# **FLEXIBLE ALUMINUM COVERS**



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

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## X-Y LM SHIELD with Thermic-Welded Covers and Movable Plates

- The X Y LM SHIELD composed of thermic-welded bellows with steel laminations, represents the cheapest solution for protecting the working area in horizontal spindle machining centers where there is a large production of hot shavings.
   This system consists of No. 2 horizontal bellows and No. 2 vertical bellows, protected by movable stainless steel plates guaranteeing a very functional product for Quality/Price.
- Accelerations up to 1 G
- Speeds up 120 m/min.
- The thermic-welded protection bellows are largely used on every kind of machine tool. They are frequently used in machining centers and chip-removing machines. In order to protect the bellow exposed to hot shavings, a shielding made by metal elements, called "plates" will be necessary. The steel laminations are fixed by special clamps keeping the plates adherent and loaded one on the other to prevent contaminants and shavings from entering.





The protection plates are made in stainless steel resistant to wear caused by shavings.



The bellow is liquid-proof.



The fastening system keeps the plates adherent and loads them one on the other to prevent contaminants and shavings from entering



## **THERMIC-WELDED COVERS**





**P.A.** = Open length

**P.C.** = Closed length

Stroke = Open length - closed length

#### 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 · 8 + SS) · NP + (SF · 2)

\* See materials list on page 31.

This data sheet shows only one type of Thermic-Welded Cover that we manufacture.

Contact our engineering department for other types.

- **B** = Outside width
- **a** = Outside height
- **x** = Fold height

### 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

- \* We hypothesize the fabric material with code "TEMAT015" (see materials list on page 32)
- \*\* We hypothesize that the stiffener is 1 mm thick
- \*\*\* We hypothesize that the flange is 2 mm thick (see materials list on page 31)

## **THERMIC-WELDED COVER WITH FLEXIBLE LAMINATIONS**





## **THERMIC-WELDED COVER WITH FIXED LAMINATIONS**



**FLAT COVERS** 

**Standard Shapes** 



**NOTE**: The above are only the standard shapes of Thermic-Welded Covers. Other shapes available upon request.



#### **Thermic-Welded Cover materials**

Fabric	Description		l	Thickness	Heat resistance			Primary		
material	Visible	Fabric	Internal	(mm)	Momentary	Conti	nuous	resistance		
code	side	insert	side		contact °C	min. °C	max. °C	characteristics		
TEMAT 091	PVC	Fiberglass	PVC	0,44	+300	-30	+ 80	Fabric suitable for minor welding splatter. Also appropriate around acids. <b>Self-extinguishing</b> .		
TEMAT 106	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. <b>Mainly used in grinding machines.</b>		
TEMAT 015	Polyurethane	Polyester	Polyurethane	0,25	+200	-30	+ 90	Excellent resistance to petroleum products,		
TEMAT 151	Polyurethane	Polyester	Polyurethane	0,35	+200	-30	+ 90	oils and heavy abrasion. Excellent bending strength.		
TEMAT 164	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.		
TEMAT 165	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. <b>Self-extinguishing</b> .		
TEMAT 169	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. <b>It may be considered as the</b> <b>best fabric on the market for use in laser</b> <b>cutting machines. Self-extinguishing.</b>		
TEMAT 017	PVC	Polyester	PVC	0,36	+100	-30	+ 70	Mainly used around heavy ambient		
TEMAT 020	PVC	Polyester	PVC	0,25	+100	-30	+ 70	Also suitable for use around acids.		

#### **Stiffener materials**

Stiffener material code	Description	Thickness (mm)	Notes
PVC 05	PVC	0,50 **	Outside width (B) up to 300 mm
PVC 10	PVC	1,00	Outside width (B) from 301 up to 700 mm
PVC 15	PVC	1,50	Outside width (B) from 701 up to 1500 mm

#### Flange materials

Flange material code	Description	Thickness (mm)
AL	Aluminum	2,0 - 3,0
AC	Steel	2,0 - 3,0 - 4,0
PVC	PVC	2,0 - 3,0

Lamination materials

Lamination material code	Description	Primary applications
AL	Aluminum (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.
ΙΝΟΧ		In work environments with large shavings. Especially suitable for use around acids.

\* Kevlar and Nomex are registered Dupont trademarks \*\* NOT recommended for Thermic-Welded Covers with laminations.

Contact our engineering department for other materials and applications.

