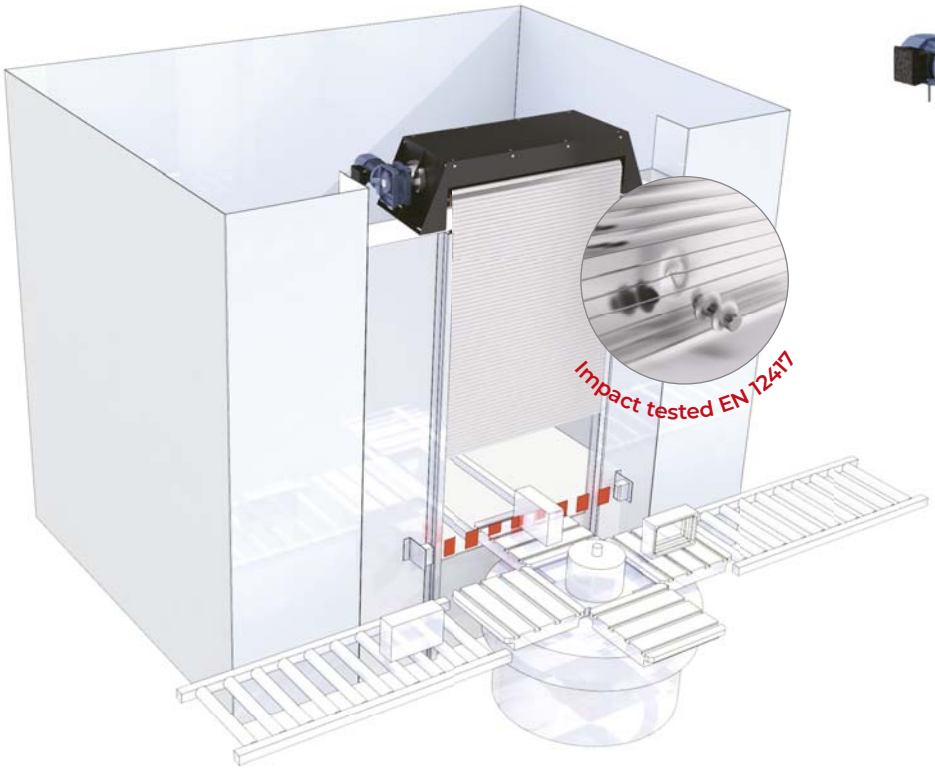
APPLICATION EXAMPLES

MOTOR ROLL-UP COVER

Roll-up cover for vertical application

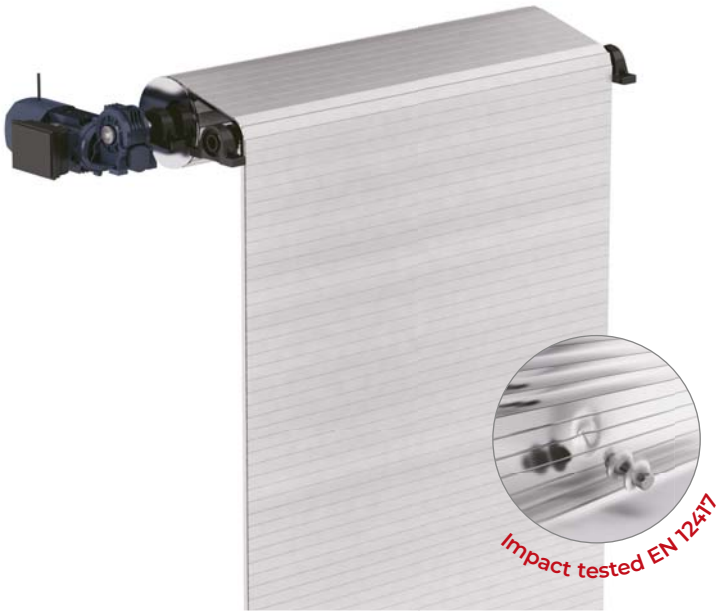
All **P.E.I.** apron covers can be equipped with a motor and serve as a dividing wall between the working area and the machine operator. This allows fast changing of the tool or the workpiece.
The apron cover works in a vertical position and can be designed with or without canister. The motor can be installed on the left or the right side, vertically or horizontally. Our design department is pleased to help you with any questions.

APPLICATION FOR CHANGING THE WORKPIECE



APPLICATION FOR THE TOOL CHANGE

VERSION WITHOUT CANISTER AND WITH DIVERTER PULLEY



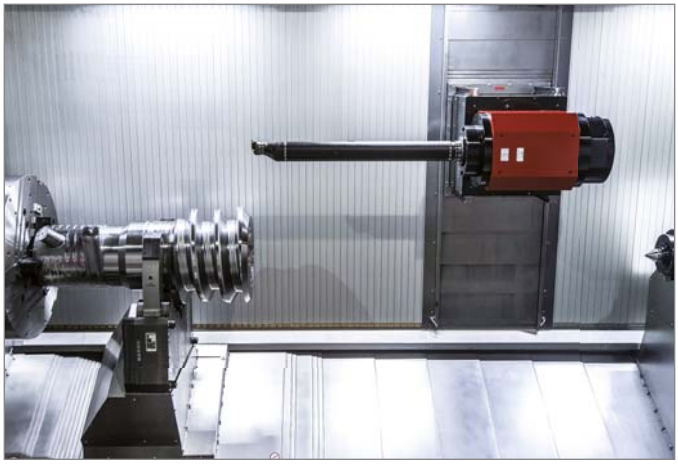
EXAMPLE OF A COVER WITH CANISTER AND SLIDE BEARING

WALL ROLL-UP COVER

Frontal roll-up covers for machine tools

WALL ROLL-UP COVER is a dividing wall between the working area and the machine room in large lathes. **WALL ROLL-UP COVER** consists of special **P.E.I.** roll-up covers.
The X-axis is equipped with an aluminium "J"-series apron, the Y-axis with a telescopic SHEET-POCKET™ cover with way wipers. Our design department is pleased to help you with any questions.

APPLICATION EXAMPLE



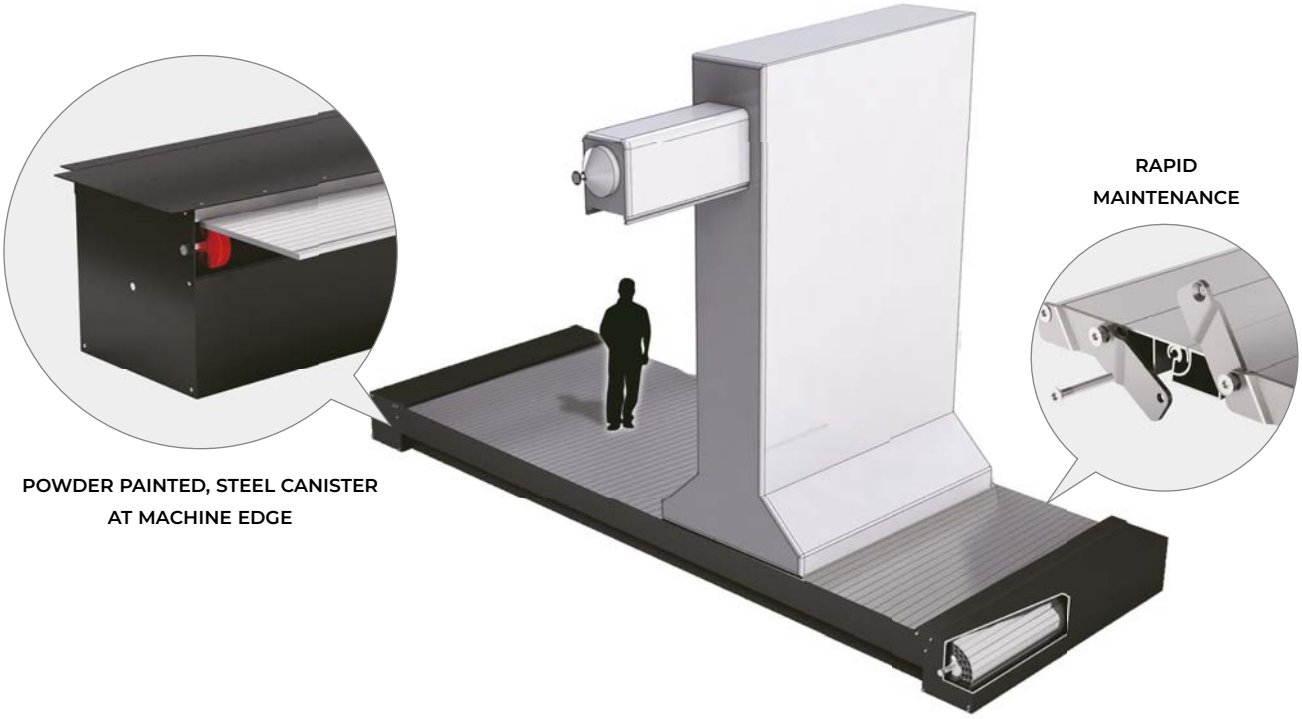
PIT ROLL-UP COVER

Walk-on roll-up covers for horizontal application

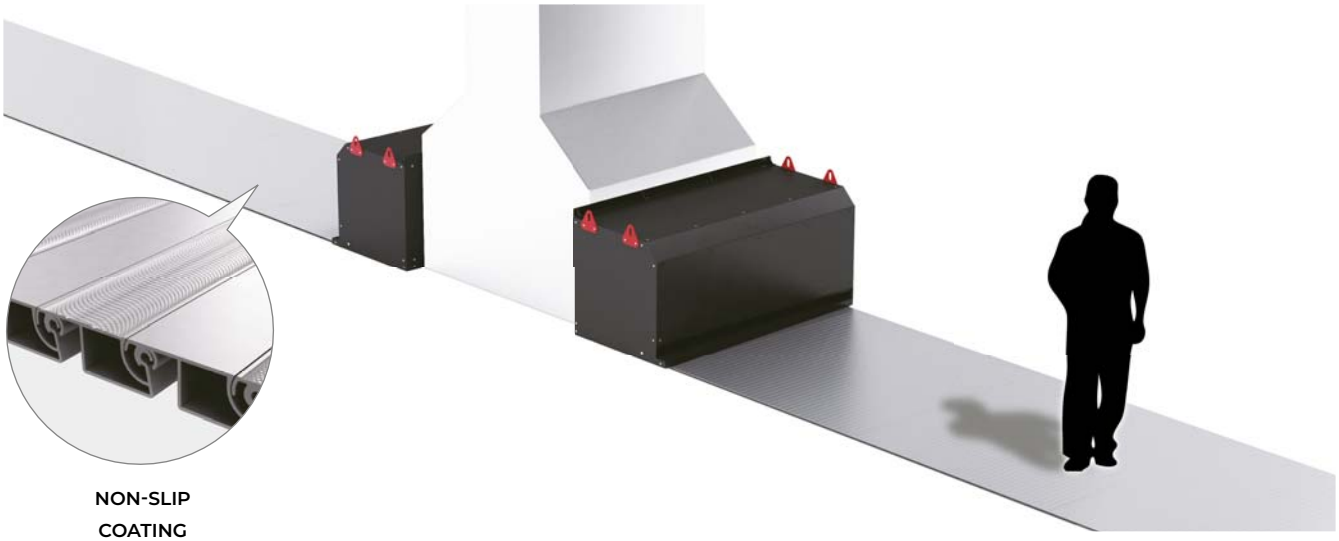
PIT ROLL-UP COVER closes the upper part of the pit of machines whose base (or other parts) lie below the tread. By use of this horizontally installed apron, current accident prevention regulations can be complied with. By installing the "J"-series apron cover, the machine pit / base can be walked-on at any time.

- Suitable for wet and dry machining
- Speed up to 120 m/min
- Guaranteed service life: 1.000.000 movements
- Entirely made of metal
- The side facing the flying chips has an absolutely even surface
- Cleaned by way wipers
- The mechanical winding mechanism produces no impact or vibration noise
- The lateral apron guide is designed in such a way that the chips fall into the chip conveyor
- Closed lateral steel plates produce a "chain effect"
- Modular system with single exchangeable elements
- Joint protected by an integrated labyrinth.

