



AXELENT X-GUARD[®]

Machine guarding without limitations





YOUR SAFETY IS OUR BUSINESS CONCEPT NO MATTER WHERE IN THE WORLD YOU ARE

At Axelent we know what production standstill can cost and we are aware of the consequences of poor safety in production. We also know that the regulations surrounding machine safety can be complicated to find your way around.

We therefore offer all our customers a safety package. A holistic approach with the tested and approved machine guarding forming the core combined with our know-how and service to provide you with an effective and rapidly delivered machine safety solution. At Axelent we seek to become your safety partner, no matter where in the world you are.



YOU CAN **COUNT ON X!**

- ✓ A top quality range of products and accessories.
- ✓ Products that comply with all current requirements and EU standards.
- ✓ A standard range that is easy to complement.
- ✓ We give you a quote including drawings within four hours.
- ✓ Easily assembled products with clear instructions.
- ✓ SnapperWorks. Tailored and easy-to-use drawing application available to all our customers.
- ✓ X-Pack™ a unique packaging system that guarantees intact and rapid delivery.
- ✓ Axelent Safety – Risk analyses and other specialist knowledge.



WE KNOW ALMOST EVERYTHING THERE IS TO KNOW ABOUT SAFETY AND **MESH WALL SYSTEMS**

Axelent is a Swedish company with extensive experience within the manufacture of mesh wall systems in the form of protection and partitioning systems for industry, warehouses and construction. Speed, safety and service are watchwords that characterise our entire organisation and business. We are market leaders within several sectors and our products are represented all over the world.

Effective production

Our head office is in Hillerstorp, Sweden. All product development, production, warehousing and packaging also takes place here. Much of our production is automated in order to cope with high volumes and fast delivery times. As all our standard products are in stock we can deliver your order within 5-7 working days.

Quotation and drawing straight away

Our own SnapperWorks drawing application enables us to quickly provide you with a quotation including a drawing and material specification.

Axelent deliveries

Thanks to Axelent's in-house packaging system, X-pack™, your Axelent products are delivered on specially adapted pallets, attractively and neatly wrapped in plastic, complete with assembly instructions. This means that products can be assembled quickly and easily making the goods easy to unload and move. We also offer technical assistance where needed.

A safe choice

Axelent has extensive, in-depth knowledge when it comes to safety for industry, warehouses and construction work. Please consult us in order to get as safe and secure an environment as possible using our products.



AXELENT AB – OUR SPEED AND SERVICE IS BASED ON
RATIONAL PRODUCTION AND AN
EFFECTIVE ORGANISATION



Axelent AB Hillerstorp. Our 14,000 sq. m. premises houses product development, production, packaging, warehousing and sales.

Raw material storage. Our raw material storage houses large volumes of rectangular hollow sections (RHS), the basis of all our products.

Production. Axelent boasts the most modern cutting centre in Europe. Here, the hollow section is cut, drilled, tapped and washed before going further on in our X-line™, thus avoiding time- and space-consuming intermediate storage. In our X-line™, complete mesh panels are produced in a very rational process.





X-PACK™



Capacity. At Axelent we have the capacity to produce 60,000 mesh panels a month.

Coating. Coating is done using powder, which means no solvents.

X-Pack™. Our own packaging system enables us to place all our mesh panels on specially designed pallets for rapid and smooth assembly. All deliveries are plastic wrapped together with the assembly instructions and other delivery documentation.

Readymade stock. All our standard products are in stock, guaranteeing fast delivery.

SNAPPERWORKS

– AS SIMPLE AS IT IS BRILLIANT



Axelent's in-house developed, user-friendly drawing application, SnapperWorks, enables our customers to get a quick layout drawing showing specific panel sizes and elevations.

Everything is prepared, all you have to do is click and drag to get a complete drawing with all the parts you need.

Click and drag! It is that simple and quick to get an overview of what you need and what your mesh panel system will look like. The drawing can then be used as an order basis.

The benefits of SnapperWorks are many...

- It is tailored to Axelent's modules and contains all our mesh panel and machine safety systems.
- It is easy to learn.
- The program enables you to import DWG and DXF files and draw, for instance, panels straight onto the drawing.
- From specified lengths you can let the program configure the most economical panel layout.
- It quickly provides you with a complete drawing including material specifications.

Read more about SnapperWorks at:

www.snapperworks.com



3D

X-Guard® now with a 3D viewer.

WWW.AXELENT.COM

Our website contains all the information you need about our company and our products. We publish the latest news and changes to our range. You can also download brochures and product information sheets.



SUPPORT



At Axelent we do all we can to give our customers the best possible service. Don't hesitate to contact us if you have any queries regarding our products, assembly, etc. You are also welcome to call us if you seek general advice about machine guards or machine safety.

WE GUARANTEE, DELIVER AND ASSEMBLE!

- ✔ We give you a quote including drawings within four hours.
- ✔ Inquiries received in the evening or at night are dealt with by 11 am the following day.
- ✔ We can provide a professional and experienced installation service for complete peace of mind.

X-PRESS

To guarantee a rapid service and secure delivery, Axelent has a smooth running logistics system with a worldwide carrier network.

COATING

We think green...

As we care about the environment we have drawn up an environmental policy to help protect our internal and external environments. For example, Axelent's own products are all powder coated and are solvent free.

but paint in yellow, black...

Each product group has its own standard colours as specified in respective group's fact sheet. But we will naturally deliver your products in the colour you desire.



X-GUARD® – A COMPLETELY **NEW WAY** OF THINKING FOR MACHINE GUARDING

X-Guard® is a completely new range of machine guard that complies with the Machine Directive's new demands on permanent guards from 29 December, 2009 (see pages 27-29).

With its wide range of standard components and accessories, X-Guard® is guaranteed to cover all possible machine guard needs. Now we also have a new machine guard, X-Guard® Contour, which is the first machine guard with round corners.

Safe

Axelent's machine guards are designed to fulfil all the demands put on a functional machine guard.

Functional and smart

In addition to safety, it is vital that our products work as smoothly as possible. Our machine guards have many smart solutions to facilitate the flows in and around the machines that require this type of protection.

Simple

Our machine guards are built around a standard design with regard to panels, posts, accessories and colour. This makes it easier for you to complement existing guards if required.

Complete

X-Guard® machine guards are available in mesh panel sections or sheet plate and plastic sections (see pages 12-13). Axelent's large selection of doors, locks and accessories offer a complete machine guard solution tailored to your needs.

