



MACHINE GUARDING SOLUTIONS FOR



# AUTOMATION & ROBOTICS



Protecting People, Property & Processes

[www.troax.com](http://www.troax.com)



# It's one thing to be a world leader

It's quite another to develop products that really are world leaders

TROAX lightweight yet secure mesh panels have an important job to do: to make an area safe. Our systems are well-planned and carefully developed to cope with the most demanding applications. Feedback from our customers and our skilled employees makes it possible to offer the strongest and most intelligent systems in our sector.



## Three strong market segments

TROAX delivers a broad range of high-quality safety solutions all over the world.

TROAX systems are marketed in three market segments: automation and robotics, material handling and logistics, and storage and property protection. By dividing operations up in this way, we can focus completely on the requirements and technical aspects within each market segment.



### Automation and robotics

Today's modern industry with advanced processes places significant demands on safety. In particular, there is a great need for controlled access for authorised personnel. TROAX mesh panels are based on a carefully developed modular system that also includes special adaptations.



### Material handling and logistics

TROAX can meet all requirements for storage and security. We are suppliers to all types of industry - from traditional manufacturers that require large-scale flows and volumes through their factories to facilities with high-bay storage and retail storage. We can meet all your requirements and we offer complete solutions.



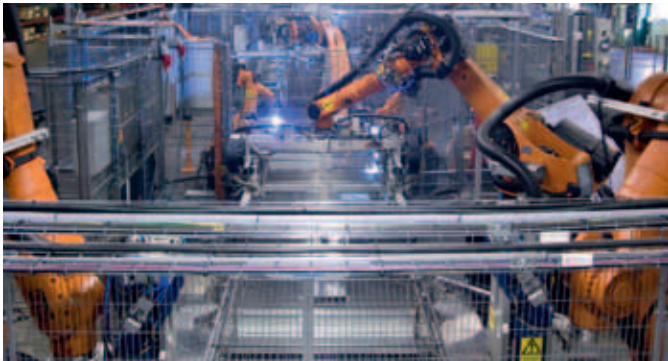
### Storage and property protection

Whether it's a question of new development or renovation of an existing installation, we are convinced that you will find our products easy to work with. Your unique needs and our creativity have contributed to our constant product development, giving rise to our motto: "Secure storage must be simple".



## Table of contents

|                               |         |                           |       |
|-------------------------------|---------|---------------------------|-------|
| Global presence               | 4-5, 24 | The broad perspective     | 15    |
| Systems & Accessories         | 6-7     | Hinged & Sliding doors    | 16-17 |
| Standards & Tests             | 8-9     | Telescopic & Linear doors | 18    |
| System solutions              | 10-14   | Panels & Posts            | 19    |
| Smart Fix                     | 11      | Additional solutions      | 19    |
| Rapid Fix                     | 12      | Safe Lock                 | 20-21 |
| Strong Fix                    | 13      | Configura                 | 22    |
| Combi Fix, Safe Fix, Base Fix | 14      | MyTROAX                   | 23    |



## Sustainable product development

TROAX's own research and development department has been entrusted with continuous optimization of our products and system solutions.

You should always feel confident in us and our products. One of the most important and integral parts of our business is our continued ability to translate ideas into strong, high-quality products, all of which have your safety as their primary goal.

TROAX has an environment-friendly, flexible and streamlined production process. We are certified according to quality management system ISO 9001 and environmental management system ISO 14001, and we work continuously on improvements to our quality and environmental performance.