**FLAT COVERS** 

# **Flange Fastening Systems**



 Solution with connector flange protruding from the cover profile, made of sheet steel, aluminum or PVC



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



Solution with STRONG HOLD rapid connection. A PVC support and flange act as a flange, to which the STRONG HOLD rapid connection is applied. The flange is made of sheet steel, aluminum or PVC, 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** 





# **Questionnaire for Thermic-Welded Covers**

<ul> <li>Type of machine on which the COVERS are to be installed:</li> <li>METAL working machine</li> <li>MARBLE working machine</li> <li>GOLD working machine</li> <li>PAPER working machine</li> <li>FABRIC working machine</li> <li>GLASS working machine</li> <li>FOOD working machine</li> <li>PHARMACEUTICAL working machine</li> </ul>			<ul> <li>Type of material falling on the covers:</li> <li>Steel shavings</li> <li>Cast iron shavings</li> <li>Brass shavings</li> <li>Aluminum shavings</li> <li>Wood shavings</li> <li>Ambient dust</li> <li>Grinding swarf</li> <li>Welding splatter</li> <li>Other</li> </ul>					Amount of material falling on the covers:Kg Temperature of material falling on the covers:°C Temperature of work area:°C Max. rapid travel speed: 				
	AGRICULI ORAL working mach     TANNING working machine     CLAY working machine	line	Liquids to w	/hich th	e covers	will be	e exposed:	Max. w	orking motio	ons per		9
	WOOD working machine Other		<ul> <li>Water/stear</li> <li>Coolant/oils</li> <li>Oils with a v</li> <li>Other</li> </ul>	/iscosity	of ISO			hour: Max. d	aily working	hours:		
!	Type of cover:	Thermic-Wel	ded 🛛 Thermi	c-Weld	ed with	fixed	laminations	🛛 🗆 Therm	ic-Welded wi	ith flexible l	amin	ations
	Working position:	Horizontal	Vertica	al	Fron	tal						
	Cover shape:	UL-OS	🖵 UL-3S		🗅 TL-D	XC	<b></b> Q	L-CAP				
		🗅 UL-1S	🗅 DL-DX	С	🗅 TL-D	XI	Q	L-RETT	CL-SIN	1		
		UL-2ST	TL-SIM	I	QL-C	JUAD	Q	2L-ASI 🗖 CL-ASI				
	TEMAT Fabric material:	091 1	06 🖬 015		151		164	<b>1</b> 65	🖵 169	🖵 017		020
	Stiffener material:	□ PVC 0,5	□ PVC 1,0		PVC 1,5	,			_			
	Flange material:	□ AL 2,0	□ AL 3,0		LI AC 2	,0	l	▲ AC 3,0		AC 4,0		
		□ PVC 2,0	□ PVC 3,0	~								
	Lamination material:			5	_		_ <b>_</b>	- <b>-</b>				<b>—</b> •
	Flange 1 connection syste	m: 🗆 A	⊔ B1			](			ШG		l	
	Flange 2 connection syste	<b>m: L</b> A		□ B2		10			L G		l	<b>J</b> I
	P.A.= Open length		m	nm								
	P.C.= Closed length		m	nm								
	Stroke=		m	nm								
	<b>a</b> = Outside height		m	nm								
	B= Outside width		m	nm								
	<b>x</b> = Fold height		m	nm								
	adx= Outside height, rt		m	nm								
	<b>asx</b> = Outside height, lt		m	nm								
	<b>d=</b> Return		m	nm								
	ddx= RT. return		m	nm								
	dsx= LT. return		m	nm							_	
	asb= Overall drive dimension	S	m	nm								
	L= Lamination height		m	nm								
	<b>Z</b> = Overall lamination dime	ensions	m	nm								
!	Company name Phone:E-m	ail:										
	Quantity											
	Annual demand											
	Date					$\square$						
	Notes					$\rightarrow$					_	

NOTE: The data fields and/or tables marked by ן are the least ones to be filled in order to give you a quotation.

**FLAT COVERS** 



## **THERMIC-WELDED COVER: 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 which obstruct the chip conveyor.
- The **closed length** of the bellow is **smaller** than traditional thermic-welded bellows due to the absence of folds of fabric in the corners.
- The range of geometry possible for manufacture has increased.
- **Structural rigidity** has increased in applications where only one bellow must cover the crossbar and roof of the machinery.