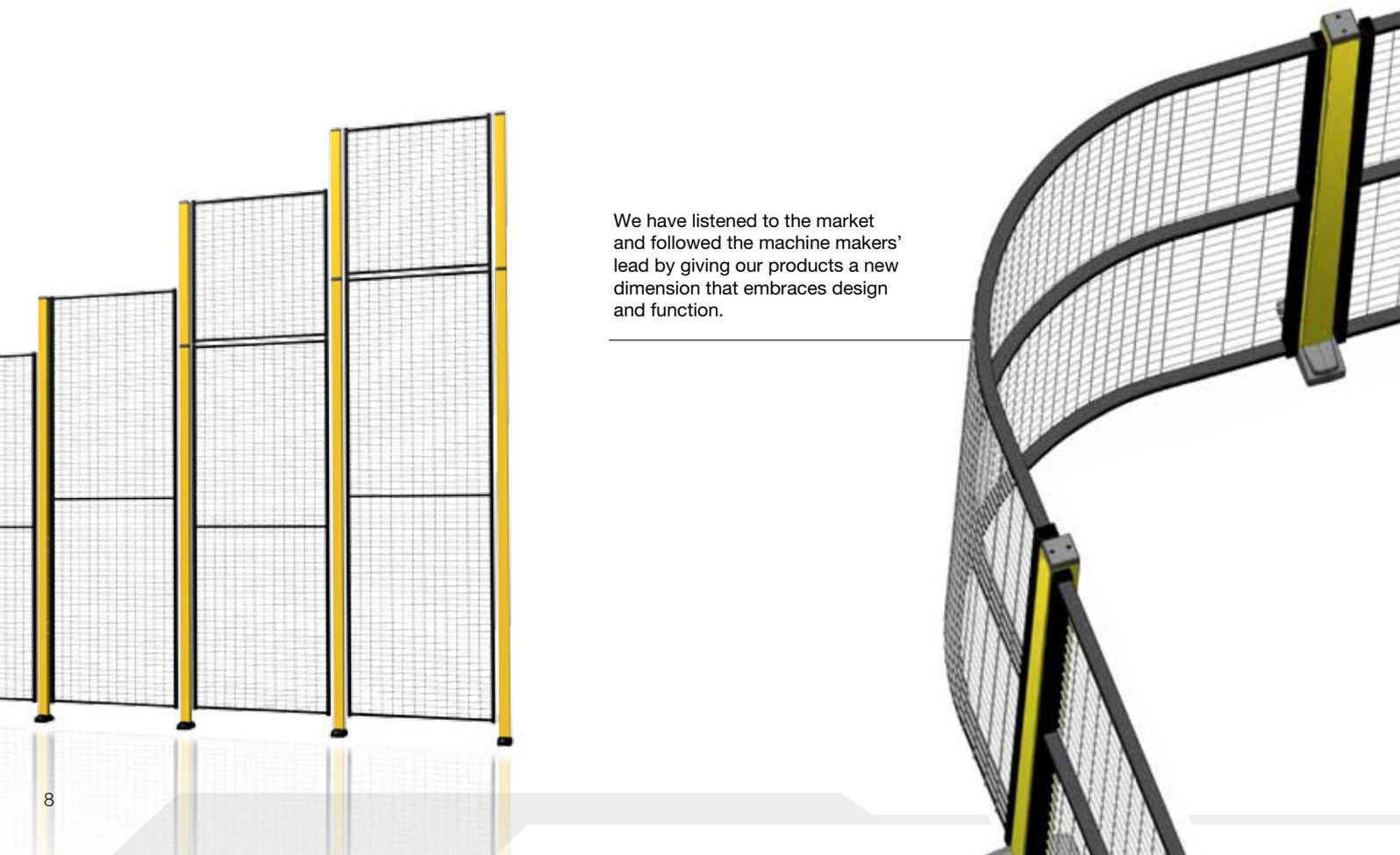
Cost-effective

Smooth and easy handling, together with speedy delivery and assembly, always gives you a good overall economy when choosing Axelent's machine guards.

A machine guard that grows

X-Guard® was launched in 2008, since then new dimensions in panels, posts and accessories have been added. We listen to our customers to enable us to develop the range as new needs arise.

We have listened to the market and followed the machine makers' lead by giving our products a new dimension that embraces design and function.



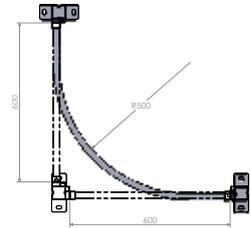
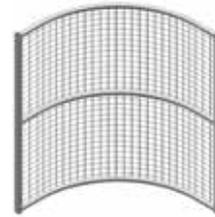
X-GUARD® CONTOUR

In 2012 Axelent launched an unique machine guard with round corners, X-Guard® Contour. The new, rounded panels are part of our X-Guard® series so they are easily combined with other parts of the same series.

Space-saving

It may seem like only a small improvement, but nobody has previously dared to veer from the traditional machine guard design with 90° right angles.

By opening ourselves to new shapes we allow the machine guards to be an attractive yet integrated part of the whole. With X-Guard® Contours more 'friendly' design, you don't have to deal with square corners that take up unnecessary space, and you'll get a machine guard that smoothly fits in the production environment.



AXELENT X-GUARD® CONTOUR

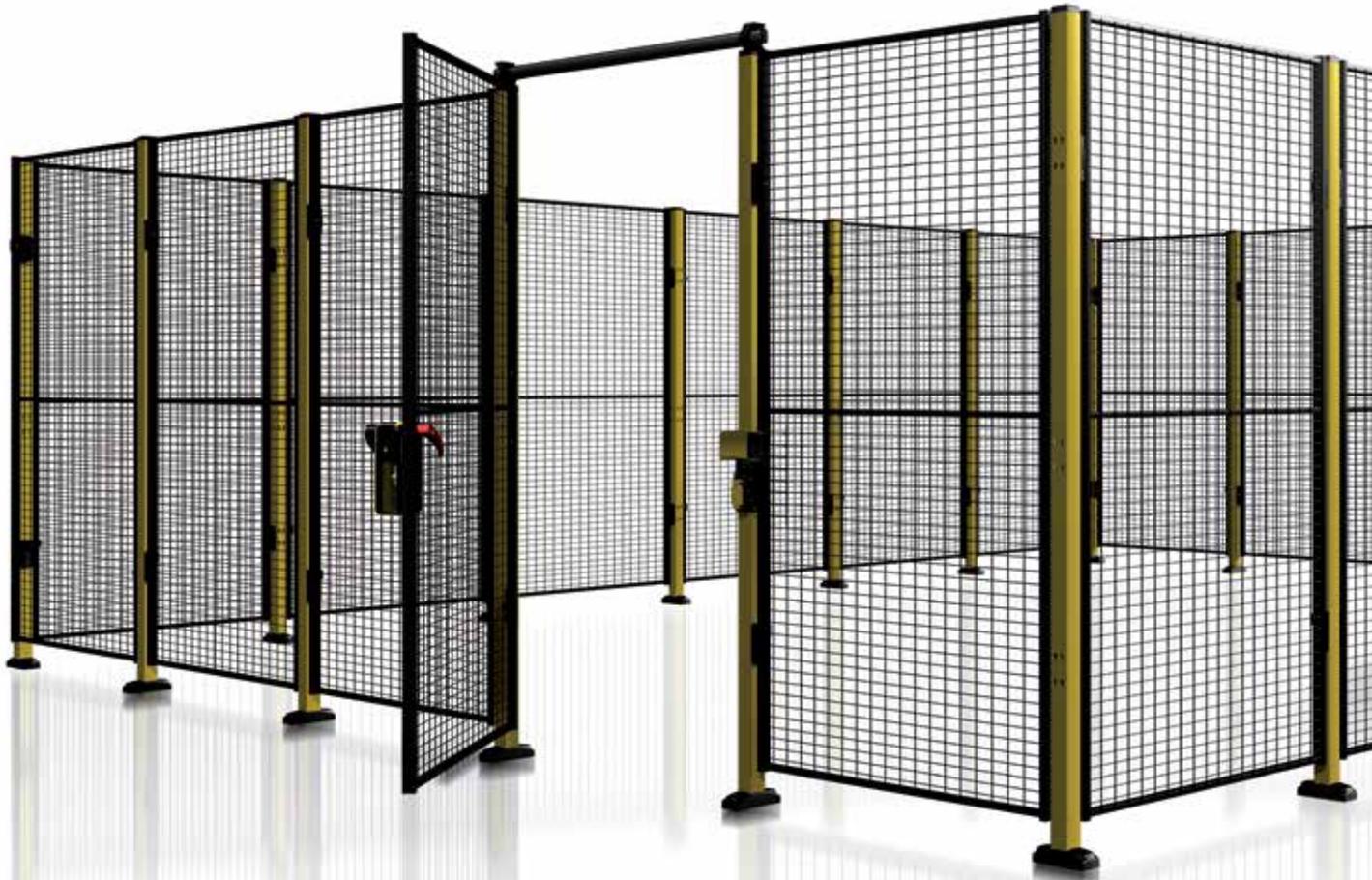
The panels come in three different heights, 1300, 1900 and 2200 mm, and in two angles, 45° and 90°.

Standard panels come in colour RAL 9011 but can be customized to specific requirements.