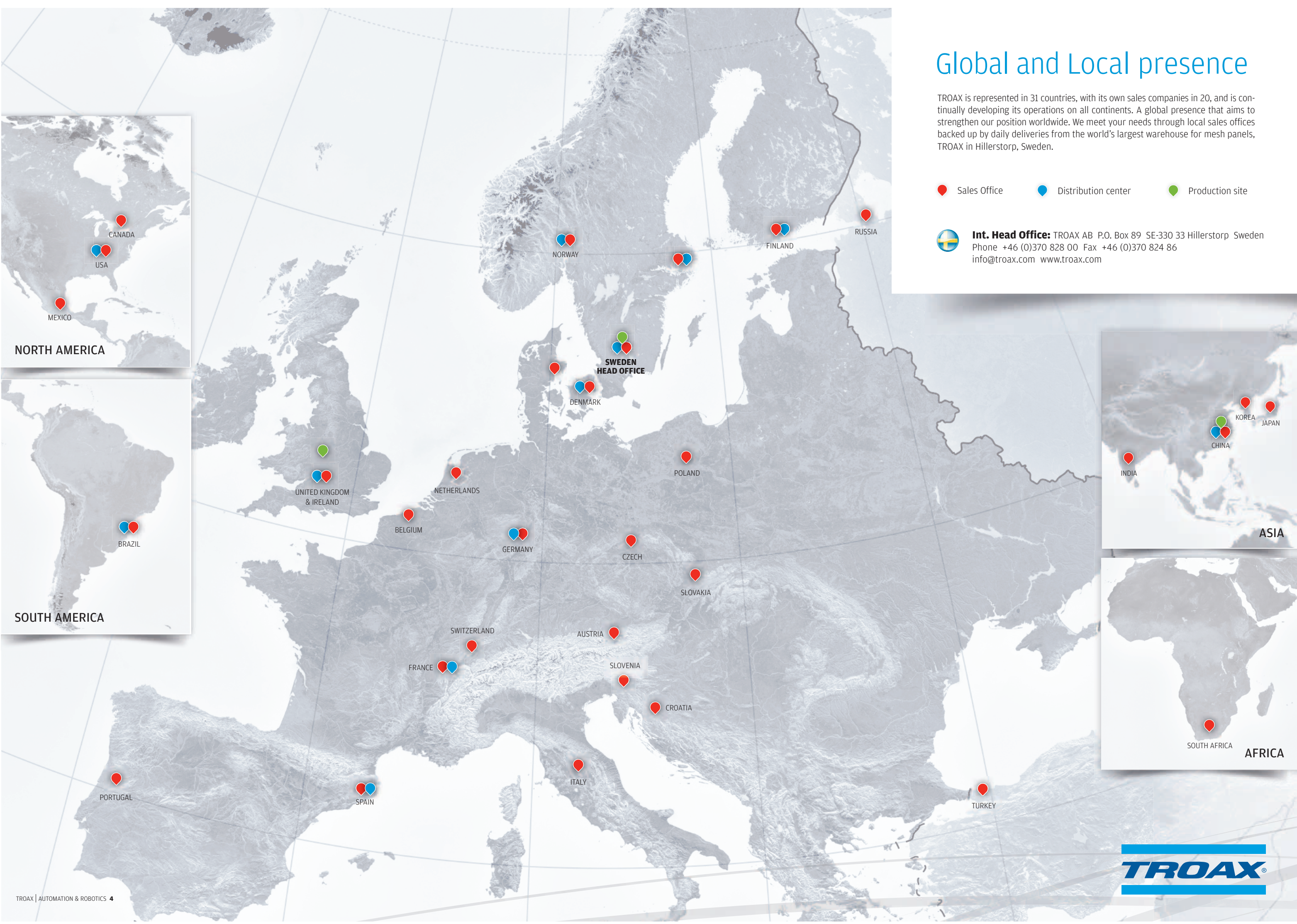
# Global and Local presence

TROAX is represented in 31 countries, with its own sales companies in 20, and is continually developing its operations on all continents. A global presence that aims to strengthen our position worldwide. We meet your needs through local sales offices backed up by daily deliveries from the world's largest warehouse for mesh panels, TROAX in Hillerstorp, Sweden.