VERSION WITH CANISTERS INSTALLED AT THE BEGINNING OF THE PIT



VERSION WITH CANISTERS ATTACHED TO THE MACHINE COLUMN

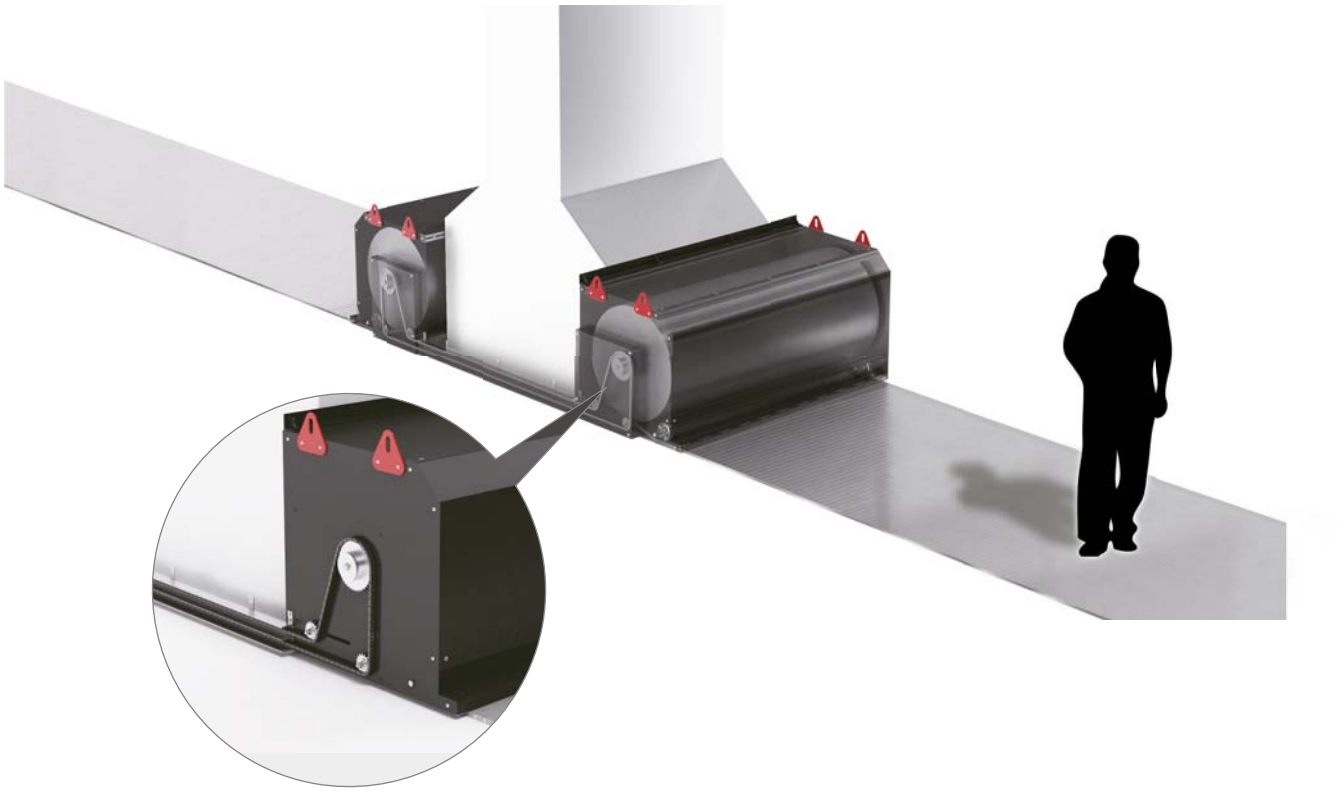


CHAIN ROLL-UP COVER

Walk-on roll-up covers, horizontal application for large runs

P.E.I. roll-up covers with chain movement (patented system).
They have the essential feature of keeping the strip perfectly fixed while the machine is running.

- The band is fixed relative to the floor, allowing people to cross the machine trench at any time even while the machine is in operation
- The winding tubes incorporated in the canisters are attached to the machine column
- A system compensating the diametre automatically allows for a concerted unwinding of the aprons
- The dimensions, layout, and speed of travel are developed for each order and can meet your exact needs
- Upon request, we can design a system using DC or pneumatic motors.



APPLICATION EXAMPLE

CORNER ROLL-UP COVER JM (Patented)

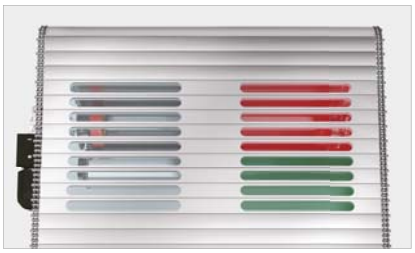
Roll-up cover for horizontal / vertical application

CORNER ROLL-UP COVER JM is a new **P.E.I** application: a roll-up cover that protects more than one side, both vertically and horizontally.

It is rolled up using a **P.E.I.** winding mechanism driven by a motor with integrated side chains fixed to the shutter, creating a rack effect.

This roll-up cover is provided with a new, 15.5 mm thick **JM** aluminium profile.

It is possible as a standard to equip the cover with **illumination** inside

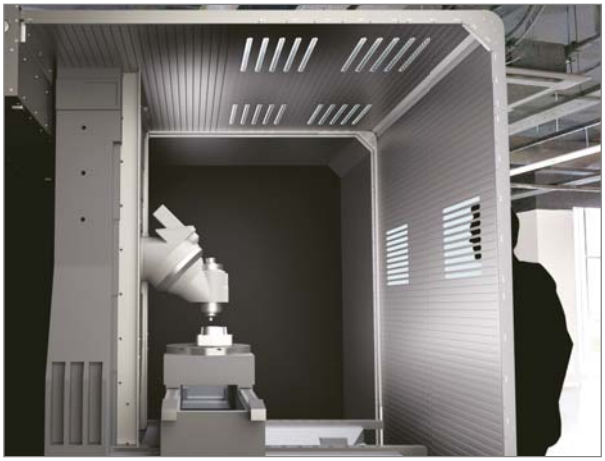


Option of viewing panel in versions:

- **transparent**
- **tinted for welding work**
- **tinted for laser working**

(after specification of equipment type and radiant source)

APPLICATION EXAMPLES

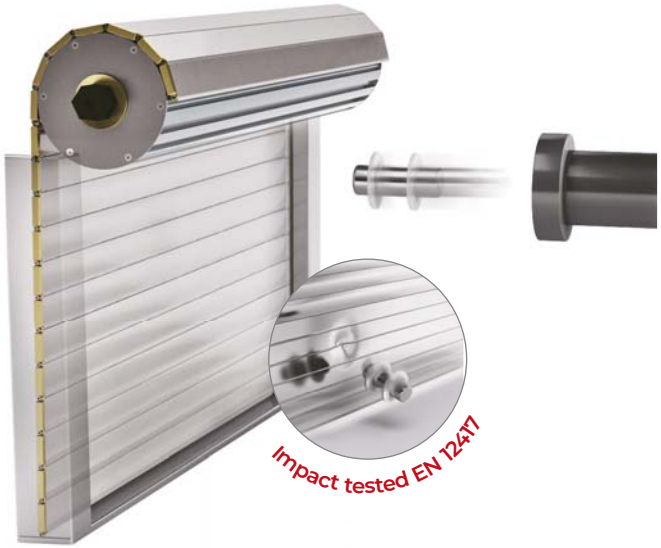


EXTRUDED APRONS

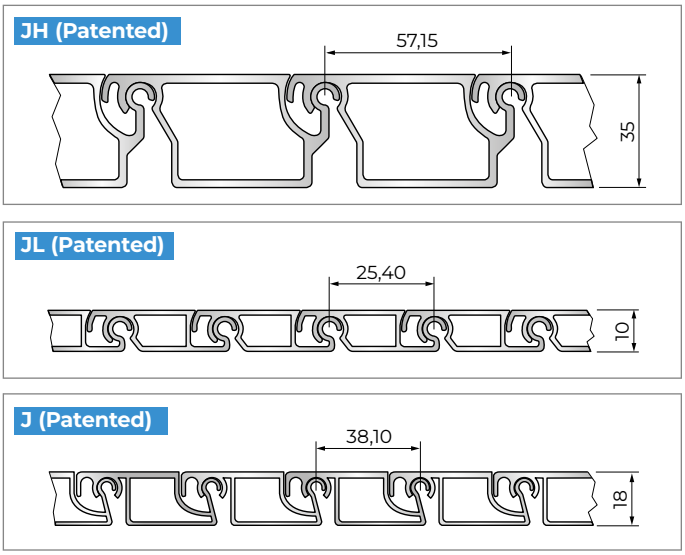
Extruded aprons are particularly robust: they are used where maximum protection of the guides from hot chips is required.
Their funtioning may be "drop-down" or by **P.E.I.** roll-up mechanism.

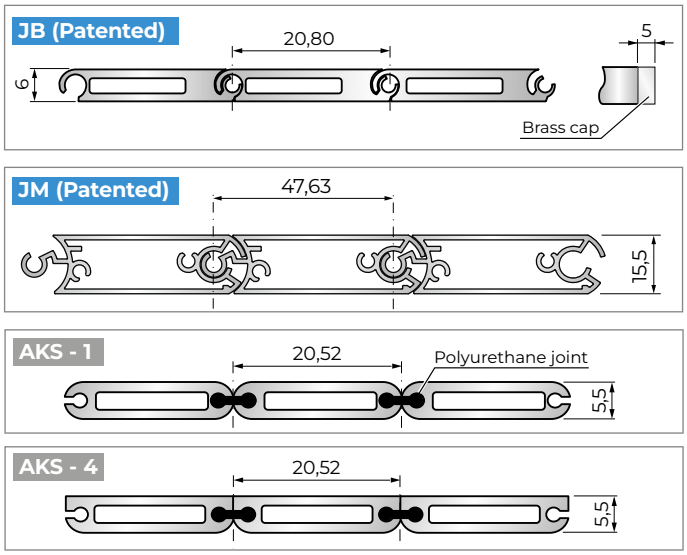
MATERIAL: Anodized silver aluminum
MAX. FEASIBLE WIDTH: 6000 mm.

All **"J"-series** apron covers are impact tested according to EN 12417.



AVAILABLE PROFILES SHAPES AND OVERALL DIMENSIONS





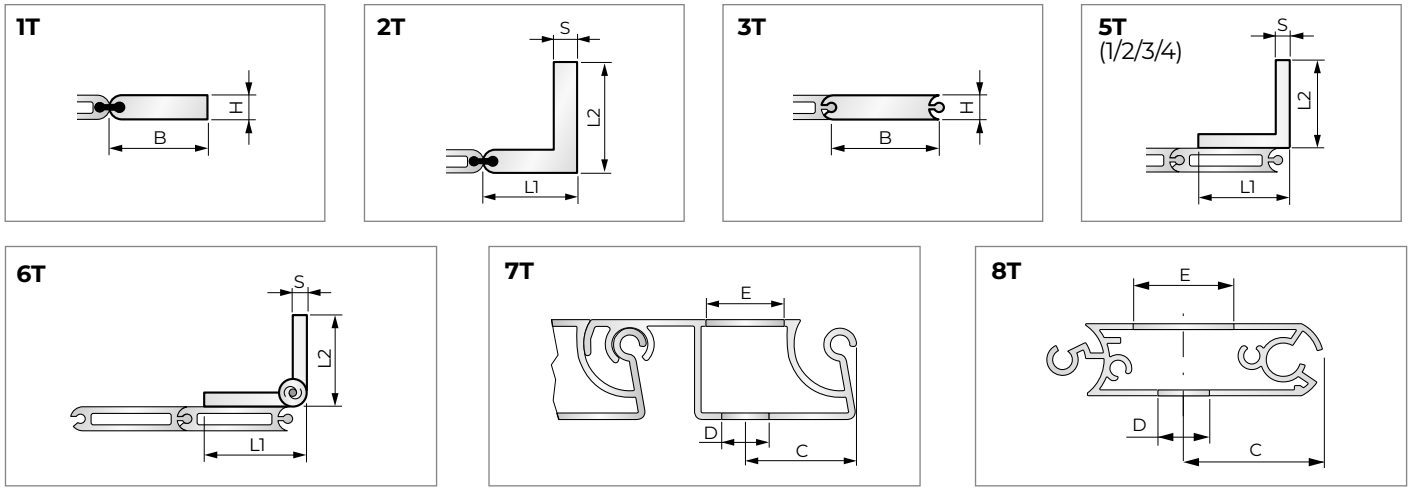
Dimensions in mm.

CODE	Minimum winding diameter		Cover weight	Cover cleaning	Bending strength, support distance*		Max. charge permitted	Impact tested EN12417	Anti-slip treatment	Traction strength kN/m
	With upper roller	With lower roller			(90 Kg)	(150 Kg)	kg each wheel Ø100			
	mm	mm	Kg/m²		mm	mm	Kg	Joule		
JH	200	200	25,0	Wiper	4500	4000	75	250	Upon request	2
JL	100	100	12,2	Wiper	1200	1000	50	90	Upon request	2
J	150	150	12,5	Wiper	2200	1750	50	150	Upon request	2
JB	/	60	9,5	Wiper	750	600	50	150	Not available	2
JM	/	150	14,8	Wiper	2250	1850	50	150	Not available	2
AKS1	50	50	9,0	Brush	750	600	/	/	Not available	1,2
AKS4	/	50	9,0	Wiper	750	600	10	/	Not available	1,2

* Max. bending 1% of the support distance

SOME AVAILABLE PROFILES

STANDARD END MOUNT PROFILES



NOTE: We can provide end mountings to match customer drawings upon request.