For this type of bellow consult our technical office.



# THERMIC-WELDED COVER WITH LAMINATIONS: MULTI-STEEL

- 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** in merit of the elastic deformation of the material and a special geometry.
- More than two sides can be covered and with different angles.



For this type of bellow consult our technical office.

## **Thermic-Welded Covers for Linear Slides**



## **List of Standard Material**

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

## **Standard Thermic-Welded Covers Size**

Slide nominal value	Ply height	Bellow width	Total height	Slide deviation
W1	X	W	н	h
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

NOTE: For the W1 slide over size 65, please contact our Technical Dept.

# **Questionnaire for Thermic-Welded Covers for Linear Slides**

Slide Manufacturer					
Slide Model					
Slide Nominal Value	<b>1</b> 5	<b>D</b> 20	25	<b>u</b> 30	
		<b>3</b> 5	<b>4</b> 5	<b>□</b> 55	<b>G</b> 65
Open length (Stroke + Closed length)mm					
Fabric type	🛛 S1		P1	LX	
Fastening system on guide top	<ul><li>Solution A with clamps</li><li>Solution B1 with flange in PVC</li></ul>				
Fastening system to table	<ul> <li>Solution A with clamps</li> <li>Solution B2 with flange in PVC</li> </ul>				

Company name
Phone:
E-mail:
Quantity:
Annual demand:
Date:
Notes:

**Example of the identification code** 

of a Thermic-Welded Cover for Linear Slides complete with flange

Slide manufacturer

Slide nominal value (W1)

(stroke + closed length)

Slide model

**Open length** 

Type of material

Flange fixing system

NOTE: The data fields and/or tables marked by gare the least ones to be filled in order to give you a quotation.

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P1 A-A

(see page 37)



# **Thermic-Welded Covers Standard Systems for Linear Slides**



This technical card represents the standard systems used for the fastening of bellows for linear slides we can provide. For different sizes, please contact our technical department.

## **BELLOWS FOR HOISTING PLATFORM**

- Prevention of impediment of the hoist pantograph
- Protection from dust, dirt or foreign particles



## **Bellows Duratite**<sup>TM</sup>





## **BELLOWS FOR HOISTING PLATFORM**

**Thermic-welded Bellows Type QL-RETT** 



All calculation formulas are shown on page 27.

## **Systems for fastening Bellows for Lift Tables**





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

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



- removal of the cover Low cost





- **EXAMPLES OF APPLICATION: Closing of upright doors**
- Closing of storehouse rooms and interspaces •
- Protection of level changing in assembly lines of the manufacturing industry Base protection of medical equipment



Questionnaire for hoisting platforms BELLOWS: **a** = ..... mm **B** = ...... mm **X** = ..... mm **Questionnaire for HOISTING PLATFORMS:** T1 = ..... mm **T2** = ...... mm **T3** = ..... mm **T5** = ...... mm **T6** = ..... mm Upper side fastening **D** I 🗅 B ΠE ΠΟΠ 🗅 CE 🛛 C I Lower side fastening **u** I 🖬 B ΞE CE CE

NOTE: The data fields and/or tables marked by 🕴 are the least ones to be filled in order to give you a quotation.

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## **FLAT COVERS GLUED AND SEWN**



Type TL-SIM





Contact our engineering department for this type of cover.





Formula for calculating the CLOSED LENGTH



Ref.	Description	Dim.	Туре	Style
P.A.	Open length			
P.C.	Closed length			
Stroke	(P.A P.C.)			
a	Outside height			
B	Outside width			
x	Fold height			
d	Return dimension			
<b>A</b> P	Fold opening			
I NP	Number of folds			

# Ang a

# **BELLOWS FOR LASER AND PLASMA MACHINES**





## **BELLOWS FOR OVERHEAD PROTECTION FOR PORTAL MILLING MACHINES:** WAVE SKY

• WAVE SKY is a bellow that limits the escape of fumes, dust and chips from the workstation area.

**WAVE SKY** bellow reduces the suction force created during working: carbon fibres, composite materials and vaporised cooling lubricant.

The special translucent fabric guarantees ample light in the work area.

The motorised version makes for a quick opening and closing of the overhead apparatus.