For more information see product facts on p 12



X-GUARD® – A **FLEXIBLE SYSTEM** WITH EXTREMELY SMART SOLUTIONS



Free height adjustment
Option for + - 10 mm vertical adjustment of the panels. The height of doors can also be adjusted. You are free to adjust entirely in line with your requirements.



Foot cover
The cover gives a more refined finish while being easier to keep clean.



X-KEY

A unique key designed for the rapid release of a panel. Forget all other tools. The X-Key is all you need.



Free selection. Switch when it suits you.

Doors and panels are designed to ensure you can switch whenever necessary. You can change hinge and lock handing with a simple operation. This means you can quickly change the machine guard as and when the need arises.



Upper panel bracket with snap on function
Upper bracket means that the panels can be easily attached and removed from inside an enclosure. The bracket can be applied to a post on three different sides (at a fixed height).



Lower panel bracket
The lower bracket guides the panel into the correct position when assembling. Two guides mean the panel falls easily into place.

X-GUARD® – MESH, PLASTIC, SHEET METAL

The flexibility of our system enables you to combine plastic, sheet metal and mesh according to your needs.



PRODUCT FACTS MESH PANELS

Safety distance	200 mm
Uprights	30x20 mm
Horizontals	25x15 mm
Posts	50x50, 50x100, 100x100 mm
Vertical wires	Ø 3 mm
Horizontal wires	Ø 2.5 mm
Mesh aperture	cc 51x31, 51x21 mm
Finish	Phosphatising/Epoxy paint
Colour mesh panel	Black RAL 9011
Colour post	Yellow RAL 1018, black RAL 9011, blue RAL 5005

(other colours can be quoted)

AXELEN'T'S STANDARD COLOURS

POSTS



Yellow RAL 1018



Black RAL 9011



Blue RAL 5005

PANELS

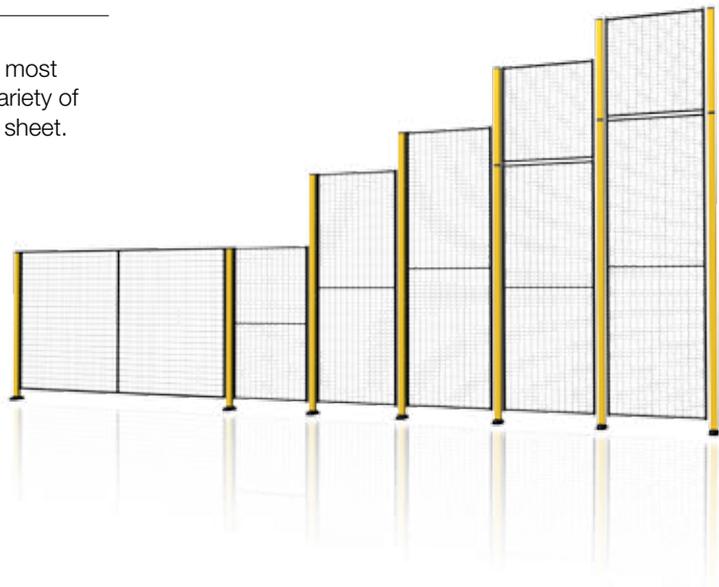


Black RAL 9011

MESH

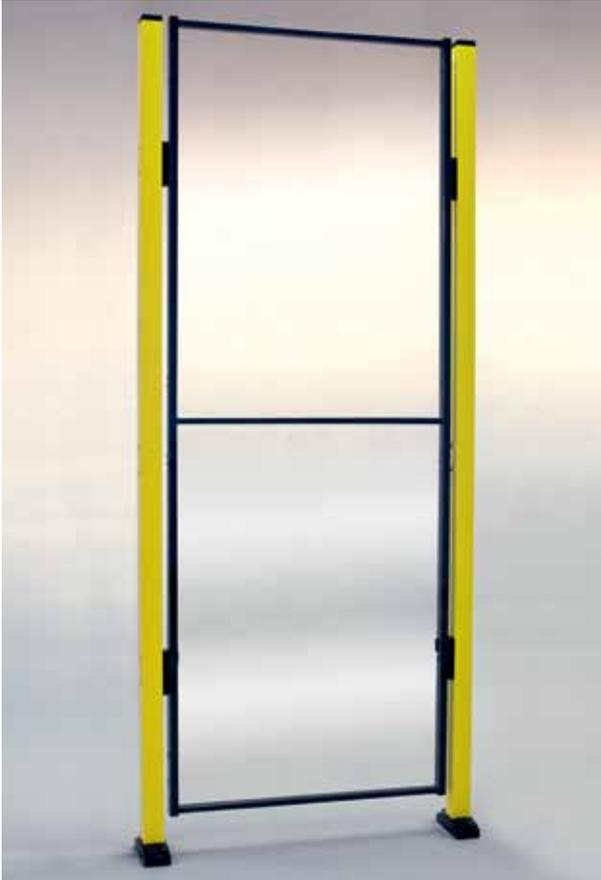
Our mesh panels provide sufficient protection in most industrial environments. The panels come in a variety of widths and heights, as specified on the product sheet.

Axelen't offers an endless variety of combinations and solutions with X-Guard® – the most versatile system for industrial and storeroom enclosure.



▶ COMPLETE TECHNICAL SPECIFICATION

As our product range is undergoing constant change with new dimensions, all technical specifications surrounding X-Guard® are presented on a separate sheet that is regularly updated. Download the latest version as a PDF at www.axelent.com



Panel with window

This new panel replaces previous systems that combined half sections of sheet and plastic.

These panels are used when you wish to monitor a certain process.

SHEET METAL AND PLASTIC

Some environments require a more comprehensive protection in the form of plastic or sheet metal covered walls. X-Guard® Plastic and Sheet Metal System is easy to assemble and you can use the same posts and door packages as for our mesh products. In order to avoid gaps between the section and post we recommend that you use our custom edging plate.

The plastic walls are heat resistant up to 60 degrees and available with clear or green coloured plastic, the last-mentioned as a protection for welding flare. Our green coloured plastic meets fire safety standards UL 94 V0 and also EN 1598.

The sections are available in 2 heights and various widths which are shown on a separate leaflet.

PRODUCT FACTS MESH PANELS PLASTIC- AND SHEETPANELS

Uprights 30 x 20 mm

Horizontals 25 x 15 mm

Plastic 2 mm (thermoplastic polyester)

Sheet 0,8 mm

Posts 50x50, 50x100, 100x100 mm

Colour panel Black RAL 9011

Colour post Yellow RAL 1018, black RAL 9011, blue RAL 5005

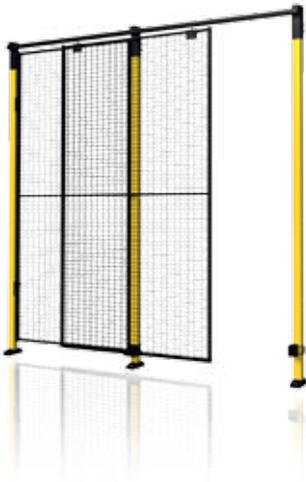
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DOORS AND HEIGHTS