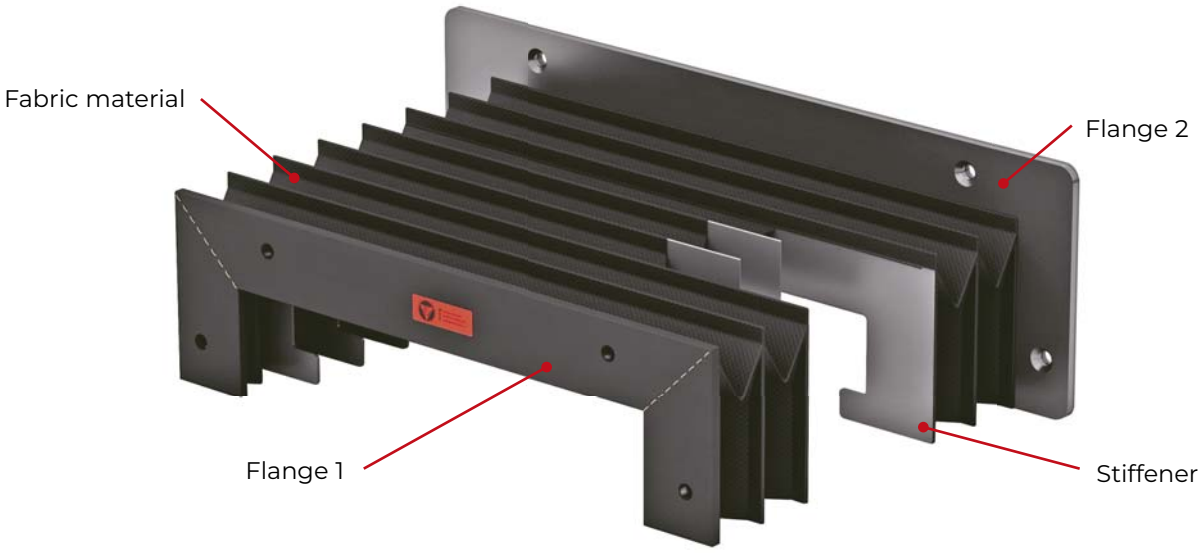
END MOUNT DIMENSIONS

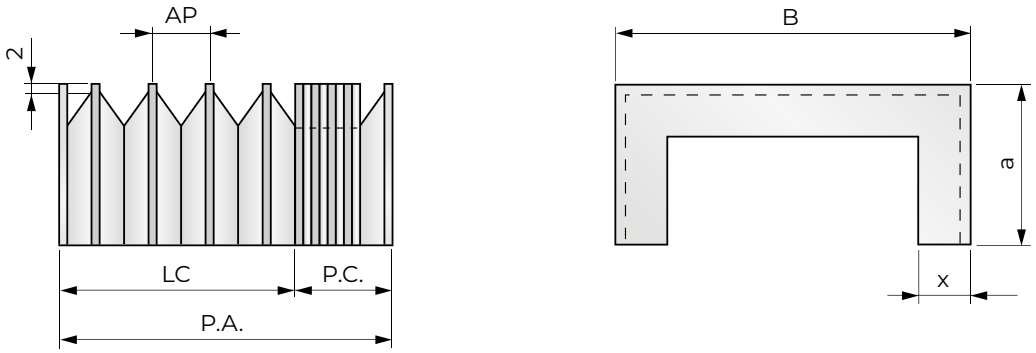
End mount code	L1xL2xS	BxH	C	D	E	Material	Description	Cover code
1T		25x5,5				Al	Flat	AKS-1 / AKS-4
2T	20x30x5,5					Al	Corner	AKS-1 / AKS-4
3T		20x6				Al	Cover	JB
5T/1	15x15x3					Al-Stl	Corner	JB
5T/2	20x20x3					Al-Stl	Corner	JB
5T/3	30x30x3					Al-Stl	Corner	J / JB / JL / JM
5T/4	40x40x5					Ac	Corner	J / JH / JM
6T	30x30x2					Ac	Stl hinge	AKS-1 / AKS-4 J / JL / JH / JB / JM
7T	Drilling upon request only		18	ø 5,50	ø 10	Al	Cover	JL
			20	ø 8,50	ø 14			J
			35	ø 13	ø 20			JH
8T			30	11	22	Al-Stl	Corner	JM
Al = Aluminium Stl = Steel								

Dimensions in mm.

THERMIC-WELDED STANDARD COVERS

The **P.E.I.** thermic-welded standard covers guarantee optimal protection for any type of machine tool thanks to the different shapes and the high-quality of the materials.
The selected materials are wear-proof and heat-resistant, making the standard **P.E.I.** thermic-welded covers ideal for protecting the parts of machine tools.





P.A.	=	Open length	**B**	=	Outside width
P.C.	=	Closed length	**a**	=	Outside height
LC (Stroke)	=	Open length - Closed length	**x**	=	Fold height

Formula for calculating the CLOSED LENGTH

AP = Opening of 1 fold = $x \cdot 2 - 8$

SM = Fabric thickness *

SS = Stiffener thickness *

SF = Flange thickness *

NP = Number of folds = $\frac{P.A.}{AP} + 2$

P.C. = $(SM \cdot 8 + SS) \cdot NP + (SF \cdot 2)$

* See materials list on page 37.

This data sheet shows only one type of our thermic-welded covers.
Contact our engineering department for other types.

Example:

Given that: Fold height = 15 mm
Open length = 1000 mm

Opening of 1 fold = 15 x 2 - 8 = 22

Number of folds = $\frac{1000}{22} + 2 = 48$

Closed length = (0,25* x 8 + 1**) x 48 + (2*** x 2)
Closed length = 3 x 48 + 4 = 148

Closed length = 148 mm

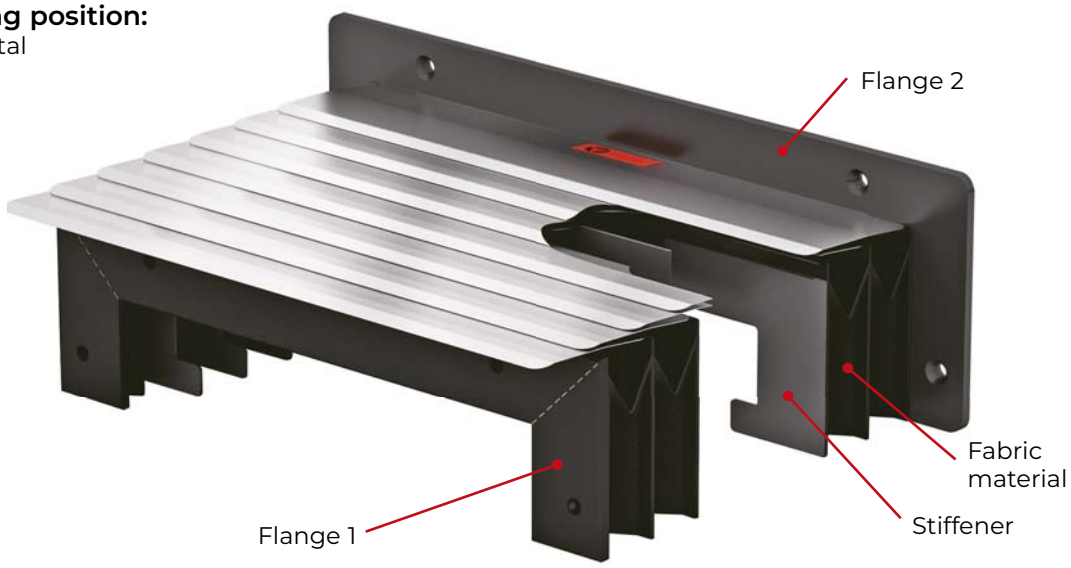
* We hypothesize the fabric material with code "TEMAT015" (see materials list on page 37)
** We hypothesize that the stiffener is 1 mm thick
*** We hypothesize that the flange is 2 mm thick (see materials list on page 37)

Dimensions in mm.

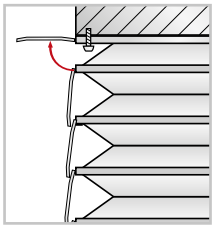
THERMIC-WELDED COVER WITH FIXED LAMINATIONS

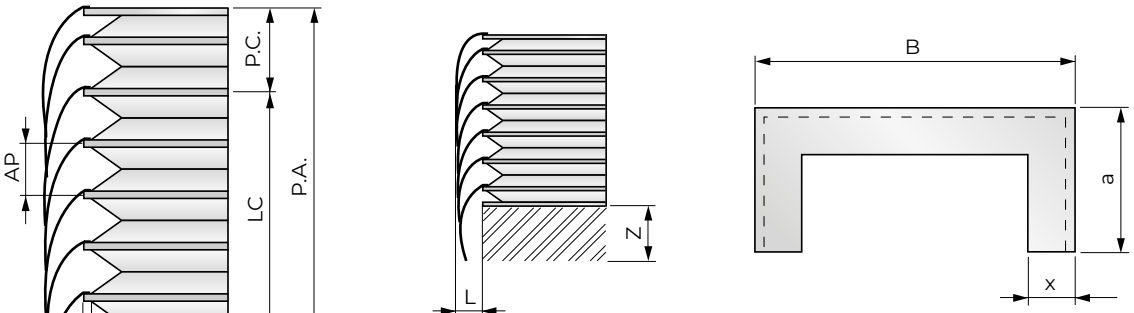
Bellows with fixed laminations are used on every type of machine tool: often used in machining centres and metal-cutting machines.
Metal elements, called "laminations", protect the bellows from shavings and prevent damages.

Working position:
Horizontal
Vertical
Frontal



Possible special fixing to facilitate the mounting of the first steel lamination





P.A.	= Open length	**B**	= Outside width
P.C.	= Closed length	**a**	= Outside height
LC (Stroke)	= Open length - Closed length	**x**	= Fold height

x(mm)	15	20	25	30	35	40	45
L(mm)	16	21	26	33	43	48	56
Z(mm)	45	55	65	75	85	95	105

Formula for calculating the CLOSED LENGTH

AP = Opening of 1 fold = x · 2 - 16

SM = Fabric thickness *

SS = Stiffener thickness *

SF = Flange thickness *

NP = Number of folds = $\frac{P.A.}{AP} + 2$

P.C. = (SM · 8 + SS) · NP + (SF · 2)

Example:

Given that: Fold height = 45 mm
Open length = 1800 mm

Opening of 1 fold = 45 x 2 - 16 = 74

Number of folds = $\frac{1800}{74} + 2 = 27$

Closed length = (0,35* x 8 + 1**) x 27 + (3*** x 2)

Closed length = 3,8 x 27 + 6 = 109

Closed length = 109 mm

* We hypothesize the fabric material with code "TEMAT151" (see materials list on page 37)
** We hypothesize that the stiffener is 1 mm thick
*** We hypothesize that the flange is 3 mm thick (see materials list on page 37)

* See materials list on page 37

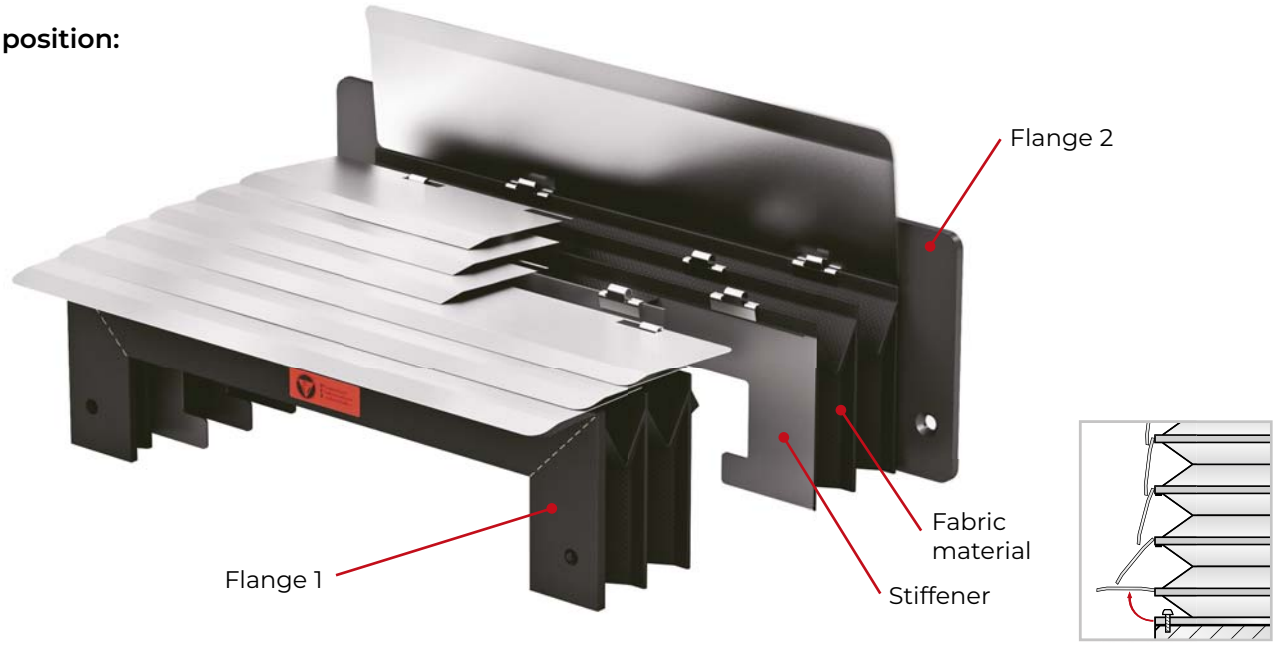
This data sheet shows only one type of our thermic-welded covers.
Contact our engineering department for other types.