-  Sales Office
-  Distribution center
-  Production site



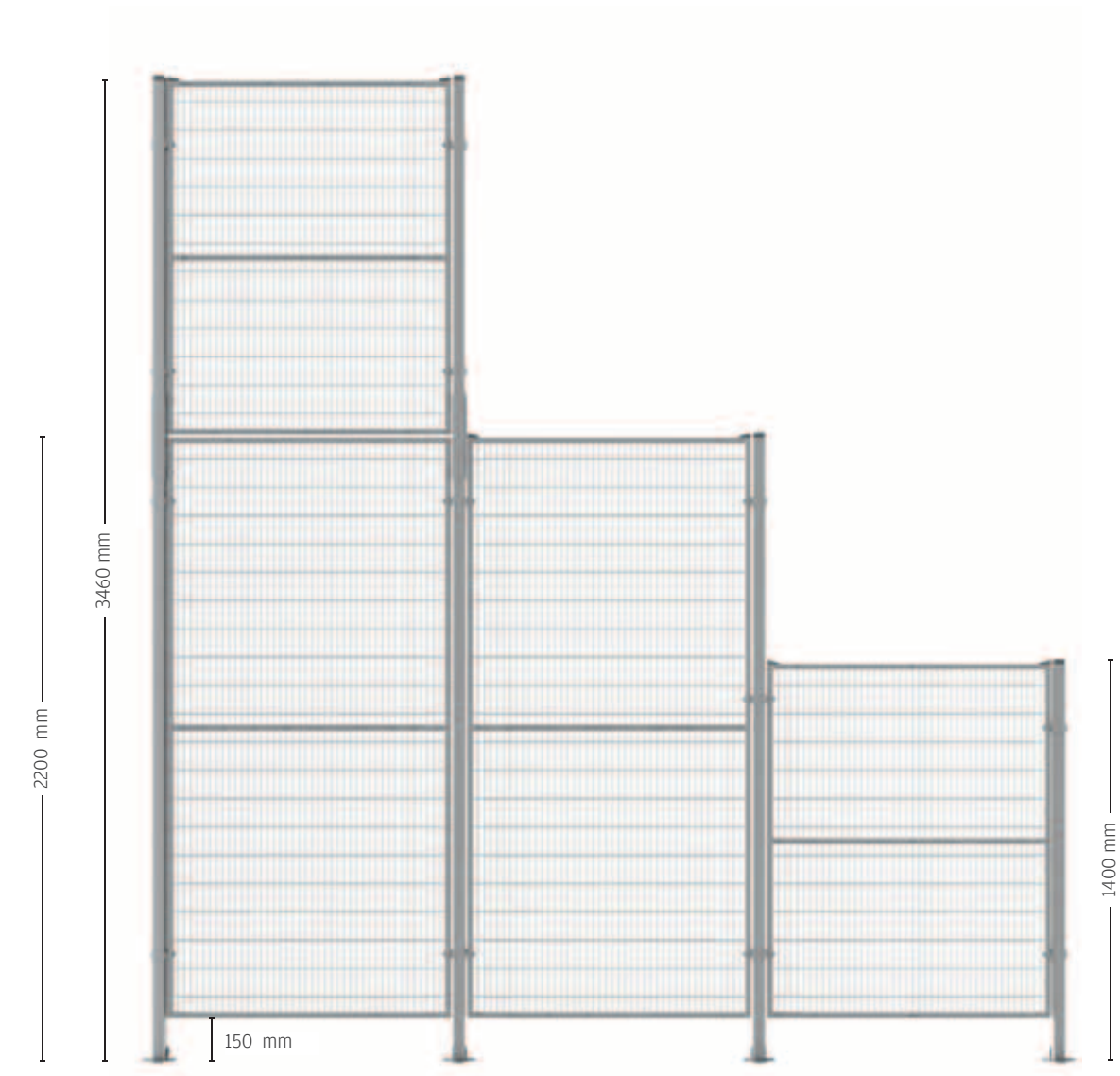
**Int. Head Office:** TROAX AB P.O. Box 89 SE-330 33 Hillerstorp Sweden  
Phone +46 (0)370 828 00 Fax +46 (0)370 824 86  
info@troax.com www.troax.com





# Build to suit your requirements with our system solutions

It is no coincidence that our systems can be adapted and constructed to suit your specific needs. Everything is well planned down to the smallest detail. Our systems can be combined with each other, something that is unique and creates a future-proof investment.