①



②



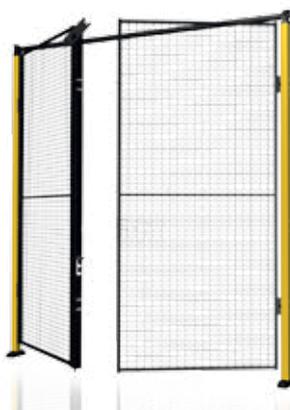
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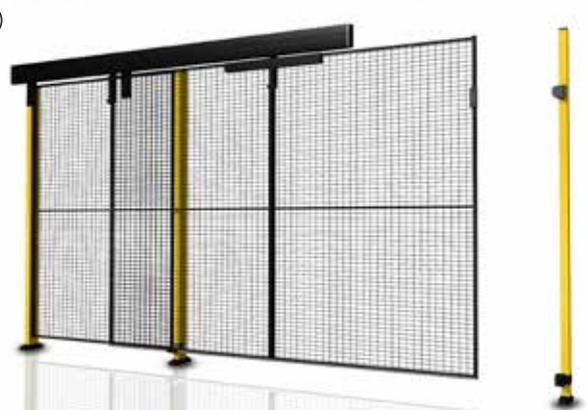
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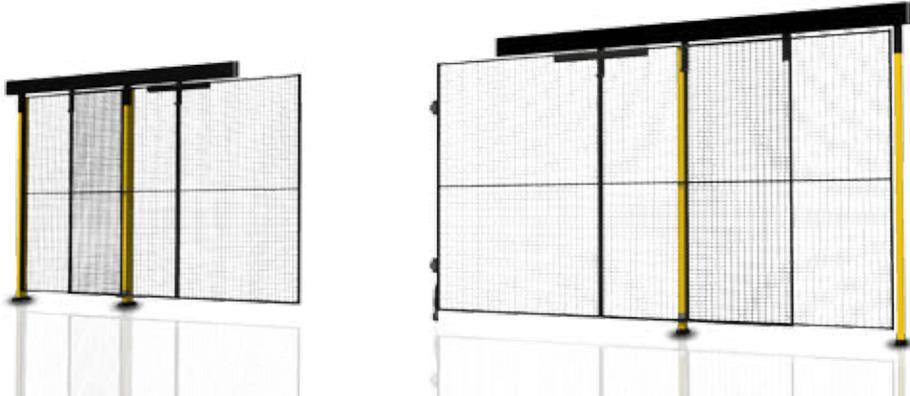


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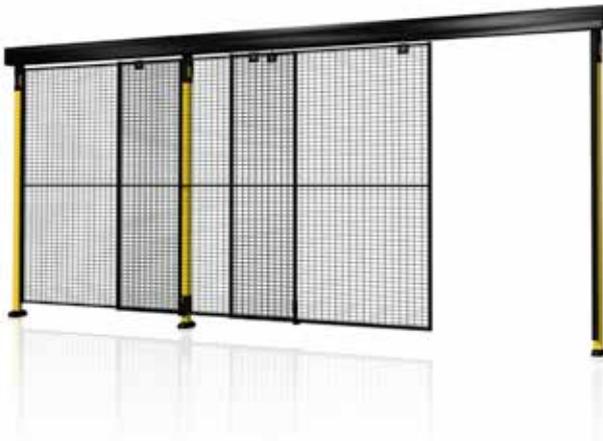


- ① **Sliding door with centre lock**, perfect solution when there is limited space and the door should be placed in the middle of a wall. Maximal width is 5900 mm.
- ② **Single sliding door**, can be built from max opening 5700 mm.
- ③ **Double sliding door**, for cramped areas and for two feed positions from the machine. Available in sizes up to 2x2900 mm.
- ④ **Single hinge door**, max opening 1500 mm.
- ⑤ **Double hinge door**, access for wider goods, pallet truck etc max opening 2x1500 mm.
- ⑥ **Single sliding door without rail**, has an opening of 3 metres and no upper limitation. The door is perfect when handling large volumes carried by overhead crane or forklift. Maximum width 3000 mm and maximum height 2300 mm.

7



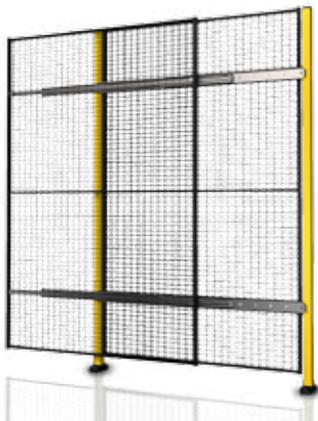
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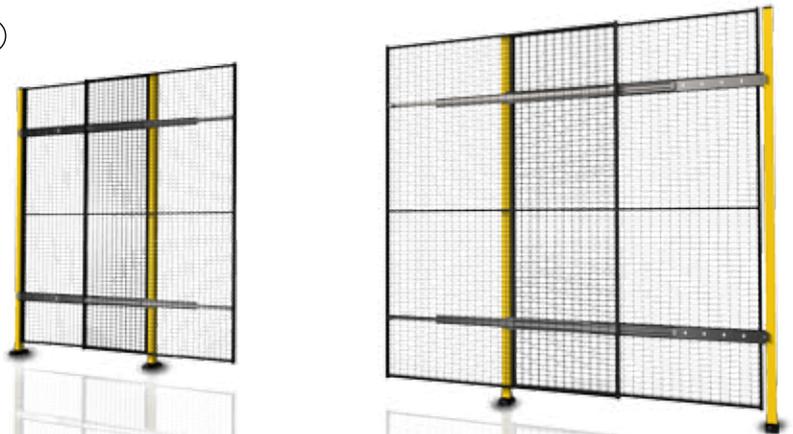
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10



11



- 7 **Double sliding door without rail**, has an opening of 6 metres and no upper limitation. The door is perfect when handling large volumes carried by overhead crane or forklift. Maximum width 2x3000 mm and maximum height 2300 mm.
- 8 **Double sliding door with 2-step rail**, is used where a large opening is required but where there is limited space at the side. The panels overlap each other instead of sliding to the side. Maximum width 2x1500 mm and maximum height 2300 mm.
- 9 **Triple sliding door with 3-step rail**, is used where a large opening is required but where there is limited space at the side. The panels overlap each other instead of sliding to

the side. Maximum width 3x1500 mm and maximum height 2300 mm.

- 10 **Single sliding door without rail**. An ideal solution for an opening with no overhead obstruction and where the need for a large opening isn't necessary. Maximum widths 900 mm and 1400 mm, maximum height 2300 mm.
- 11 **Double sliding doors without rail, with centre lock**. An ideal solution for an opening with no overhead obstruction and where the need for a large opening isn't necessary. Maximum widths 1800 mm and 2800 mm, maximum height 2300 mm.

LOCKS



Hitch lock

This lock is an alternative to our X-lock and has an integrated mounting for non-contact switches. The lock has an adjustable hitch for eliminating any internal play.

The handle is spring-loaded to remove the ability of the door to automatically fully close. To fully shut the door requires deliberate operation of the handle eliminating accidental closure. Euro cylinder locking is available as an option. With this variant the key should be carried with the engineer into the cell to prevent accidental closure.

▶ BREAKER / EMERGENCY STOP

Axellent collaborates with several market leaders within the sector, including Allen-Bradley GuardMaster, Euchner, Jokab, Telemecanique and Siemens. This gives us a wide range to offer our customers for the safest and most optimum solution possible.



Catch

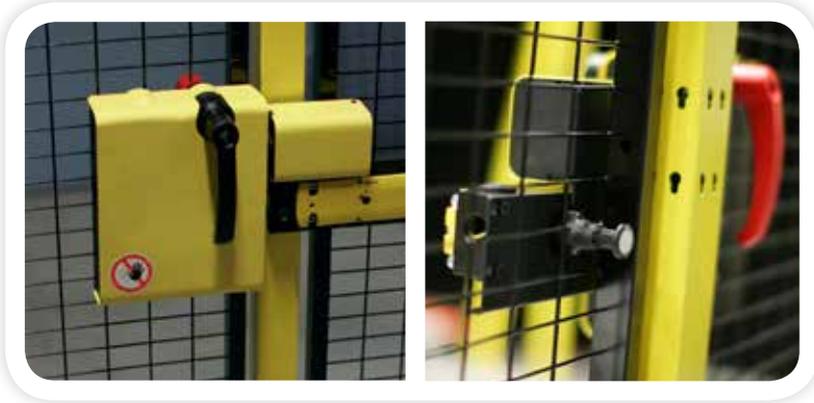
The door closes with a simple push and is kept closed by the built-in catch.



Euchner MGB

The MGB (Multifunctional Gate Box) is a unique inter- and guard locking system for the protection of safety doors on machines and systems. Four LEDs indicate information about the lock status.