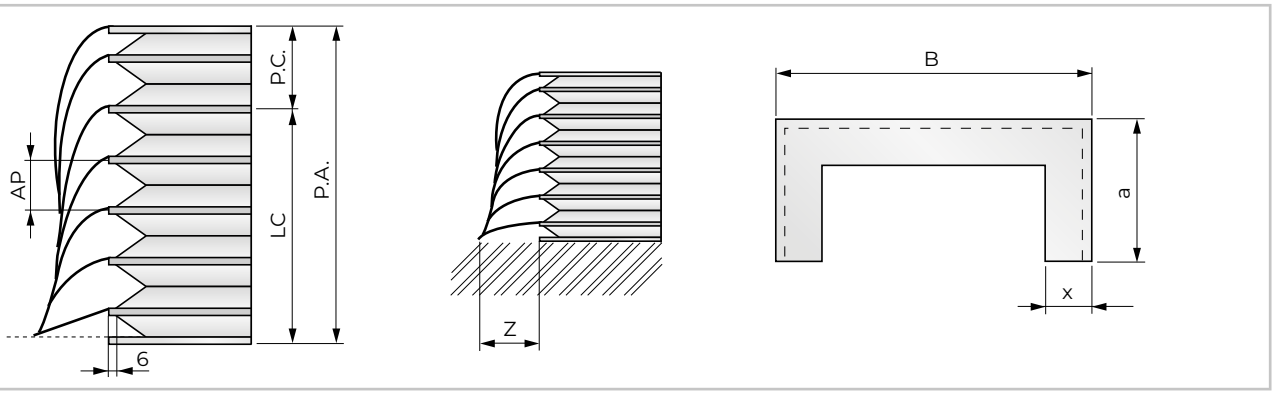
Dimensions in mm.

THERMIC-WELDED COVER WITH FLEXIBLE LAMINATIONS

The **P.E.I.** thermic-welded standard covers are supplied also with flexible laminations, able to guarantee the same protection as the fixed ones, but they offer more flexibility in matching the supporting plan, thanks to their rotating capability.

Working position:
Vertical





P.A.	= Open length	**B**	= Outside width
P.C.	= Closed length	**a**	= Outside height
LC (Stroke)	= Open length - Closed length	**x**	= Fold height

x(mm)	15	20	25	30	35	40	45
Z(mm)	40	50	60	70	80	90	100

Formula for calculating the CLOSED LENGTH

AP = Opening of 1 fold = $x \cdot 2 - 16$

SM = Fabric thickness *

SS = Stiffener thickness *

SF = Flange thickness *

NP = Number of folds = $\frac{P.A.}{AP} + 2$

P.C. = $(SM \cdot 8 + SS) \cdot NP + (SF \cdot 2)$

Example:
Given that: Fold height = 30 mm
Open length = 1000 mm

Opening of 1 fold = 30 x 2 - 16 = 44

Number of folds = $\frac{1000}{44} + 2 = 25$

Closed length = (0,25* x 8 + 1**) x 25 + (2*** x 2)

Closed length = 3 x 25 + 4 = 79

Closed length = 79 mm

* We hypothesize the fabric material with code "TEMAT015" (see materials list on page 37)
** We hypothesize that the stiffener is 1 mm thick
*** We hypothesize that the flange is 2 mm thick (see materials list on page 37)

* See materials list on page 37

This data sheet shows only one type of our thermic-welded covers.
Contact our engineering department for other types.

Dimensions in mm.

THERMIC-WELDED COVER MATERIALS

The fabrics selected by **P.E.I.** have excellent mechanical bending and folding strength produced during machinings. They have as well excellent resistance to petroleum products, oils and heavy abrasion, minor welding splatters or hot materials.

Fabric material code	Description			Thickness (mm)	Heat resistance			Primary resistance characteristics
	Visible side	Fabric insert	Internal side		Momentary contact °C	Continuous min. °C	Continuous max. °C	
TEMAT106	Ptfe	Polyester	Polyurethane	0,30	+200	-30	+120	Excellent resistance to oils and chemical products. No adhesive surface. Low friction coefficient. Excellent chemical inertia. Excellent resistance to abrasion and bending strength. **Mainly used in grinding machines.**
TEMAT015	Polyurethane	Polyester	Polyurethane	0,25	+200	-30	+ 90	Excellent resistance to petroleum products, oils and heavy abrasion. Excellent bending strength.
TEMAT151	Polyurethane	Polyester	Polyurethane	0,35	+200	-30	+ 90	
TEMAT164	Polyurethane	Kevlar*	Polyurethane	0,35	+350	-30	+180	Excellent resistance to petroleum products, oils and heavy abrasion. Excellent bending strength. Excellent mechanical strength. Kevlar also has excellent shear strength. Normally used when there is heavy mechanical stress, a large amount of sharp shavings, and at high temperatures. **Self-extinguishing.**
TEMAT165	Polyurethane	Nomex*	Polyurethane	0,36	+300	-30	+130	Excellent resistance to petroleum products, oils and heavy abrasion. Excellent bending strength. Excellent mechanical strength. Good resistance to minor welding splatter or hot material. Widely used in laser cutting machines. **Self-extinguishing**.
TEMAT169	Polyurethane	Panox*/ Kevlar*	Polyurethane	0,33	+300	-30	+130	Excellent resistance to petroleum products, oils and heavy abrasion . Excellent bending strength. Excellent mechanical strength. Good resistance to minor welding splatter or hot material. **It may be considered as the best fabric on the market for use in laser cutting machines. Self-extinguishing.**
TEMAT017	PVC	Polyester	PVC	0,36	+100	-30	+ 70	Mainly used around heavy ambient dust, minor splatters of coolant and oil. Also suitable for use around acids.
TEMAT020	PVC	Polyester	PVC	0,25	+100	-30	+ 70	

* Kevlar, Panox and Nomex are registered trademarks.
Contact our engineering department for other materials and applications.

Stiffener materials

Stiffener material code	Description	Thickness (mm)	Notes
PVC 05	PVC	0,50 **	Outside width (B) up to 300 mm
PVC 10	PVC	1	Outside width (B) from 301 up to 700 mm
PVC 15	PVC	1,5	Outside width (B) from 701 up to 1500 mm

** NOT recommended for thermic-welded covers with laminations.

Flange materials

Flange material code	Description	Thickness (mm)
AL	Aluminium	2 - 3 - 4 - 5
INOX	AISI304	1 - 1,5 - 2 - 2,5 - 3
AC	Carbon steel	1 - 1,5 - 2 - 2,5 - 3 - 4 - 5
PVC	PVC	1 - 1,5 - 2 - 3

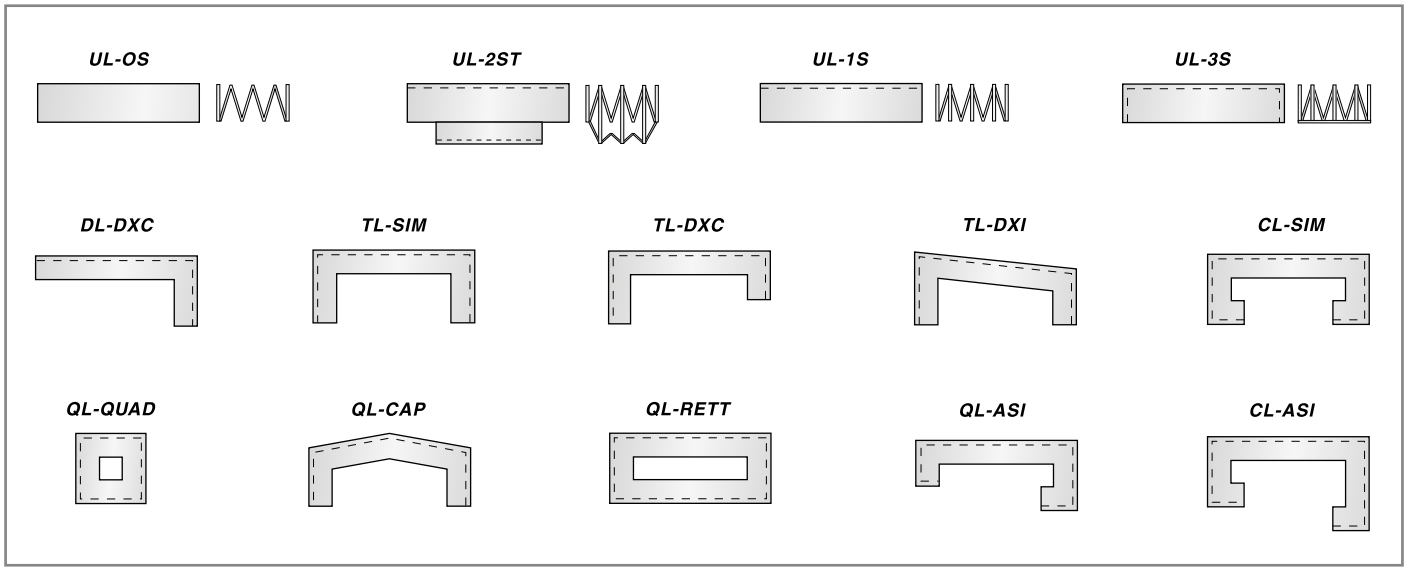
Lamination materials

Lamination material code	Description	Primary applications
AL	Aluminium (Baked Enamel Finish)	For use around welding splatter, small and medium-sized hot shavings. Especially suitable for use around continuous sparks. Appropriate where lightweight materials are necessary.
INOX	Stainless Steel	In work environments with large shavings. Especially suitable for use around acids.

Dimensions in mm.

Shapes

Here below are only standard shapes of thermic-welded covers, other shapes available upon request.



Code legend:

UL-OS = Folding fabric only

UL-2ST = Thermic-welded bellows with two weld seams and pull-out stop inside the bellows

UL-1S = One-sided bellow with PVC supports

UL-3S = One-sided thermic-welded bellows with three welded edges

DL-DXC = Thermic-welded bellows with two welded edges

TL-SIM = Thermic-welded bellows with three welded edges, symmetrical shape

TL-DXC = Thermic-welded bellows with three welded edges, asymmetrical shape

TL-DXI = Thermic-welded bellows with three welded edges, slanted shape

CL-SIM = Thermic-welded bellows with five welded edges, symmetrical shape

QL-QUAD = Thermic-welded bellow, square shape

QL-CAP = Thermic-welded bellow, roof shape

QL-RETT = Thermic-welded bellow, rectangular shape

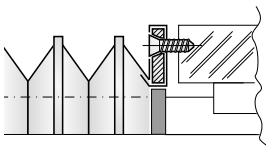
QL-ASI = Thermic-welded bellows with four welded edge, asymmetrical shape

CL-ASI = Thermic-welded bellows with five welded edge, asymmetrical shape

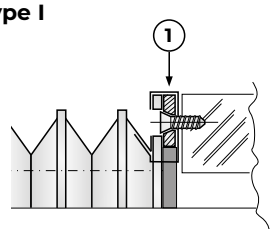
Flange Fastening Systems

- Fixing flange **Type A**: Flange covered by bellow fabric (without last support)
- Fixing flange **Type I**: Painted flange, fixed to last bellow support
- Solution with sheet steel, aluminium or PVC flange
- Shape and holes per customer drawings

Type A



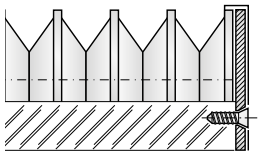
Type I



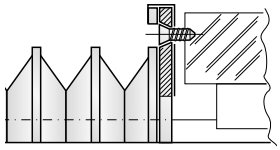
1 = Flange

- Fixing flange **Type B1**: Solution with connector flange protruding inside from the cover profile
- Fixing flange **Type B2**: Solution with connector flange protruding outside from the cover profile
- Solution with sheet steel, aluminum or PVC flange
- Shape and holes per customer drawings

Type B1

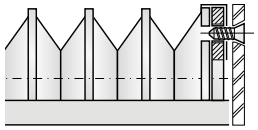


Type B2



- Painted flange, fixed to last bellow support with threaded bores
- Solution with sheet steel flange
- Shape and holes per customer drawings
- Threaded flange holes

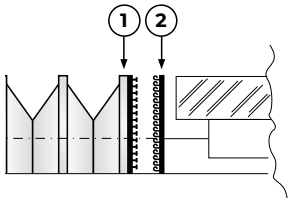
Type C



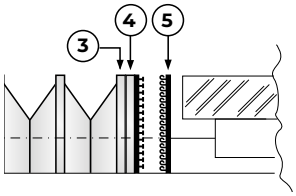
- Solution with rapid VELCRO connection.
- A PVC support acts as a flange, with VELCRO strips applied to the stiffener and directly to the machine.
- This solution offers:
  - Rapid application and removal of the cover
  - Low cost

Recommended for dry work environments

Type E



Type H

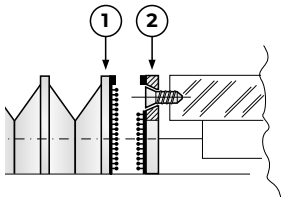


1 = PVC cover stiffener
2 = Strip of Velcro applied to the machine
3 = PVC stiffener
4 = Flange
5 = Strip of Velcro applied to the machine

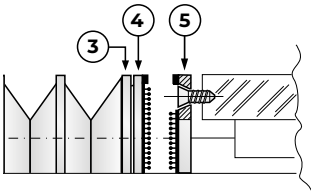
- Solution with STRONG HOLD rapid connection.
- Solution with sheet steel, aluminum or PVC flange. Shape and holes per customer drawings.
- This solution offers:
  - Rapid application and removal of the cover
  - Foam gasket strip provides a tight seal around the connection.

