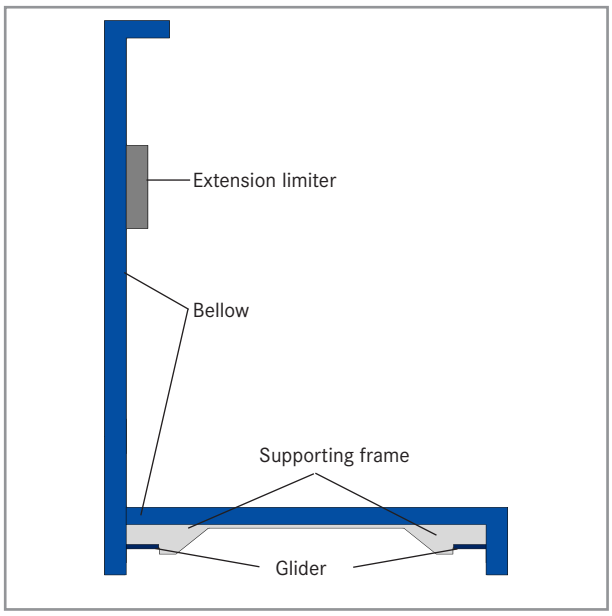
COVERS FOR MOVING COLUMN MACHINES

These machines with their large travel and working space areas require a special solution.
For the workspace area, both backwall systems and large bellows with or without lamellas are suitable.



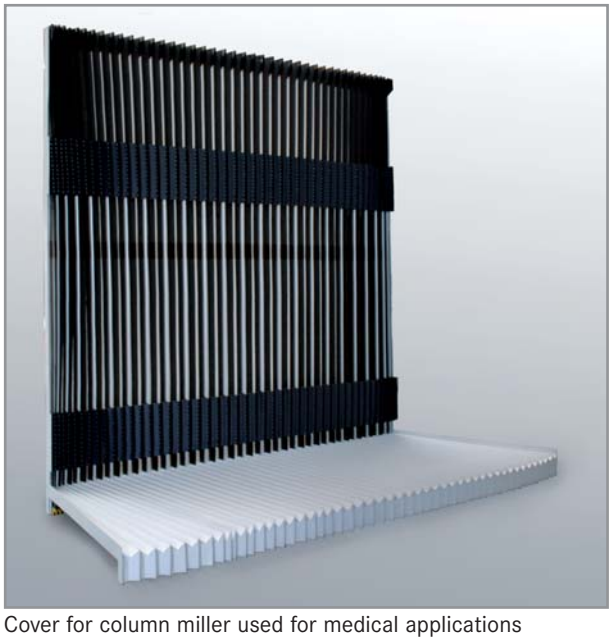
Typical backwall cover

Depending on the machine type and its concept two design principles are applicable:

- Column type cover
- Venetian blind type

Column type cover

This design principle is used if a guiding rail is not possible. The column milling cover type is L-shaped and runs on gliders.

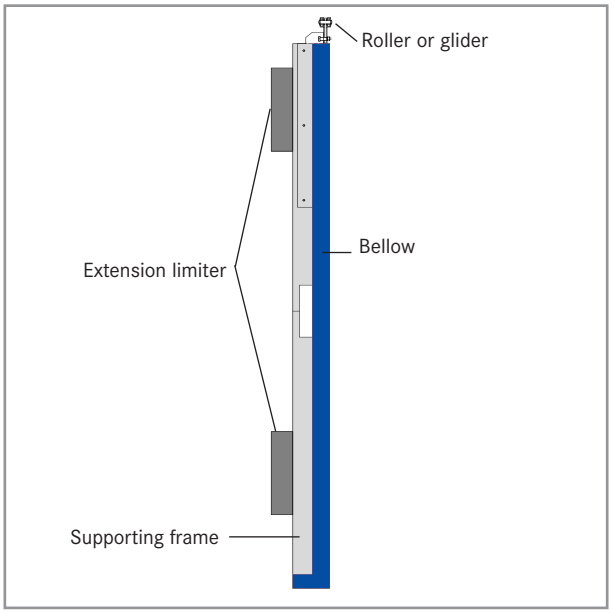

Cover for column miller used for medical applications

Venetian blind type

If a guiding frame is available, the bellow can be supported using profiles, roller or rail systems.

The guiding system has been successfully tested on a high speed test machine at the PTW under worst conditions. Over one million cycles were recorded.


Venetian blind type cover with SAMURAI Bellows for moving column machine



Design of venetian blind cover

CUBE Backwall Systems

Milling machine centres are fitted with complete backwall systems.
The design of an individual solution is time and cost intensive, and these can be reduced only if larger piece numbers are produced.
A modular built-up rear wall system can reduce the engineering efforts even for a single backwall - and the CUBE Backwall system was developed.