The lock has an intelligent plunge whose position is detected by an RFID transponder which has a unique code. This prevents tampering while allowing the MGB meets EN ISO 13849-1 / SIL 3 according to EN 62061.



X-Lock

A versatile door lock system that suits all our accident prevention series. X-Lock has a mechanical bolt that holds hinged and sliding doors closed. The lock is designed so that it requires conscious action to open and close the door from the outside. From the inside X-Lock can not be closed, but it is always possible to open.

To prevent the machine from being started accidentally, there is a plate with three holes on the side of the X-Lock where you can secure a padlock when the door is opened. This ensures the highest safety during safety work, etc. For X-Lock EN ISO 12100 chapter 5.5.3. is applicable.



Hinge lock

Our most simple lock system. A normal hinge lock secure the area from being entered by unauthorized.



Cylinder lock

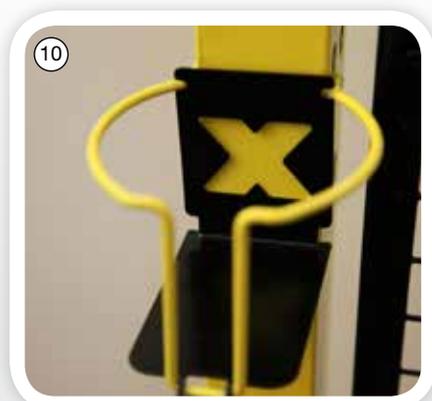
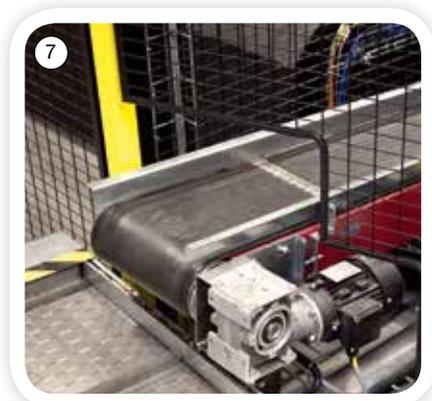
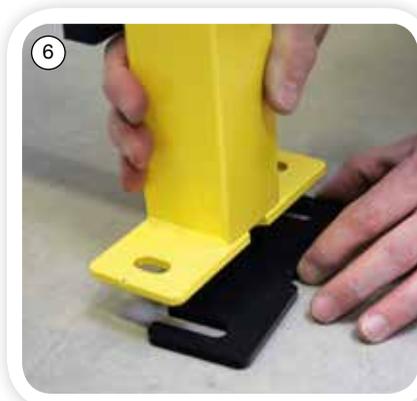
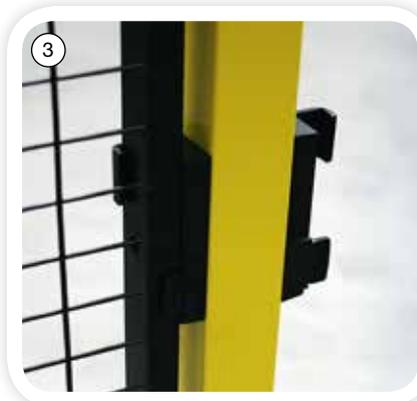
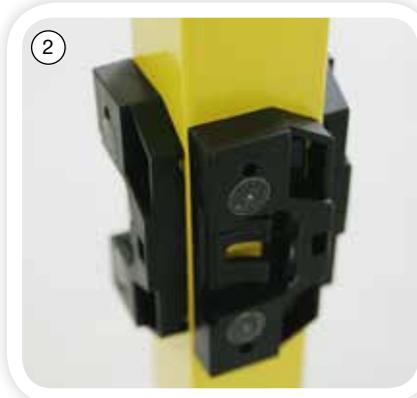
Burglar-proof lock system with easy grip handle.



Panic lock

A lock with cylinder can be used as an emergency exit and means of escape where maintenance access is required. Doors with panic lock can always be opened from the inside, even when locked by key from the exterior.

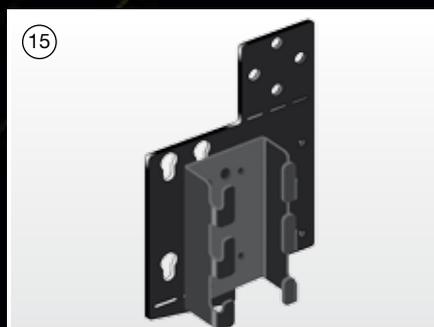
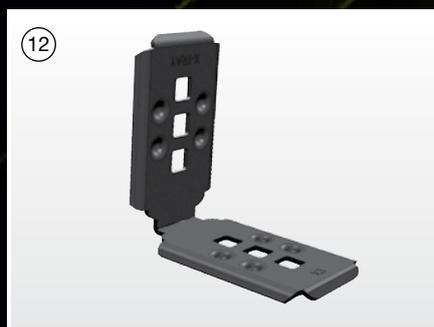
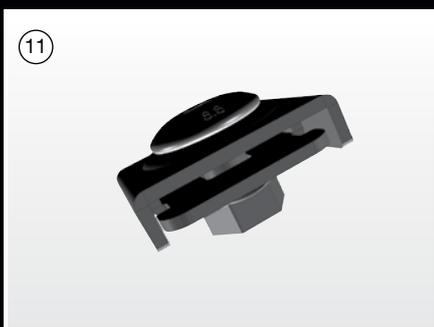
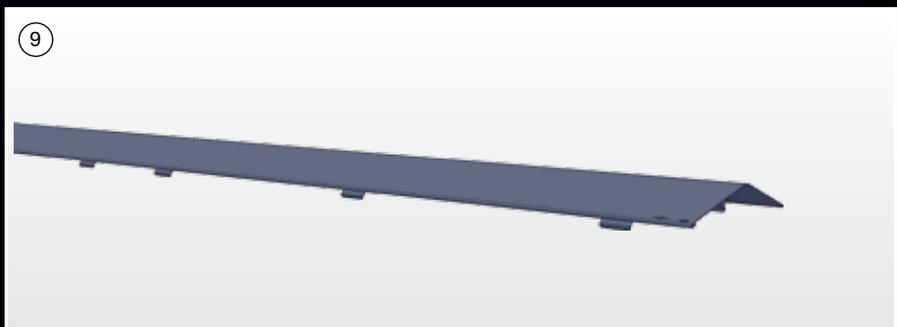
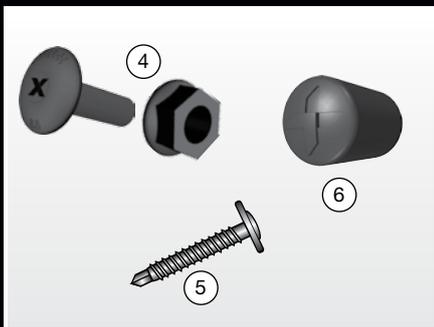
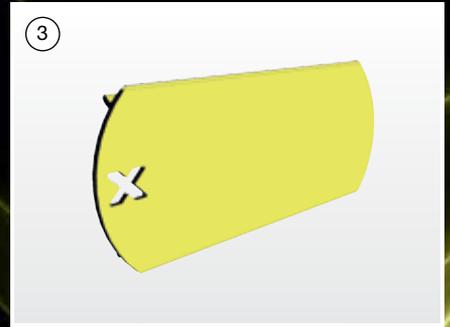
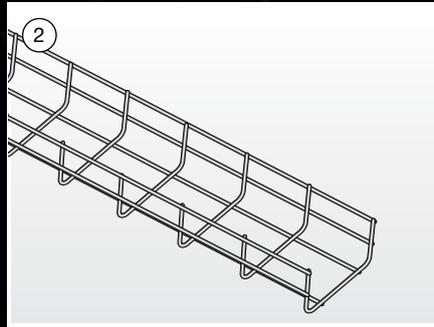
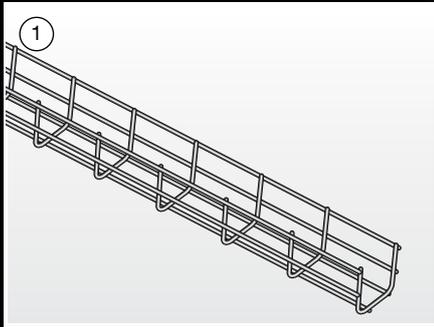
X-GUARD® – ACCESSORIES