Recommended for wet work environments

Type F



Type G (Entire fold in PVC)



1 = PVC stiffener
2 = Flange
3 = PVC stiffener
4 = Flange
5 = Counterflange

We invite you to fill in the questionnaire available on our website: you will receive a targeted offer for flat covers

click here

BELLOWS FOR HOISTING PLATFORMS

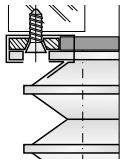
Hoisting platforms are often used in industrial or logistic areas, but are also used as undercarriages for medical equipment and wherever goods need to be moved.

The lifting area underneath the platform is exposed to dust, dirt or other foreign bodies, therefore it should be protected.

The bellows also act as safety guard, minimising the risk of injury to operators.

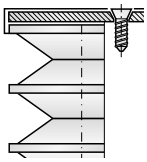
Standard systems for fastening bellows for lift tables

I



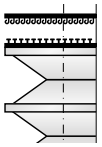
Solution with sheet steel, aluminum or PVC flange. Shape and holes per customer drawings.

B



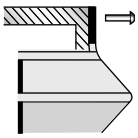
Solution with sheet steel, aluminum or PVC flange. Shape and holes per customer drawings.

E



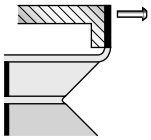
Solution with rapid VELCRO connection.
This solution offers:
- Rapid application and removal of the cover
- Low cost

CI



Bellows inner collar. Suitable for screw fastening.

CE



Bellows outer collar. Suitable for screw fastening.

QUICK BOX BELLOWS (Patent Pending) NEW

This bellow for lifting platforms is supplied disassembled for easy on-site assembly

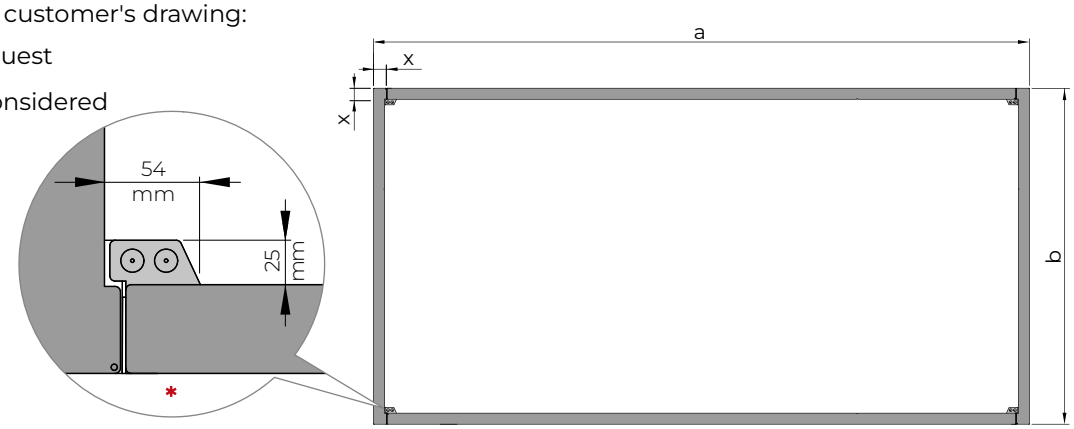
QUICK BOX BELLOW is supplied in separate elements that can be joined together by simple mechanical fasteners - without any tool - and then attached to the platform.
The compact packaging results in significant savings in transport and storage.

Available in yellow or black.

It is made according to the customer's drawing:

a - b - x = Sizes upon request

* = Internal space to be considered in design phase

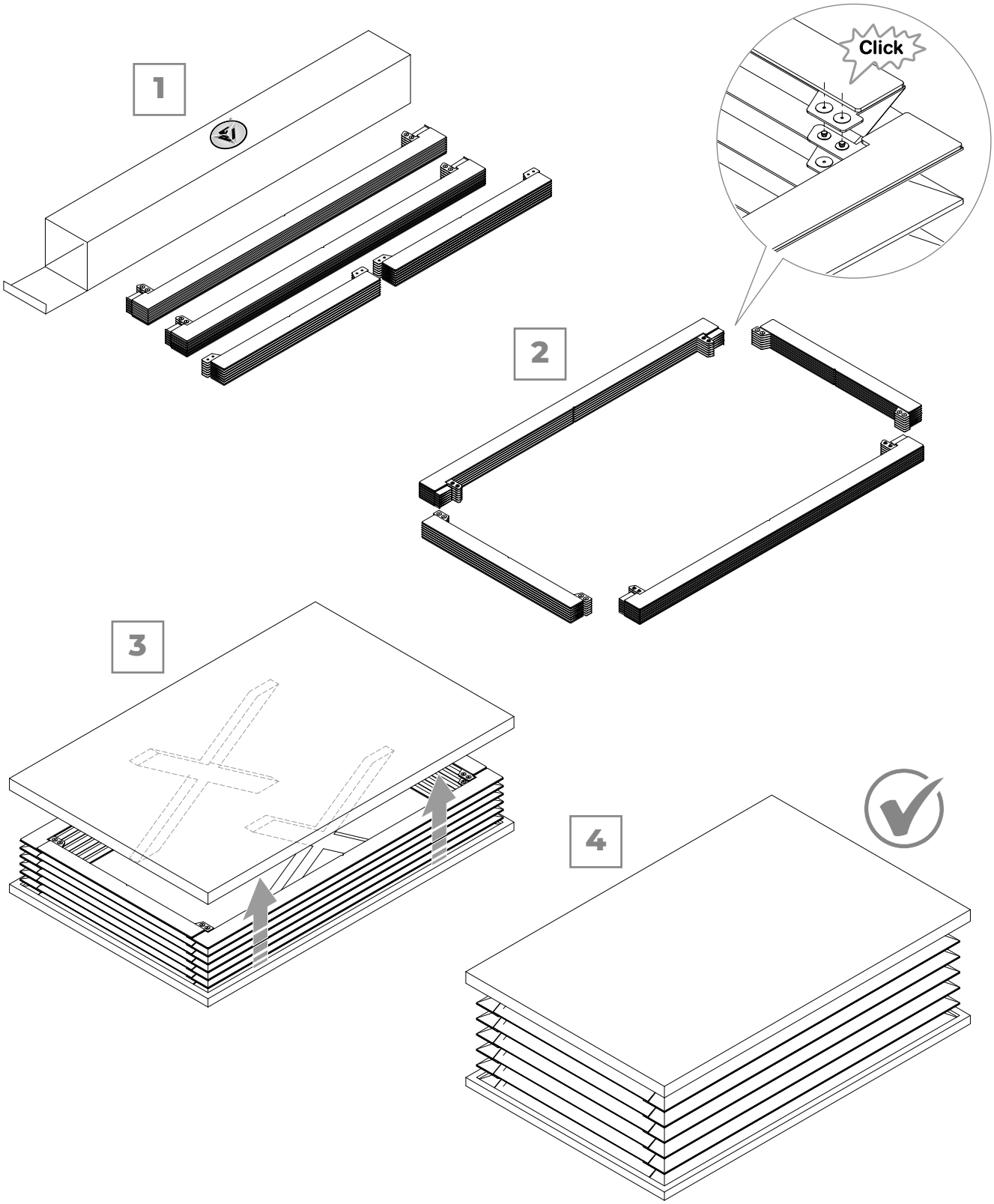


We invite you to fill in the questionnaire available on our website: you will receive a targeted offer for bellows for hoisting platforms

click here

QUICK BOX BELLOWS (Patent Pending)

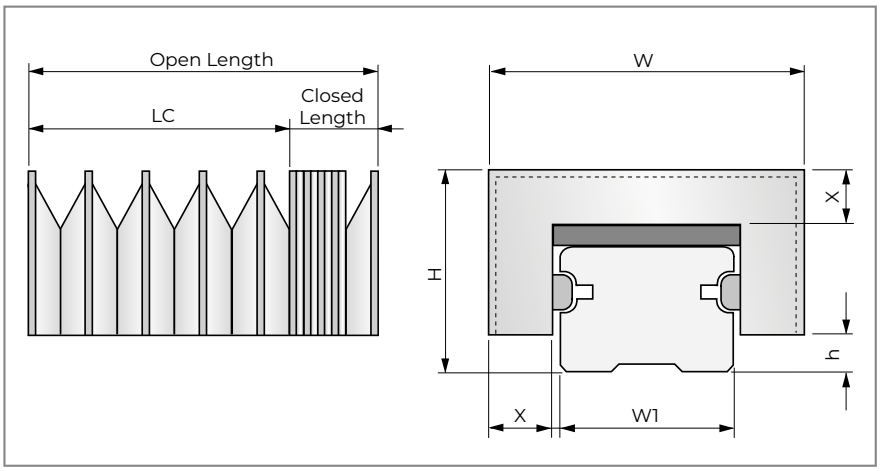
Assembly sequence:



full video available on YouTube

THERMIC-WELDED COVERS FOR LINEAR SLIDES

Thanks to the cutting precision of the PVC supports, which guarantees perfect adhesion to the slide, and the range of materials used, **P.E.I.** bellows are widely used in all industrial sectors.



Example of bellows mounted on linear slides

Standard thermic-welded covers size

Slide nominal value **W1** (mm)	Ply height **X** (mm)	Bellow width **W** (mm)	Total height **H** (mm)	Slide deviation **h** (mm)
15	19	56	36	5
20	19	61	40,5	5
25	19	67	43	7,5
30	19	72	51	8
35	19	76,5	51	9
45	19	87,5	61	10
55	25	108	73	15
65	32	132	90	15

(For the W1 slide over size 65, please contact our Technical Dept.)

Standard materials list

Material Type	Support	Fabric material	Closed length for 1000 mm of open length
S1	PVC 0,50	PVC + Polyester + PVC 0,25 (TEMAT020)	90 mm
P1	PVC 0,50	Polyurethane + Polyester + Polyurethane 0,25 (TEMAT015)	90 mm
LX	PVC 1,00	Polyurethane Panox/Kevlar + Polyurethane 0,33 (TEMAT169)	150 mm

We invite you to fill in the questionnaire available on our website: you will receive a targeted offer for thermic-welded covers for linear slides

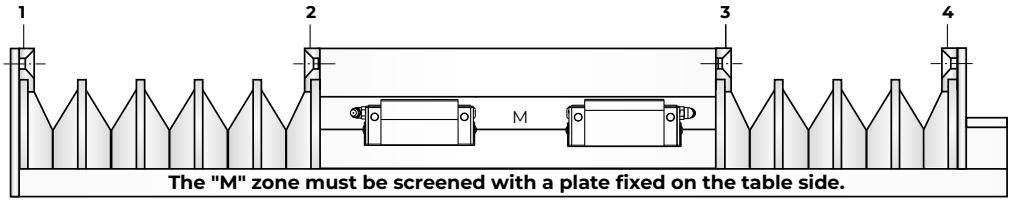
click here

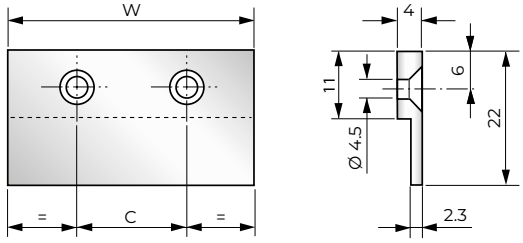
Thermic-welded covers standard systems for linear slides

For different sizes, please contact our technical department.