- Suitable for protection systems for two axes
- Significant reduction of engineering time
- Fast and detailed information for machine engineering
- The costs for each CUBE rear wall system are well below the costs of an individually designed concept

CUBE Backwall system

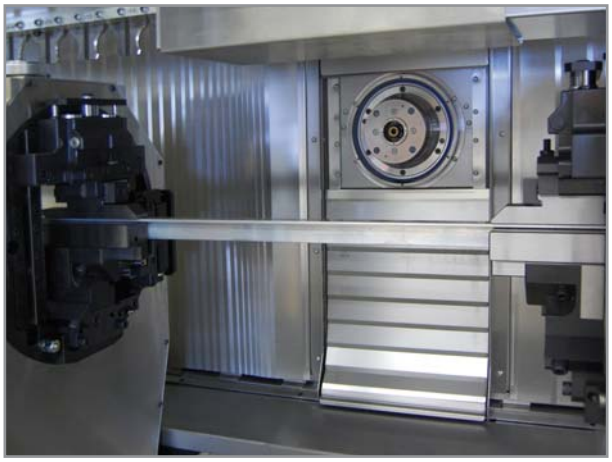
These features benefit machine builders with smaller production numbers and special machines.
The great savings in time and money compared with previous construction requests and orders could otherwise only be managed with large production numbers of identical design.

Design

Using the straightforward formulas we can determine the width and the height of the outside frame of the cover and for the sheet metal design and then provide these for the machine construction. The covers in the CUBE model consist of bellows which are incorporated along the X and Y axis fitted individually for the perfect match. Depending on the loads and machine travel speeds we select suitable bellow guiding:

- CUBE 60: standard profiled glider guide for speeds up to 60 m/min
- CUBE 80: Backwall system with rail glider guide for speeds up to 80 m/min
- CUBE 80+: High load roller rail guide for speeds over 80 m/min
- CUBE X: Customized solutions

For backwall protection SAMURAI Bellows are used. Fixed mounted stainless steel lamellas protect the bellows against hot and sharp edged swarf.



Through spindle

The spindle opening is designed to the customer's requirements.
The frame construction is made of solid warp resistant steel sheet. The mounting options for the rear wall can be integrated in the frame construction, but the force transmission along the X axis requires connections to the machine in the upper and lower areas.

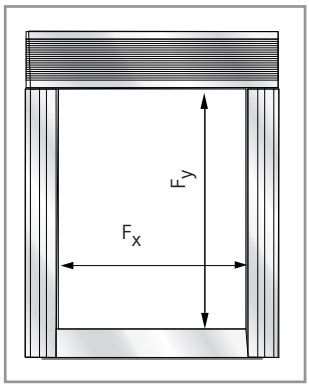
For an optimum load transmission to the X axis cover protection, this cover must be connected at the top and bottom with the moving column or other supporting machine parts.

Versions of CUBE X with large extensions up to five meters long and three meters high have already been realized.
Additional concepts such as DynaSynchro or pantographs can absorb the dynamic loads. Therefore a travelling speed up to 120 m/min can be realized.

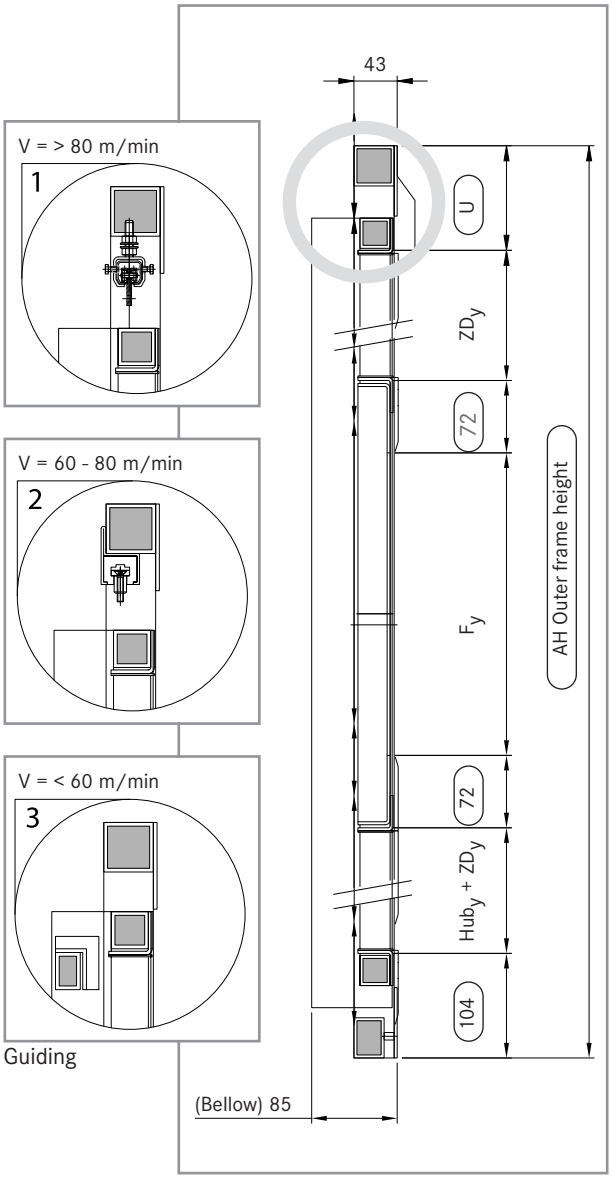
All dimensions in mm if not marked otherwise. Errors and omissions excepted.