- ① **Hinge** - You can easily replace a wall bracket with a hinge, even after installation.
- ② **Upper bracket** - Simple snap on brackets can be fitted to three sides of a post.
- ③ **Lower bracket** - Guides the panel into the correct position when assembling.
- ④ **Rail for sliding door** - New design aluminium sliding door rail.
- ⑤ **Top plug** - Used for mounting of tubular door lintel, cable conduit etc.
- ⑥ **Shims kit** - For height adjustment of X-Guard posts.
- ⑦ **Rubber edging** - Our rubber edging gives a soft and neat edge in places where the mesh panel has been cut.
- ⑧ **Tubular frame** - Width adjusted during assembly to suit door opening
- ⑨ **Top frame fittings** - For double hinge doors in corner.
- ⑩ **X-Cup** - Mug holder to fix onto the X-Guard post.
- ⑪ **Quick fastener** - For optional placement. 1-pack.
- ⑫ **Cutting package** - Available in both vertical and horizontal versions.
- ⑬ **0-180° fittings** - Fittings for creating corners up to 180°.
- ⑭ **Magnet** - For use when extra stability is required.
- ⑮ **Recess piece** - Available in all heights.
- ⑯ **Cover strip** - Used to cover the gap between the pole and panel.

X-TRAY® – CABLE TRAY SYSTEM FOR X-GUARD®





▶ X-TRAY®

AXELENТ offers the simple, smart and flexible cable tray for our X-Guard® system. The product is strong, flexible and at the same time fast and easy to assemble. You can shape elegant solutions without any welding. As with our X-Guard® system few fittings and tools are needed. You can easily follow the winding shapes of a conveyor system or make on site alterations.

You need the project finished on time, with as little material as possible. You want all the material delivered to site without the need and expense of ordering additional components to complete the project. With Axelent's wire tray you get maximum flexibility with the minimum material, simple and smart.

- ① **Wire tray** - 60/60, 2300 mm. Black-zincd.
- ② **Wire tray** - 120/60, 2300 mm. Black-zincd.
- ③ **Marking Clip X70** - 90x37 mm. Yellow plastic.
- ④ **Bolt and flange nut X61 and X62** - M8x19mm. 40 pcs/pack. Black-zincd.
- ⑤ **Screw AX-13** - Self-drilling. 7 mm hexagon washer head. Black-zincd.
- ⑥ **Safety Cap end part X72** - Black rubber. Available in 4 and 5 mm. 100 pcs/pack.
- ⑦ **Bolt Cutter X75** - Length 630 mm.
- ⑧ **Fitting X4** - 10 pcs/pack. Black-zincd.
- ⑨ **Cover X65** - Width 60 or 120 mm, length 1000 mm. Black-zincd.
- ⑩ **Fitting X1** - 10 pcs/pack. Black-zincd.
- ⑪ **Fitting X2** - 20 pcs/pack. Black-zincd.
- ⑫ **Angled Fitting X3** - 10 pcs/pack. Black-zincd.
- ⑬ **Bracket with pegs AX-11** - 10 pcs/pack. Black-zincd. Assembly materials included.
- ⑭ **Bracket AX-12** - 90°. 10 pcs/pack. Black-zincd. Assembly materials included.
- ⑮ **Corner Bracket AX-15 + AX-11** - For inner corner. Black-zincd. Assembly materials included.
- ⑯ **Corner Bracket AX-16 + AX-11** - For inner corner. Black-zincd. Assembly materials included.
- ⑰ **Accessories holder X63** - Black-zincd.

X-GUARD® – REFERENCES

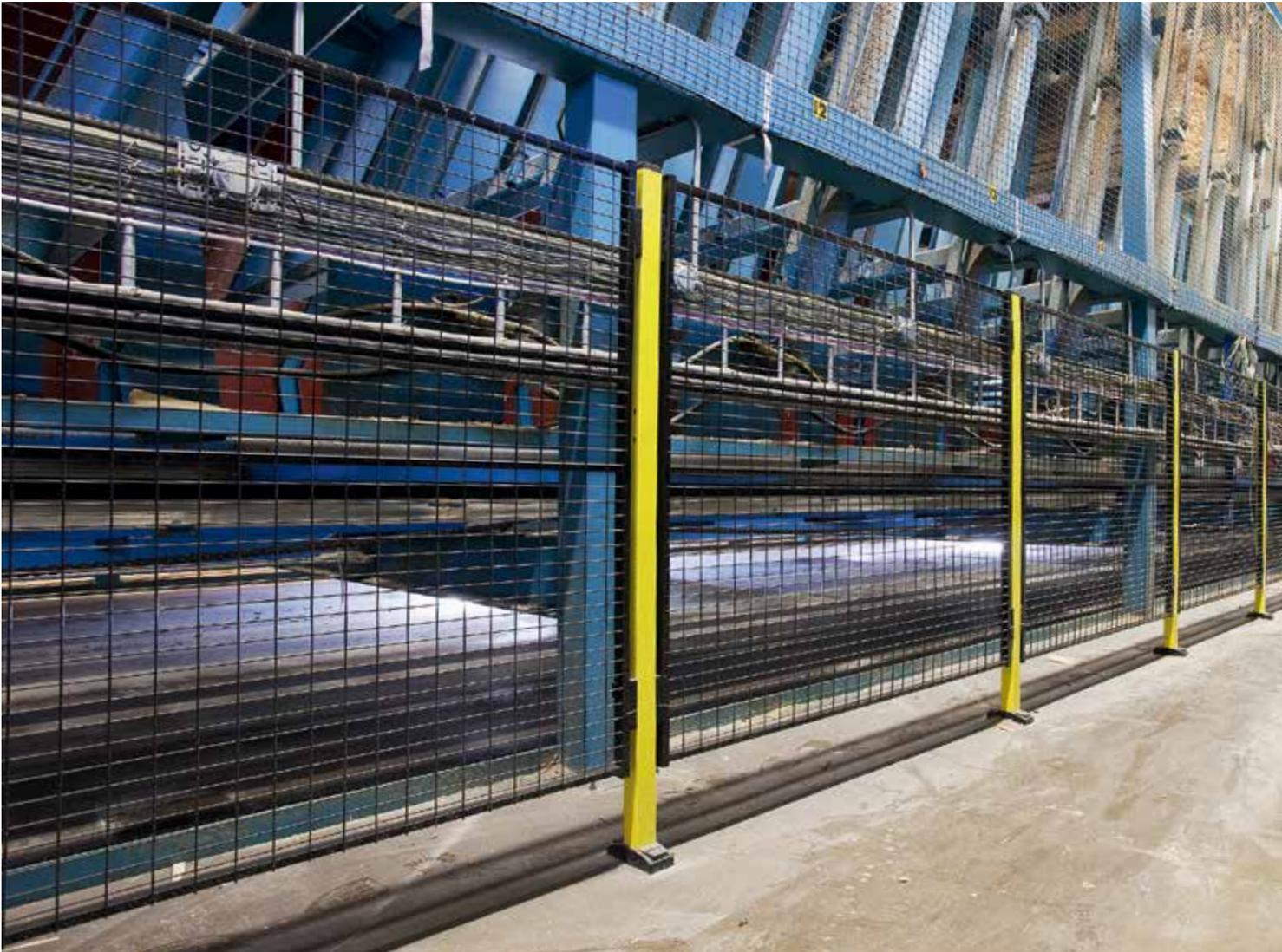




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- ① Axelent X-Guard®, height 2300 mm. The picture shows a machine guard around an automated plate sheeting machine.
- ② Axelent X-Guard® is easily tailored for individual solutions. A practical cutting package facilitates the integration of conveyor belts. The picture shows a machine guard in sheet metal cover production.
- ③ Axelent X-Guard®, height 2000 mm. The picture shows our mesh panels providing 150 mm protection in post and parcel sorting.
- ④ At KWA garden furniture in Knäred our Axelent X-Guard® is used around a CNC machine that processes pinewood table tops. The machine is fed by a Kuka robot.