## System dimensions

Standard System heights are 2200 mm and 1400 mm, leaving a 150 mm floor gap for easier cleaning. Panels are available in 7 widths, from 200 mm up to 1500 mm. Both panels and posts can be adjusted to requested size.

## Mesh guards

The TROAX panel design for ST20 and ST30 mesh panels complies with European norms for maintaining a safety distance of 120 mm from the hazard. Vertical wires on the outside of the panel make it difficult to climb.

## High visibility

TROAX's grey (RAL 7037) colour provides the best visibility throughout the hazard zone. Mesh Panels can, of course, be supplied in any colour of your choice.

# Smart accessories complete the overall picture

All installations are unique. We know that. That's why our smart accessories are developed to meet the demands of our customers and their applications. This ensures that our components and systems work together.



**Snapper** The Snapper adjoins two panels and can be used to replace a post.



**Angle bracket** The angle bracket is used together with our Smart Fix kit and enables adjustment of an angle up to 180 degrees.



**Extension bracket** The extension bracket is used to build higher walls and extend the standard posts of 2200 mm and 3000 mm.



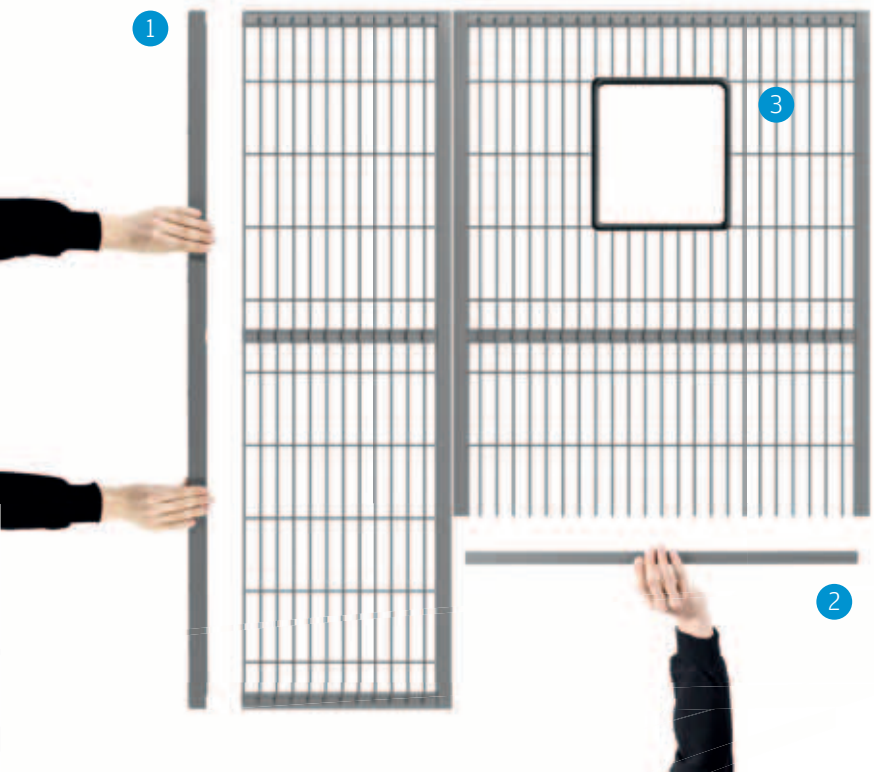
**PC holder** The PC holder fix a polycarbonate infill sheet to the mesh panel, to withhold liquids and small parts.



**Earthing** For Smart Fix system, the kit functional bonding creates an electrical bonding between panels and posts, solving problems with leakage current.