Solution A: Fastening holdfasts

Suitable for heavy working places and in coolants presence



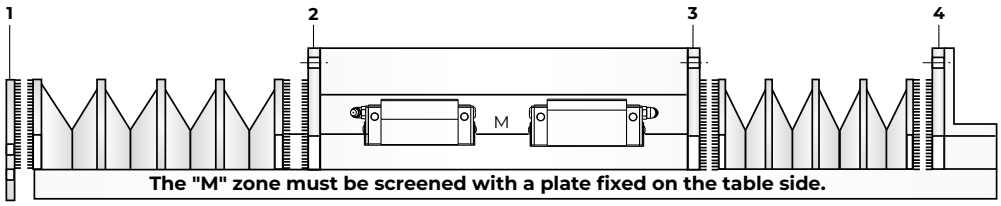


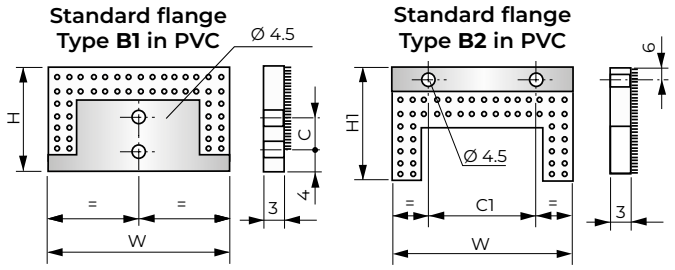
SLIDE	W	C	HOLES No.
15	52	26	2
20	57	29	2
25	63	32	2
30	68	34	2
35	72	36	2
45	83	28	3
55	104	35	3
65	128	32	4

Suitable for bellows fastening in positions **1 - 2 - 3 - 4**, with angular or plate supports provided by customers.

Solution B: Velcro flange fastening (B1 and B2)

Suitable for dry working places





SLIDE	W	H	C	W	H	HOLES No.
15	56	36	0	42	26	2
20	61	40,5	8	46,5	29	2
25	67	43	8	46,5	32	2
30	72	51	8	54	34	2
35	76,5	51	18	53	36	2
45	87,5	61	18	62	28	3
55	108	73	18	69	35	3
65	132	90	18	86	32	4

Pos. **1** a) Fix the type 1 standard flange at the head of the slide.
b) Fix the bellows to the type 1 standard flange by pressing strongly.

Pos. **2-3** a) Fix the table or the mounting plate to the type 2 standard flange by means of screws.
b) Fix the bellows to the type 2 standard flange by pressing strongly.

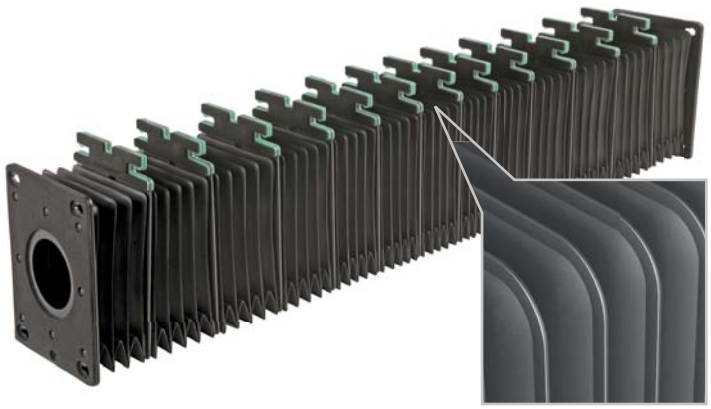
Pos. **4** a) Fix the type 2 standard flange to the angular support provided by the customer by means of screws.
b) Fix the bellows to the type 2 standard flange by pressing strongly.

N.B. Fastening options showed in Pos. 1-4 are interchangeable

Dimensions in mm.

BELLOWS FOR LASER MACHINES

The bellows for the mechanical parts are made of fabric with high strength, while the bellows for the optical beam are more complex, as they have to ensure the sealing of the pressurised gas and limit any divergence of the laser beam by means of internal metal inserts.
The fabric must also be self-extinguishing and must not emit dust.

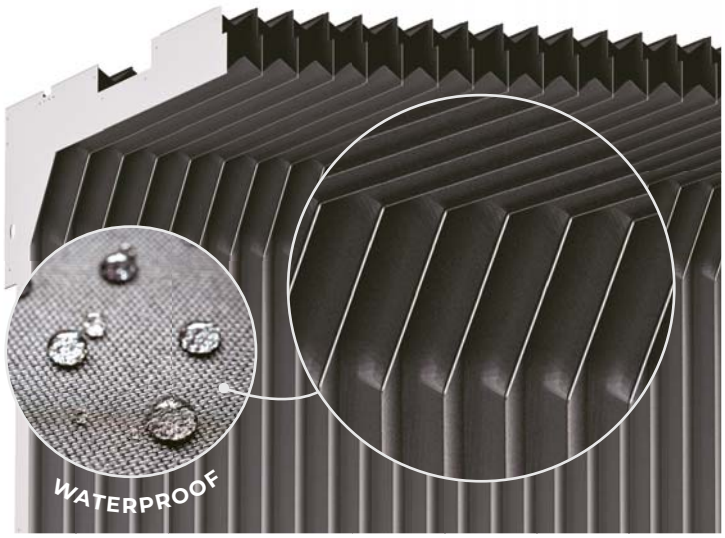


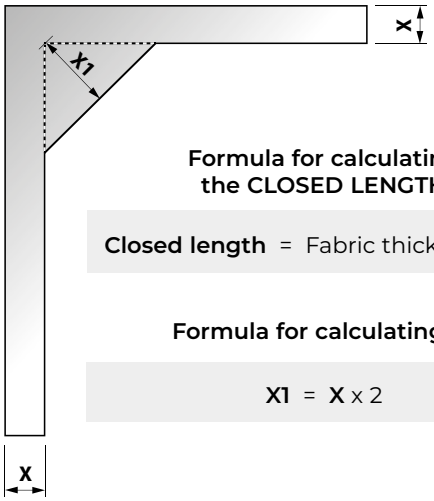
MULTI-STEEL (Patented)

Thermic-welded bellows with laminations on many sides are the ideal solution for complete protection of the roof and crossbar in multi-shaft working centres.
The corners are closed and steel inox laminations applied with a perfect 90° fold thanks to the elastic deformation of the material and the special geometry.
More than two sides can be covered and with different angles.
For this type of bellow consult our engineering department.

EVER-CLEAN

The construction of the corner is the main feature of this thermic-welded bellow.
The bellow is guaranteed to be free from chips and sludge, there are no creases in the fabric obstructing the chip falling into the conveyor. The closed length of the bellow is smaller than traditional thermic-welded bellows due to the absence of folds of fabric in the corner.
For this type of bellow consult our engineering department.





Formula for calculating the CLOSED LENGTH

Closed length = Fabric thickness x 4,5

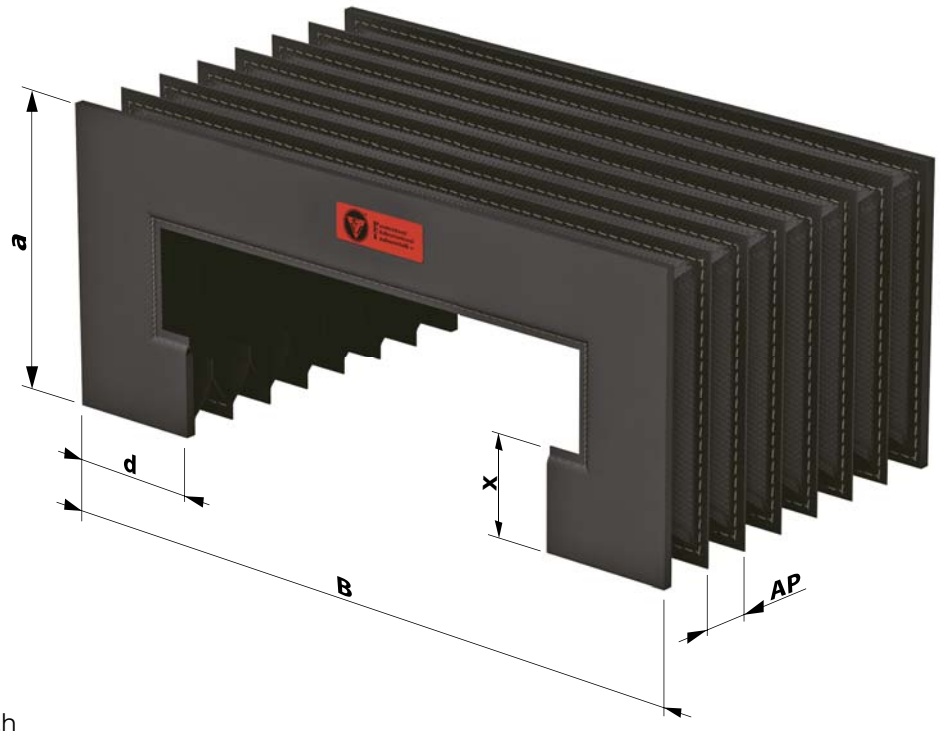
Formula for calculating X1

X1 = **X** x 2

Dimensions in mm.

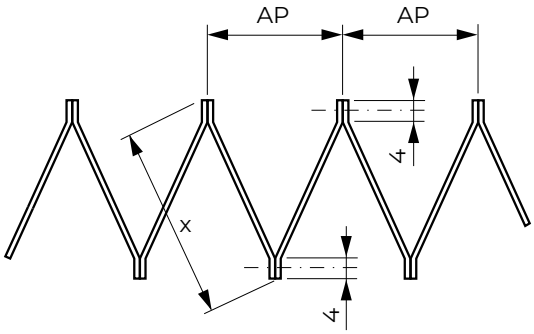
SEWN FLAT COVERS

P.E.I. sewn bellows are very robust and have a very compact closed length in relation to the stroke of the bellows.
These bellows are manufactured with a double seam on the folds.
Since there is no pleat, the accumulation of chips and emulsions on the bellows is avoided.
If the application requires special structural rigidity, profiled metal intermediate elements can be provided for a secure support on the guideway.



B = Outside width
a = Outside height
d = Return dimension
x = Fold height
AP = Fold opening

Sewn style



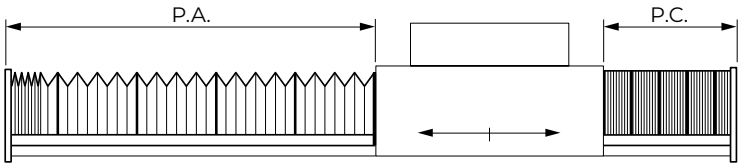
Formula for calculating the CLOSED LENGTH

P.C. = NP . 2,5 + flange thickness

NP = Number of folds = $\frac{\text{P.A.}}{\text{AP}} + 2$

AP = Opening of 1 fold = (x-8) · 1,41

Dimensions in mm.



P.A. = Open length
P.C. = Closed length

Contact our engineering department for this type of cover.

We invite you to fill in the questionnaire available on our website: you will receive a targeted offer for sewn flat covers

click here

SEWN ROUND BELLOWS

They are used where a very compact closed length is required.

- High resistance to mechanical and dynamic stress
- Resistance to coolants and oils
- Suitable for high temperatures
- Available with guide bushings and reinforcement rings
- No tooling costs
- Minimum internal diameter starting at 20 mm
- Any size external diameter
- With selected edging (in safety colors upon request)

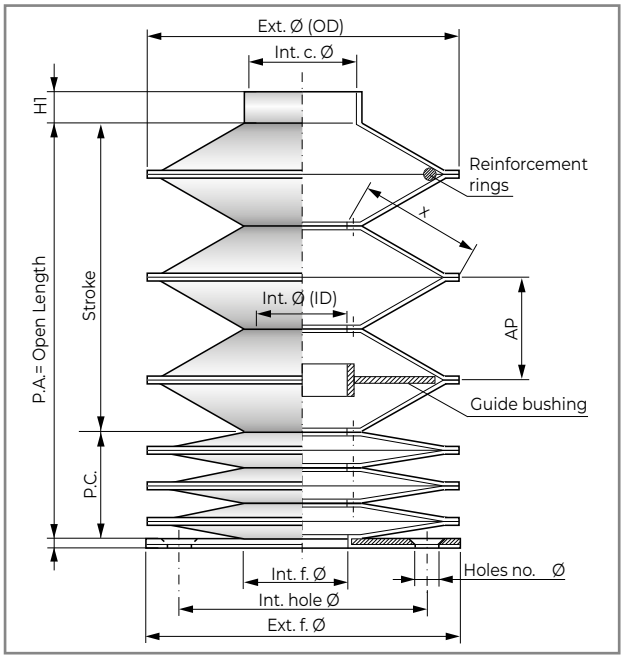
Materials available:

Polyester coated with Neoprene* (from 0,3 to 1,2 thick)
Polyester coated with PVC (from 0,3 to 0,7 thick)
TEMAT007
TEMAT164-TEMAT165
TEMAT009
TEMAT011
TEMAT081

* Neoprene is a registered trademark.