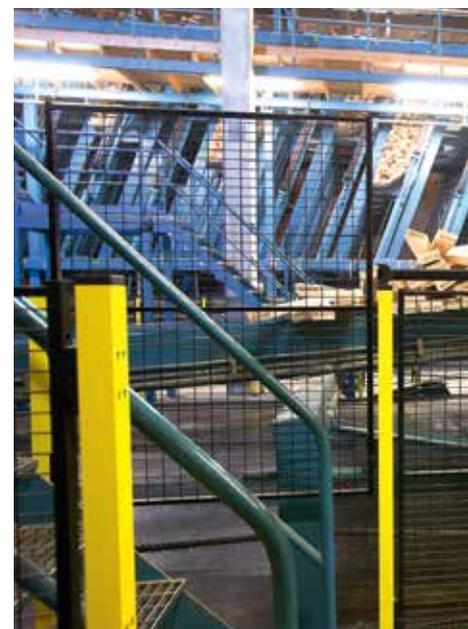
SETRA SAWMILL, MALÅ



Setra is one of Sweden's largest wood processing companies and is a leading player on the European market. Axelent AB is the preferred supplier of machine guards to all Setra's Swedish plants.

7.5 km machine guard

Setra's sawmills have a total need of 7.5 km of machine guards and 450 hinged doors. The Malå plant has around 1 km of machine guards and 40 hinged doors.





X-GUARD® - REFERENCES



Axelent X-Guard®, height 2300 mm. The pictures show 25 metres of machine guard around a robot and pallets.



MACHINE SAFETY STANDARDS AND RISK ASSESSMENT

What is the reason behind the continuous machine safety improvements within the sector? The first and most important is the moral reason. All employees are entitled to a safe and secure work environment. The second reason is financial as workplace accidents cost enormous amounts in sick leave, damages and production losses. The last reason is to comply with the legal requirements of EU directives.

A new machine directive came into force on December 29, 2009: 2006/42/EC. The new directives have the following modifications:

- Machines defined as “non-independent machines” (2B machines) are now defined as “partly completed machinery”. The requirements for these machinery types have also been raised, e.g. a documented risk analysis must be carried out.
- In Appendix I, all examples of “should” have disappeared and the technical requirements have been expanded and clarified to a certain extent, e.g. ergonomic and control system requirements have been made more precise.
- Modified certification procedure for Appendix IV machinery.

Read more at <http://ec.europa.eu/enterprise/newapproach/standardization/harmstds/reflist.html>

1. Fixed guards

Machinery Directive annex 1 chapter 1.4.2.1
Fixed guards must be fixed by systems that can be opened or removed only with tools. Their fixing systems must remain attached to the guards or to the machinery when the guards are removed. (Valid from 29/12/2009.) Where possible, guards must be incapable of remaining in place without their fixings.

2. Safety Distances

EN 953 chapter 5.2.2
Guards intended for preventing access to danger zones shall be designed, constructed and positioned to prevent parts of the body from reaching danger zones (see also EN ISO 13857).

3. Distances to impede free access

EN ISO 13857
A protective structure can be used to restrict the free movement of the lower limbs under protective structures. When this method has to be used, distances are given in annex A in relation to the height to the protective structure.

Figure A.1 (EN ISO 13857)

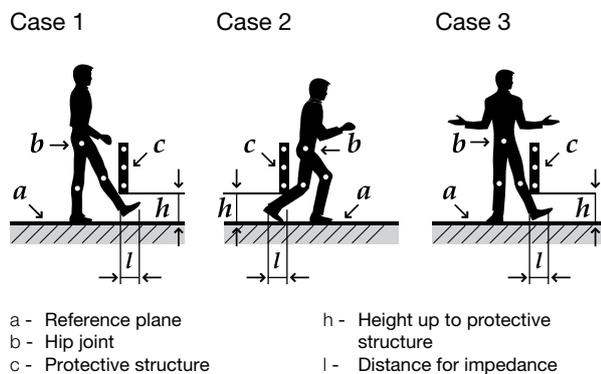


Table A.1 (EN ISO 13857)

Height up to protective structure (h)	Distance (l)		
	Case 1	Case 2	Case 3
$h \leq 200$	≥ 340	≥ 665	≥ 290
$200 < h \leq 400$	≥ 550	≥ 765	≥ 615
$400 < h \leq 600$	≥ 850	≥ 950	≥ 800
$600 < h \leq 800$	≥ 950	≥ 950	≥ 900
$800 < h \leq 1000$	≥ 1125	≥ 1195	≥ 1015

Dimensions in mm

Figure A.1 – Impeding free movement under protective structures.

Table A.1 gives distances for particular cases where access of the lower limbs is impeded when the person remains in a standing position (see figure A.1) without any additional support.

Where there is a risk of slipping or misuse, applying the values given in Table A.1 can be inappropriate.

There should be no interpolation between the values in this table. If the height, h, up to the protective structure lies between two values, then the distance for the higher value of h should be used (for further information see EN ISO 13857 chapter 4.3).

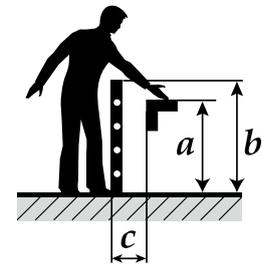
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VALUES FOR SAFETY DISTANCES

EN ISO 13857 chapter 4.2.2.1.2 table 2

Dimensions in mm

Height of hazard zone ^c <i>a</i>	Height of protective structure <i>a, b</i>									
	1000	1200	1400	1600	1800	2000	2200	2400	2500	2700
Horizontal safety distance to hazard zone, <i>c</i>										
2700	0	0	0	0	0	0	0	0	0	0
2600	900	800	700	600	600	500	400	300	100	0
2400	1100	1000	900	800	700	600	400	300	100	0
2200	1300	1200	1000	900	800	600	400	300	0	0
2000	1400	1300	1100	900	800	600	400	0	0	0
1800	1500	1400	1100	900	800	600	0	0	0	0
1600	1500	1400	1100	900	800	500	0	0	0	0
1400	1500	1400	1100	900	800	0	0	0	0	0
1200	1500	1400	1100	900	700	0	0	0	0	0
1000	1500	1400	1000	800	0	0	0	0	0	0
800	1500	1300	900	600	0	0	0	0	0	0
600	1400	1300	800	0	0	0	0	0	0	0
400	1400	1200	400	0	0	0	0	0	0	0
200	1200	900	0	0	0	0	0	0	0	0
0	1100	500	0	0	0	0	0	0	0	0



- a** Protective structures less than 1000 mm in height are not included because they do not sufficiently restrict movement of the body.
- b** Protective structures lower than 1400 mm should not be used without additional safety measures.
- c** For hazard zones above 2700 mm, refer to 4.2.1.

4. Regular openings for persons of 14 years of age and above

EN ISO 13857 chapter 4.2.4.1

Axelent MasterGuard has an aperture of 19 x 49 mm which gives a safety distance of 120 mm, Axelent's other machine guard systems has an aperture of 29 x 49 mm which gives a safety distance of 200 mm (for further information see EN ISO 13857 chapter 4.2.4.1 table 4).

5. Viewing

EN 953 chapter 5.2.4

To minimise the need to remove them, guards shall be designed and constructed to offer adequate viewing of the process.

EN 953 chapter 5.10

Where viewing of machine operation is required through the guard, materials shall be selected with suitable properties, e.g. if perforate material or wire mesh is used this should be of adequate open area and suitable colour to permit viewing. Viewing will be enhanced if the perforate material is darker than the area observed.