CUBE BACKWALL SYSTEMS

CUBE

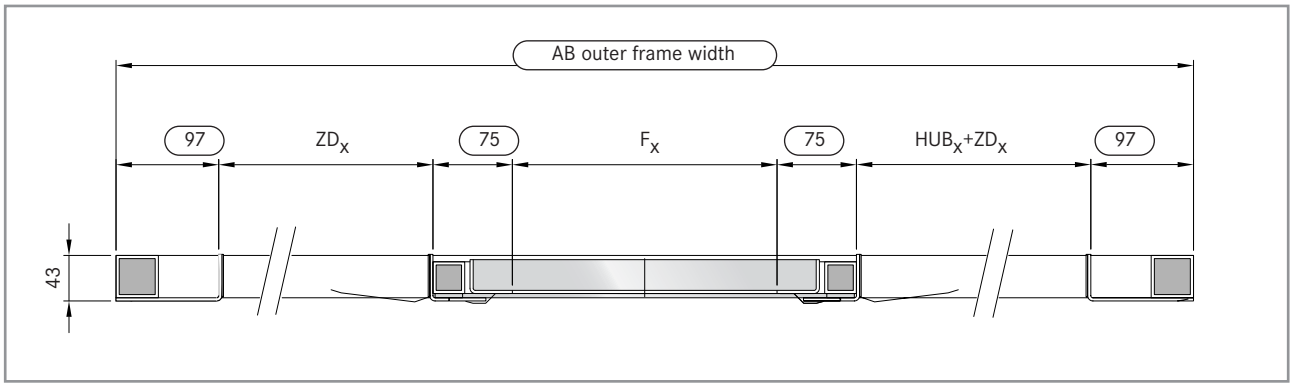


Calculation of spindle opening



Guiding

Calculation of outer frame height



Calculation of outer frame width

Order and request forms available at: www.hema-group.com

CUBE Backwall Systems

CUBE	Guiding (V m/min)	Application area
CUBE 60	Standard glider guiding	up to 60 m/min
CUVE 80	Rail glider guiding	up to 80 m/min
CUBE 80+	Roller glide guiding	up to 80 m/min
CUBE X	customized	customized

Design

Data to be provided by customer

V_x	Travel speed in X direction
V_y	Travel speed in Y direction
Hub_x	Required working area travel in X direction
Hub_y	Required working area travel in Y direction
F_x	Width of opening for spindle lead-through
Fy	Height of opening for spindle
ZD_x	Required compression length X axis
ZD_y	Required compression length Y axis
AB	Frame width CUBE
AH	Frame heigth CUBE
U	Fixed dimensions upper bar
⬭	HEMA specification values

Factors of compression

CUBE 60

ZD $Faktor_{60x}$	0.12
U_{60}	104 mm

CUBE 80

ZD $Faktor_{80x}$	0.155
U_{80}	137 mm

CUBE 80+

ZD $Faktor_{80+}$	0.165
U_{80+}	137 mm

Allgemeinfaktor Y-Achse

$ZDFaktor_y$	0.075

Basic principle for calculation

These data also cover extreme situations. If less space is available in the customer's machine construction, the data are adapted accordingly.

Calculation example

Example calculation for CUBE 80+

V_x	80 m/min
V_y	80 m/min
Hub_x	800 mm
Hub_y	650 mm
F_x	200 mm
F_y	200 mm

Calculation of the compression

$ZD_x = Hub_x \times ZD_{Factor80+}$ = 800 mm x 0.165 = [132 mm]
$ZD_y = Hub_y \times ZDFy$ = 650 mm x 0.075 = [49 mm]
[ ] = values rounded up without decimal place

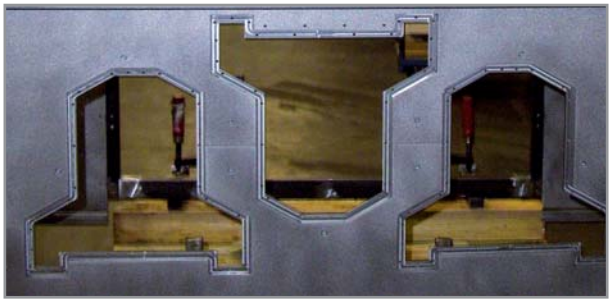
Calculation the results for $CUBE_{80+}$

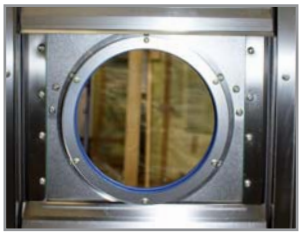
Outside frame width in X direction:
AB = (System spec. value*) + Hub_x + F_x + 2 x ZD_x
AB = (97 + 75 + 75 + 97) + 800 + 200 + 2 x 132 =1.608 mm

Outside frame heigth in Y direction

AH = (System spec. value*) + U_{80}+ Hub_y + F_y + 2 x ZD_y
AH = (104 + 72 + 72) + 137 + 650 + 200 + 2 x 49 =1.333 mm

*HEMA system specification values





Types of spindle openings