- ✔ MAX SPEED: 90 mt/min.
- ✔ MAX ACCELERATION: 1g
- ✓ MAX WIDTH BETWEEN GUIDES: 8.000 mm
- ✔ MAXIMUM STROKE: 25.000 mm
- ✔ STANDARD FOLD HEIGHT: 200 / 250 / 300 mm

**EXAMPLE OF APPLICATION** 





## **BELLOWS FOR OVERHEAD PROTECTION FOR PORTAL MILLING MACHINES: WAVE SKY**









**Automatic motorisation** opening/closing available on request

		Descri	ption of ma	terials	s	Heat re	sistance	
Code	Visible side	Fabric insert	Hidden side	Thicknes	Momentary contact °C	Continuous °C	Primary resistance characteristics	
	TEMAT154	Polyurethane	Polyester	Polyurethane	0,9	+130	-30 +90	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 plus an aesthetically pleasing appearance. It is normally used in environments where there are large quantities of chips. <b>TRANSLUCENT and ANTI-STATIC.</b>
	TEMAT180	CPT**	Polyester	-	1,6	+1200	-25 +300	CERAMIX has an excellent abrasion resistance and excellent shear strength. CERAMIX 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 only CERAMIX is used in the bellow folds close to the working area, when large quantities of ALUMINUM hot and shearing shavings are produced, in cases of high speed chip-removing dry work environments. ANTISTATIC-PROOF and SELF-EXTINGUISHING.

\*\* Ceramic Polymer Technology

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## **THERMIC-WELDED TIGHT BELLOWS**

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

- Economic bellows
- Good resistance to chemicals
- Resistance to heat compatible with the used materials (see characteristics on pages 52-53)
- They can be supplied in a variety of geometrical shapes, with low cost production of moulds (if not already present in our stock).
- Materials available: Code TEMAT 018 Code TEMAT 019 Code TEMAT 153

See the characteristics shown in the tables on pages 52-53.



# **SEWN ROUND BELLOWS**

These are used when strong rotation resistance is required (for instance, to cover ball screws) and where a very compact closed pack is required.

- Highly reliable bellows
- 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**
- With selected edging (in safety colors upon request)
- Minimum internal diameter starting at 20 mm
- Any size external diameter
- Good **price/quality** ratio



#### Materials available:

- Polyester coated with Neoprene\* and Hypalon\*
- Polyester coated with Nitril rubber
- Polyester coated with Polyurethane
- Polyester coated with PVC
- Kevlar\* coated with Neoprene\* and Hypalon\*
- Kevlar\* coated with Polyurethane
- Fiberglass coated with Silicone and Neoprene\*
- Fiberglass coated with PVC
- Aluminum-coated fabrics
- \* Neoprene, Hypalon and Kevlar are registered Dupont trademarks

(see materials list on pages 52-53)

#### Formula for calculating the CLOSED LENGTH

**P.C.**= Closed Length = NP 
$$\cdot$$
 SP

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

\* SP= Thickness of 1 fold; see materials list on page 52-53

**AP**= Opening of 1 fold = 
$$\left(\frac{\emptyset \text{ e. soff.- } \emptyset \text{ i. soff.}}{2} \cdot 6\right) \cdot 1,2$$

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



## **HEAT-FORMED BELLOWS**

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

- Excellent resistance to mechanical stress
- Also available cone-shaped
- Resistance to coolants and oils
- No tooling **costs**
- Available with guide **bushings** and **reinforcement rings** upon request
- Suitable for high temperatures

## **OPEN HEAT-FORMED BELLOWS**

#### Materials available:

- Polyester coated with Neoprene\* and Hypalon\*
- Polyester coated with Nitril rubber
- Polyester coated with Polyurethane
- Polyester coated with PVC
- Fiberglass coated with Silicone and Neoprene\*
- \* Neoprene and Hypalon are registered Dupont trademarks

(see materials list on pages 52-53)



#### Formula for calculating the CLOSED LENGTH

**P.C.**= Closed Length = NP 
$$\cdot$$
 SP\*  
**NP**= Number of folds =  $\frac{P.A.}{m}$  +1

\* SP= Thickness of 1 fold; see materials list on pages 52-53

**AP**= Opening of 1 fold = 
$$\left(\frac{\emptyset \text{ e. soff.} \cdot \emptyset \text{ i. soff.}}{2}\right) \cdot 1,41$$

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





## **Questionnaire for Round Bellows**

NOTE: The data fields and/or tables marked by 🛛 are the least ones to be filled in order to give you a quotation.