6. Transparency

EN 953 chapter 5.11

As far as practicable, materials used for viewing machine operation shall be selected from those which retain their transparency, with age and use. Guards shall be designed to make provision for the replacement of degraded materials.

Certain applications can require the selection of materials or combinations of materials that are resistant to abrasion, chemical attack, degradation by ultra violet radiation, dust attraction by static electrical charge, or surface wetting by fluids which impair transparency.

7. Colour

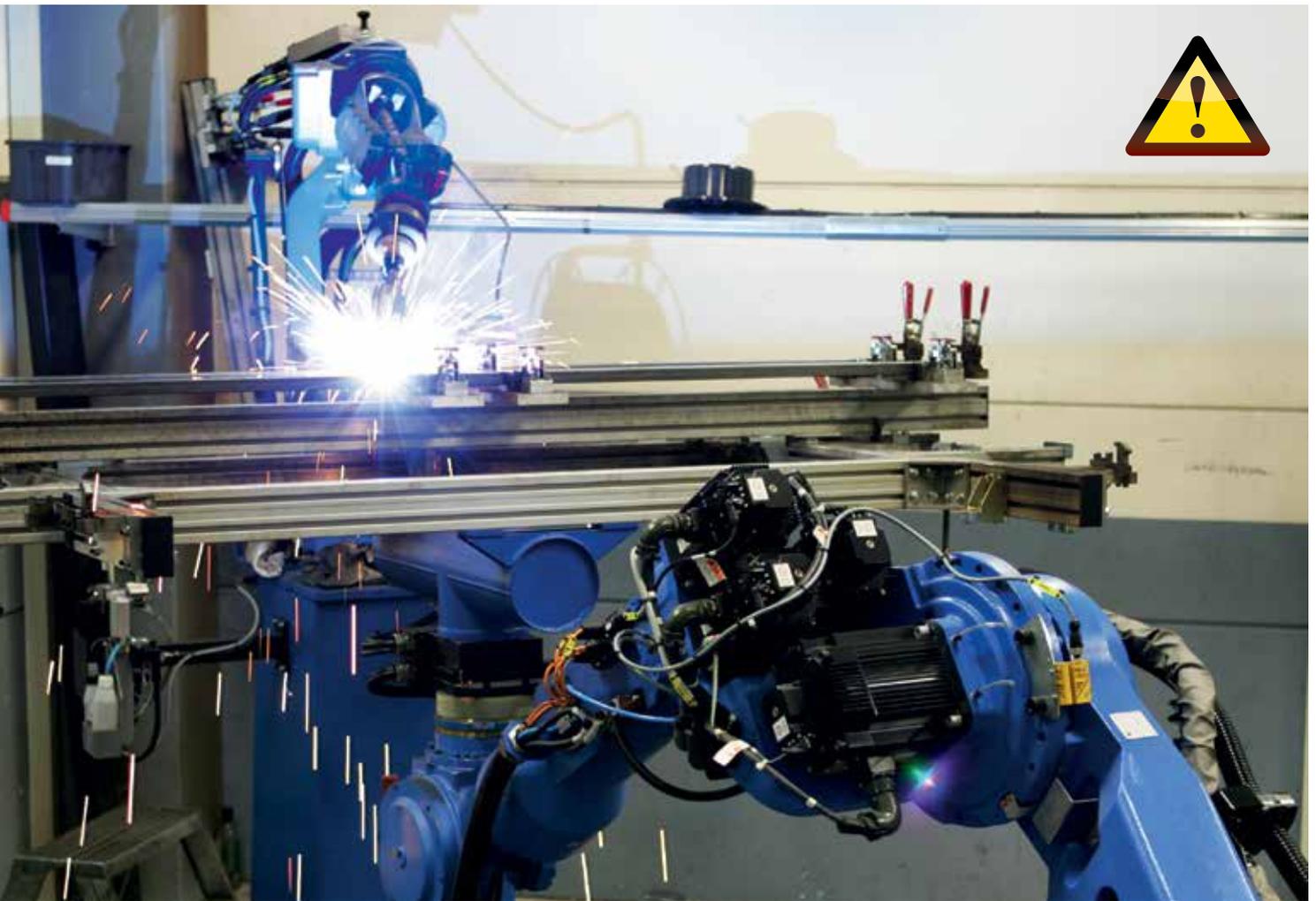
EN 953 chapter 7.5

Hazards can be highlighted by the use of suitable colours. For example if a guard is painted the same colour as the machine and the hazardous parts painted a contrasting bright colour, attention is drawn to the hazard when the guard is opened or left off.

8. Positive location of removable guards

EN 953 chapter 5.4.4

Where practicable removable guards shall be unable to remain in place without their fixings.



9. Removal only by tool

EN 953 chapter 5.4.3

Demountable parts of guards shall only be removable with the aid of a tool.

10. Geometrical factors

EN ISO 12100-2 chapter 4.2.1

The design of the machine shall be such that, from the main control position, the operator is able to ensure that there are no exposed persons in the danger zones.

11. Measures for the escape and rescue of trapped persons

EN ISO 12100-2 chapter 5.5.3

Measures for the escape and rescue of trapped persons may consist, e.g. of:

- escape routes and shelters in installations generating operator-trapping hazards;
- arrangements for moving some elements by hand, after an emergency stop;
- arrangements for reversing the movement of some elements;
- anchorage points for descender devices;
- means of communication to enable trapped operators to call for help.

12. Removal of fixed guards

ISO 14120:2002 chapter 5.3.9 (draft)

Demountable parts of guards shall only be removable with the use of a tool (see 3.9 and 3.10). The time it takes to remove the guard shall be in relation to the time for the hazards of the machine to cease, i.e. it shall not be so easy to remove the guard that it is chosen instead of using the interlocked guard with guard locking.

Other aspects such as the number of fixings shall also be considered to prevent removal of the guard instead of using interlocked doors. Fasteners that can be quickly loosened or removed shall not be used.

EXAMPLE Quick release fasteners, such as quarter turn screws, are not considered as suitable for fixed guards.

As this is a sample from the applicable standards, we recommend that you read the standard relevant to each application. This document is subject to changes in applicable directives and standards.

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AXELENT SAFETY

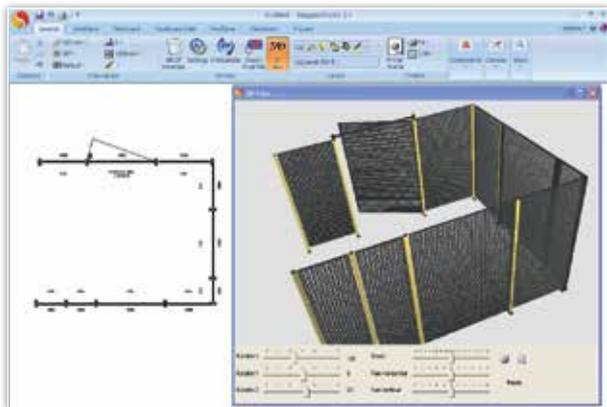
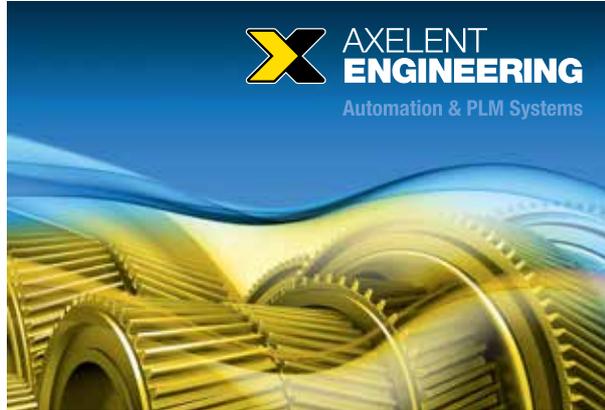
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