You find the materials list on our website www.pei.it

Other materials available upon request:
contact our engineering department.



Dimensions in mm.

Formula for calculating the CLOSED LENGTH

P.C. = Closed length = NP · SP*

$$\textbf{NP} = \text{Number of folds} = \frac{\text{P.A.}}{\text{AP}} + 1$$

* **SP** = Thickness of 1 fold (see materials list on our website www.pei.it)

$$\textbf{AP} = \text{Opening of 1 fold} = \left(\frac{\text{Ext. Ø - Int. Ø}}{2} - 6\right) \cdot 1{,}2$$

Note: When steel rings are required inside the folds, the **P.C.** is calculated by our engineering department.

THERMIC-WELDED TIGHT BELLOWS

They are used when leak-tight protection of the components (i.e. screws, shafts, etc.) is necessary against the contamination made by coolants.

They have good chemical and heat resistance according to the properties of the materials used. Thermic-welded tight bellows are available in various shapes and dimensions.
Small tooling costs for new moulds should be considered, if not already available in stock.

Materials available:

TEMAT 018
TEMAT 019
TEMAT 153
TEMAT 153/S
TEMAT 156
TEMAT 081

You find the materials list on our website www.pei.it

Other materials available upon request: contact our engineering department.

HEAT-FORMED, OPENABLE ROUND BELLOWS

These are used when high mechanical strength and heat resistance are required.

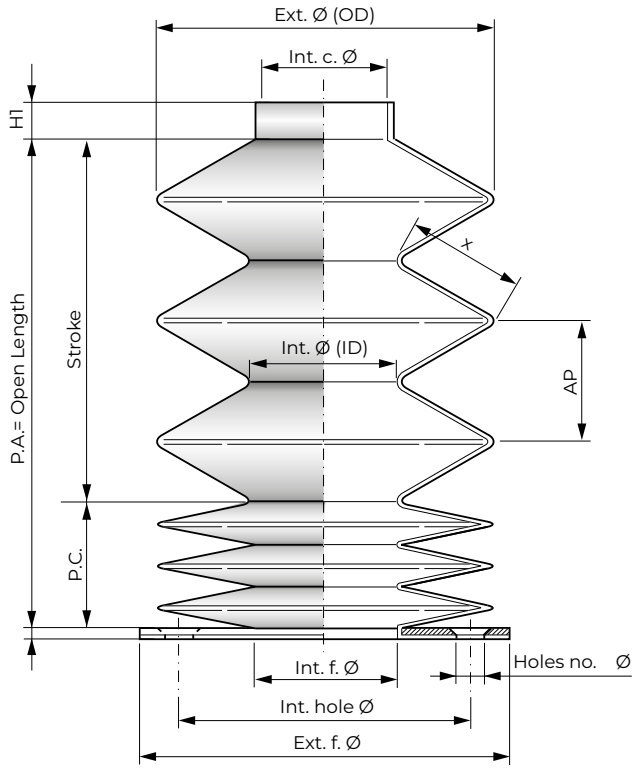
They are characterised by excellent resistance to mechanical stress as well as to coolants and oils. They are also available in cone-shaped according to the needs.
They do not involve any cost of equipment and have an excellent quality / price ratio.
On request, the heat-formed and openable round bellows are available with guide bushings and reinforcement rings.

Materials available:

TEMAT202
TEMAT018
TEMAT019
TEMAT081
TEMAT094

You find the materials list on our website www.pei.it

Other materials available upon request: contact our engineering department.



Upon request with **longitudinal opening** seam when the bellow must be disassembled without dismantling the part to be protected.

Formula for calculating the CLOSED LENGTH

P.C. = Closed length = NP · SP*

$$\textbf{NP} = \text{Number of folds} = \frac{\text{P.A.}}{\text{AP}} + 1$$

* **SP** = Thickness of 1 fold (see materials list on our website www.pei.it)

$$\textbf{AP} = \text{Opening of 1 fold} = \left(\frac{\text{Ø Ext. Ø - Int. Ø}}{2}\right) \cdot 1{,}41$$

Note: When steel rings are required inside the folds, the **P.C.** is calculated by our engineering department.

We invite you to fill in the questionnaire available on our website: you will receive a targeted offer for round bellows

click here

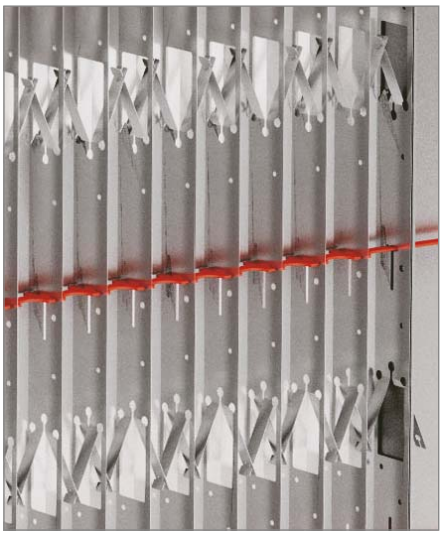
UNIQUE STEEL COVER (Patented)

The *light* protective cover consisting of stainless steel plates

Traditional thermic-welded bellows with plates have always been present in the **P.E.I.** product range: now they are joined by a version without fabric material, **UNIQUE STEEL COVER**, which takes up even less space in the machine tool. The absence of fabric material leads to a reduced weight of the cover and, above all, to a smaller dimension of the closed length: both are advantages for the customer.
The incorporation of a special traction device in the slats is a patented system that allows quick assembly of the cover and easy replacement of damaged plates, if necessary.
The entire structure is even more compact compared to other solutions available on the market today.

- Synchronised traction device
- Defined tensile stress
- It transfers only minimal tractive forces to the machine axis
- Designed for frontal working positions.

watch on YouTube



X-Y SHIELD

Thermic-welded covers with laminations

These dynamic covers for machine tool guideways are true moving protection barriers along the X and Y axes of modern industrial machines.
The **X-Y SHIELD** is a double cover protection solution of **P.E.I.** that separates the machining area from the motor compartment. This protective wall is composed of four thermic-welded bellows with stainless steel laminations and has a stroke limitation system.
This solution combines convenience and robustness with an extremely attractive appearance and reduced weight.
The system offers double protection, as the laminations protect the bellows from hot and sharp-edged chips, while the fabric material safeguards the guides from the inlet of oils and coolants.
The X-Y Shield system achieves travel speeds of up to 120 m/min. and accelerations of 2g.
This cover is widely used on horizontal and vertical machining centres of small, medium and large dimensions.

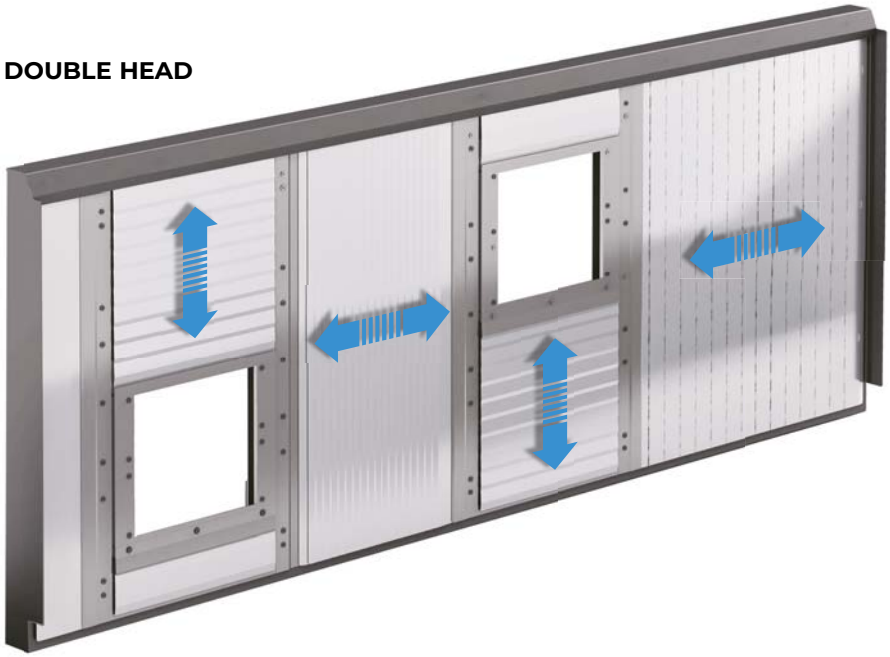
APPLICATION EXAMPLE

Available options

FIXED LAMINATIONS bellows

FLEXIBLE LAMINATIONS bellows

DOUBLE HEAD



HIGH TEMPERATURE resistant bellows, without laminations, often used in 3D printers and for roof covers of machining centres.

Structure of shield covers with laminations

1) SUPPORTING STRUCTURE
2) FRONTAL BELLOWS
3) VERTICAL BELLOWS
4) SPINDLE OPENING
5) WIPER

We invite you to fill in the questionnaire available on our website: you will receive a targeted offer for the shields

click here

GIANT SHIELD

Large size shield

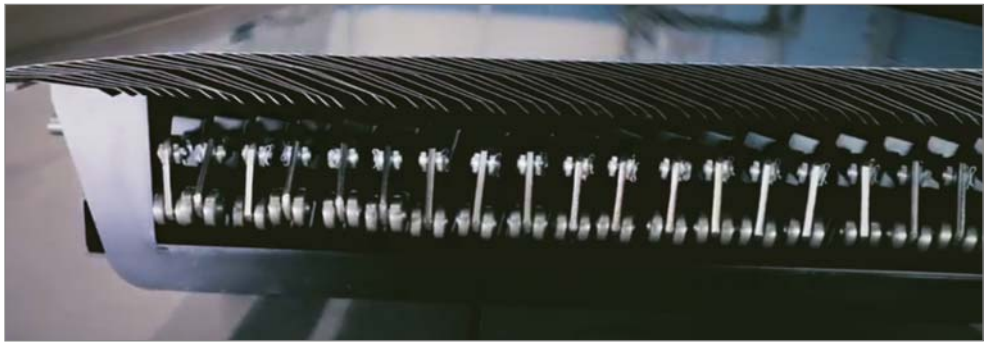
Gigantic protective wall characterised by its dimensions over standards, which is suited for huge machine tools where large parts have to be machined.

It can be built up to a height of 6000 mm with laminations featured by special characteristics allowing dynamic movement with elasticity, stiffness and effortlessness.

The fabric material at the rear of the blades, made of special texture and thermic-welded along its entire height, provides for an effective protective barrier against the penetration of coolants, which the laminations alone could not guarantee.

GIANT SHIELD follows each transverse movement of the machine head.

The stainless steel laminations represent the rigid part of the cover, a protective barrier against incandescent chips escaping during the machining of work pieces.



watch on YouTube

WAVE SKY SYSTEM (Patent Pending)

Bellows for overhead protection for portal milling machines

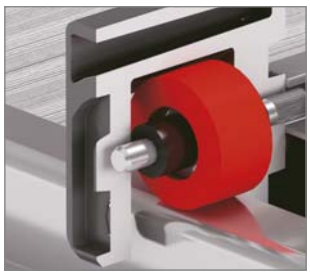
This range of bellows limits the escape of fumes, dust and chips from the machining area.

watch on YouTube

VERSION	MAX SPEED mt/min.	MAX ACCELERATION g	MAX WIDTH BETWEEN GUIDES mm	MAX STROKE mm	STANDARD FOLD HEIGHT mm	USE
WAVE SKY	90	1	6.500	25.000	100 / 150 / 200 / 250 / 300	applications in the machine tool sector
WAVE SKY LIGHT	60	1	2.000	8.000	100 / 150 / 200 / 250	machine tools / other sectors
WAVE SKY HEAVY	90	1	10.000	25.000	100 / 150 / 200 / 250 / 300	for covering over 6.000 mm width
WAVE SKY CHEMICAL	60	1	6.000	25.000	100 / 150 / 200 / 250 / 300	chemical treatment plants
WAVE COVER	to be defined in the design phase					machines with Z-axis less than 2 meters

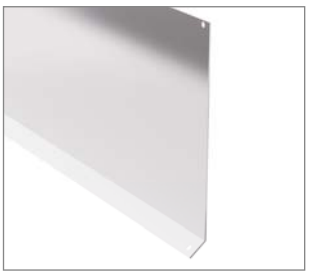
WAVE SKY (Patent Pending)

By using the **WAVE SKY** overhead protective cover, the suction force can be reduced when extracting fumes during machining carbon fibres, composite materials and vaporised cooling lubricant.
The special translucent fabric guarantees ample light in the work area.


Movement using rollers


Modular support made of aluminium


Special high strength fabric


Guide cover casing

WAVE SKY LIGHT (Patent Pending)

WAVE SKY LIGHT is a version of Wave Sky suitable for applications where a small closed length is required despite of long strokes. Stability and durability are the same as for the traditional Wave Sky.
The translucent fabric is suitable not only for machine tools, but also for other applications.
The same guides are used as for Wave Sky.

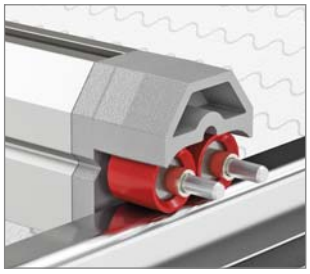

Sliding on guides


Lateral guides modular and adjustable


Guide cover casing

WAVE SKY HEAVY

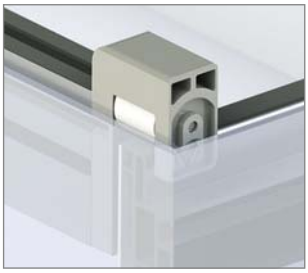
WAVE SKY HEAVY is a version of Wave Sky for applications with a **machine width of over 6 metres**.
The same guides are used as for Wave Sky.


Double bearing sliding


Crossbar guide

WAVE SKY CHEMICAL

WAVE SKY CHEMICAL is a version of Wave Sky, suitable for closure of chemical plants for surface treatments, as galvanic, chromium-plating, painting treatments.
It ensures optimal protection of the tanks in a very small space, with easy maintenance and high level of customisation.



Polymer carriages resistant to the aggression of surface treatments

Technical polymer fabric created to resist against the aggression of chemical agents

WAVE COVER (Patented)

This **P.E.I.** solution is a complete roof cover for gantry and portal machines **with Z-axis up to 2 meters** that allows the machine operators to access the machining chamber without opening the cover.
Differently from Wave Sky, **WAVE COVER** has a portal shape with sides and roof making the structure self-supporting.

The plastic hinges in the sides are rigid enough to prevent tipping over, but flexible enough to ensure the mechanism opens and closes.
The system is designed so that all the frames remain parallel and vertical to each other.

WAVE COVER is based on the same modular construction as Wave Sky, but uses a "gable" roof solution which increases the height of the workspace.
The cover can be fitted at any guide height.

SMART DRIVE MOTORISATION (Patented)

Motorised solution for Wave Sky roof protection

This motorisation system simplify opening and closing operations of the folding roof cover. Its aluminum extrusion profile is designed to obtain the best weight / resistance ratio.
The motorisation **SMART DRIVE** is driven by a planetary gear integrated with a braking system in the motor bar.
These are supplied with 24 V low voltage.
The same guide system can also be used for the Wave Sky Light version.

MATERIALS

TEMAT154

Excellent resistance to petrol based products, oils and strong abrasion. The textile insert is made of a special fabric with high rigidity in the diagonal weave and an aesthetically pleasing appearance. It is normally used in environments where there are large quantities of chips. Translucent and anti-static.

Bellow cover in translucent and double weave fabric

Detail of the antistatic feature of the fabric

CODE	Description of materials			Thickness (mm)	Heat resistance	
	Visible side	Fabric insert	Hidden side		Momentary contact °C	Continuous °C
TEMAT154	Polyurethane	Polyester	Polyurethane	0,9	+130	-30 +90

CERAMIX - TEMAT180

It has an excellent abrasion resistance and excellent shear strength. It shows excellent resistance to mineral oils and hot temperatures. The two-ply fabric insert gives an high transverse rigidity and a very attractive appearance.
In Wave Sky, Ceramix is only used in the bellow folds close to the working area, when large quantities of aluminium hot and shearing shavings are produced, in cases of high speed chip-removing dry work environments. Antistatic.

CERAMIX LIGHT - TEMAT181

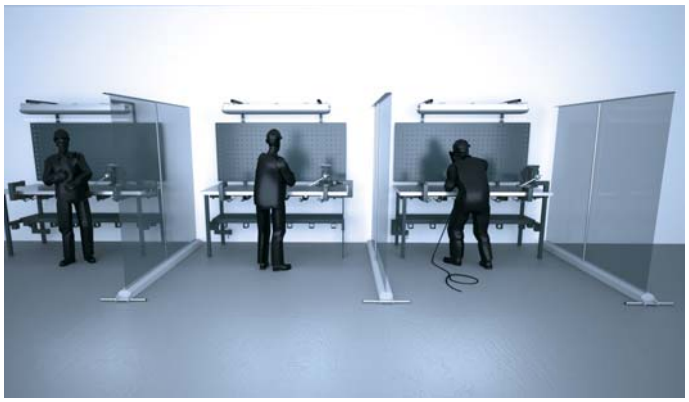
It has an excellent abrasion resistance and excellent shear strength. The fabric insert is made by an antistatic-proof material with good transverse rigidity and a very attractive appearance.
Ceramix Light is normally used in case of hot and shearing shavings, or in high speed chip-removing dry or wet work environments.

CODE	Description of materials			Thickness (mm)	Heat resistance	
	Visible side	Fabric insert	Hidden side		Momentary contact °C	Continuous °C
TEMAT180	CPT**	Polyester	-	1,8	+1200	-30 +90
TEMAT181	CPT**	Polyester	-	0,9	+1200	-30 +90

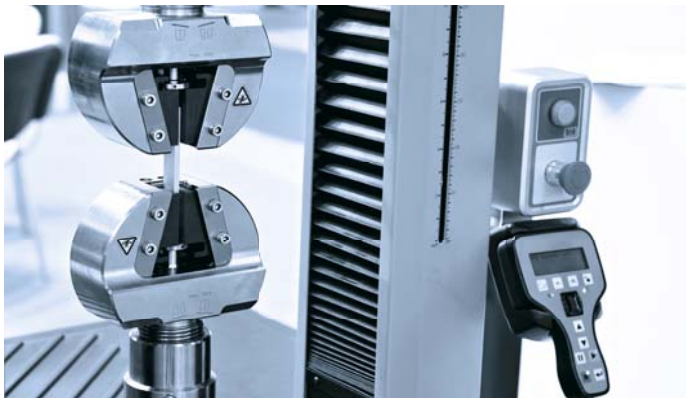
** Ceramic Polymer Technology

FURTHER APPLICATIONS OF THE P.E.I. PROTECTIVE COVERS

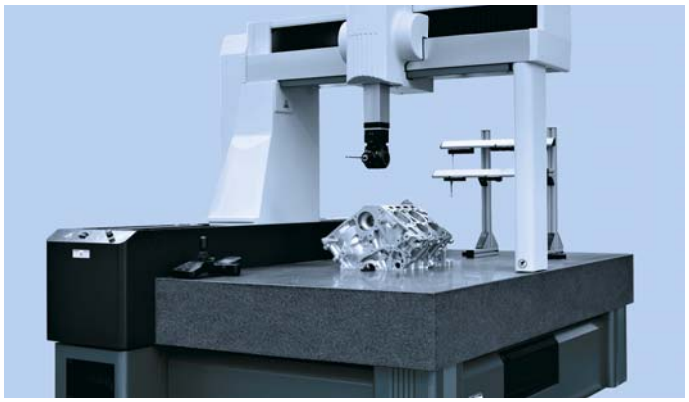
SECURITY



LABORATORY TESTING MACHINES



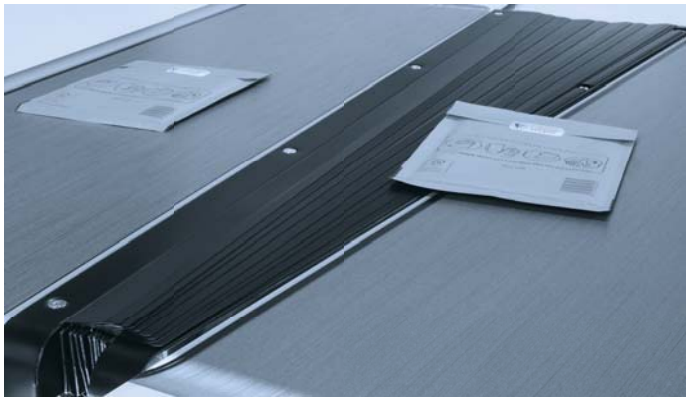
MEASURING MACHINES



GALVANIC AND SURFACE TREATMENTS

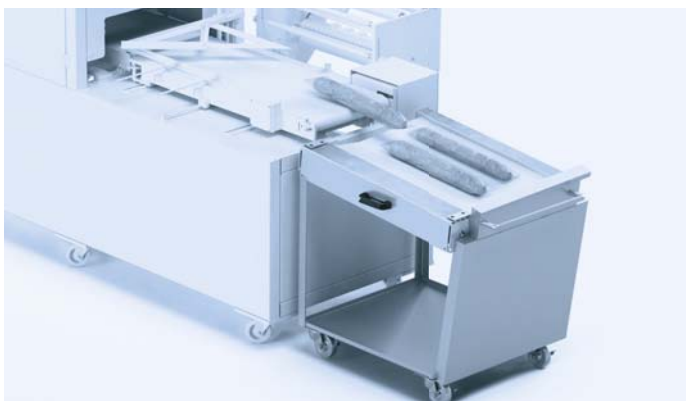
MEDICAL SECTOR

LOGISTICS



AGRICOLTURE

FOOD INDUSTRY



More information on our website www.pei.it

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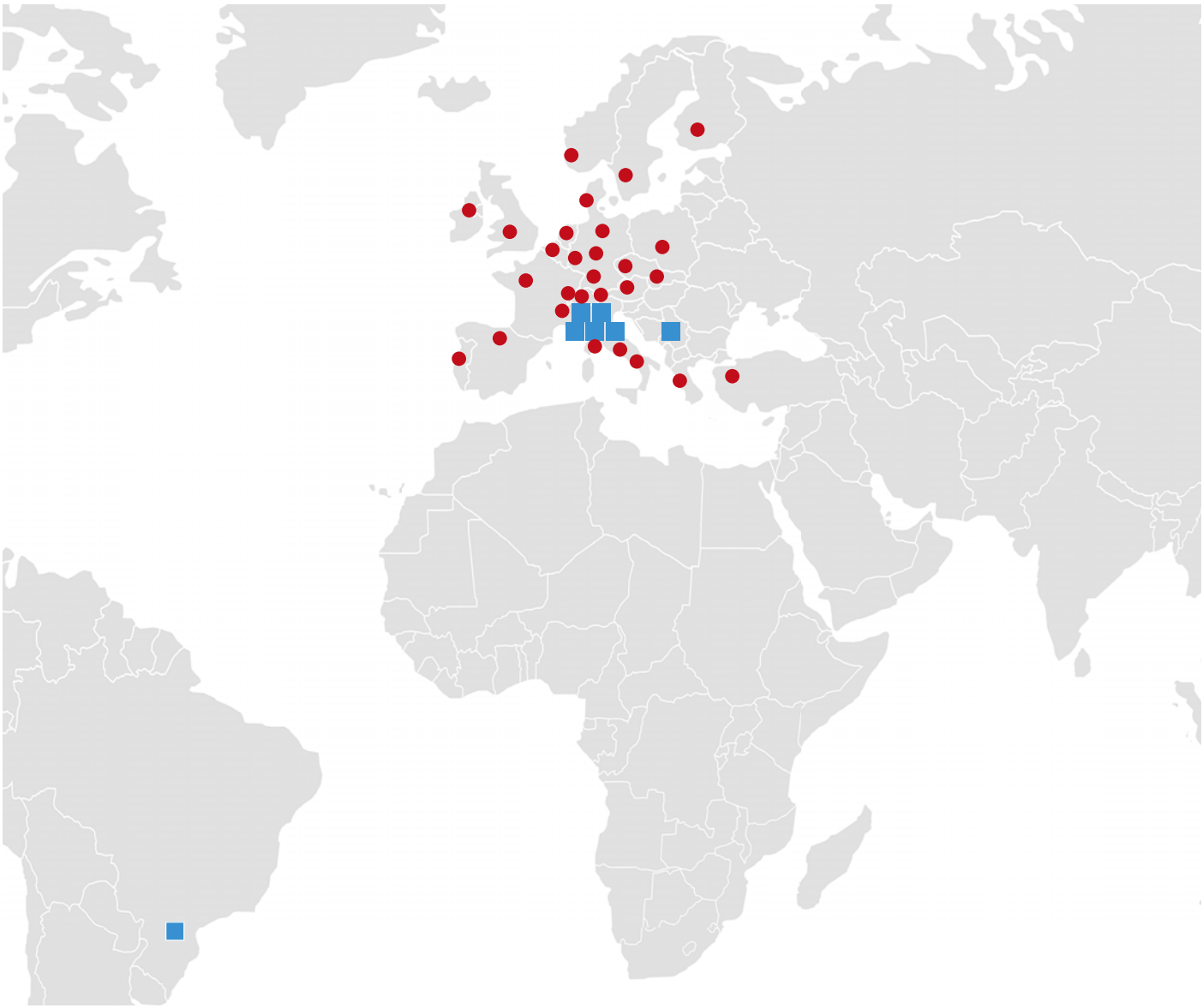

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