**Cable ladder** TROAX cable ladder kit is used to fix different cable ladder systems to our posts.



## 1 End profile

The end profile is a flexible solution for adjusting the width of the mesh panel on site while still retaining strength as a welded panel frame.

## 2 Cut profile

The cut profile is a flexible solution for adjusting the height of the mesh panel on site while still retaining strength as a welded panel frame.

## 3 Edge cover

Edge cover is a flexible solution for covering sharp edges after cutting mesh for access.



# Our strength is in the details

TROAX's automated production process ensures a high quality for every panel produced. All horizontal wires are welded into the frame and the vertical wires are welded to the crossing tubes. This creates a stable mesh panel with a well-knit structure making the panel very strong and impact resistant.



## Strong welding method

All horizontal wires are welded into the panel frame, joining the wires and frame to form a strong mesh panel.



## Unique profiled tubing

The horizontal tubes on our mesh panels have a unique profiled tubing designed to make the welding stronger and the mesh flatter.

## Standards and rules

### ISO standards and norms

TROAX has been active in several national and international standard committees since 2007, working to improve and clarify the recommendations of the standards and norms. The EN and ISO standards are our guides in order to design and construct safe products.

### Machinery Directive - 2006/42/EC

The Machinery Directive provides the harmonisation of the essential health and safety requirements for machinery through a combination of mandatory health and safety requirements and voluntary harmonised standards. The Member States of the EU, Norway, Iceland, Lichtenstein and Turkey are obliged to incorporate the Directive into their legislature.

Troax machine guard products are designed and developed to comply with the requirements of the Machinery Directive, the ANSI/RIA and the CSA standards.



- EN-ISO 12100
- ISO 14120
- ISO 14119
- ISO 10218-2
- ISO 14121-1
- ISO 13857

## Quality tests

TROAX's own research and development center continually works to optimize our products and system solutions. Panels, posts and fixing systems are tested in accordance with the impact test recommendations in the coming standard ISO 14120 that will be published at the turn of 2014/2015.

The tests are carried out using energy impact from 309 up to 2000 joules in order to both guarantee function and maintain our globally renowned quality reputation.

Test reports are available for download at [www.troax.com](http://www.troax.com) that describes the test criteria and results.







## All systems comply with the Machinery Directive

Smart Fix, Rapid Fix, Strong Fix, Combi Fix and Safe Fix

We offer a flexible modular panel system, which together with our unique solutions for fixings and posts, fit our mesh, full steel, and polycarbonate panels. As many of our fixing systems use the same posts, all can be combined or interchanged with the machine guarding for the most optimal solution for your requirements.



## Smart Fix

A strong and proven system

Smart Fix is our well-proven safeguard system with many unique properties. The fixings are tightened to the post and can easily be moved up and down to adjust for uneven floors and tunnels for conveyors.

### Smart details

The bolt attached to the panel is held captive even when the system is disassembled, fulfilling the requirements of the current standards and rules for machine guarding.



**Panel fixing**  
Strong and durable steel clamp.



**Smart Fix** system is tested to withstand an impact of 1600 joules together with the 60x40 standard post and the ST30 or ST20 mesh panels.







## Rapid Fix

Quick and easy access  
when you need it

Rapid Fix is a cleverly designed machine safety system that offers a quick and easy access to the hazard zone. The lower bracket has a slot that the panel hooks into and the upper bracket has an innovative locking mechanism that snaps the panel into its correct position.

The system is disassembled from inside the cell, and a tool is used to release the panel.

All fixings are fastened to the panel and posts remaining attached to the guard when disassembled, fulfilling the requirements of current standards and rules for machine guarding.

**Upper fixing**  
Secure the panel  
with ease using  
the built-in click  
function.



**Lower fixing**  
Easily slides in the  
panel in the lower  
fixing position.



**Rapid Fix** system is tested to withstand an impact of 1000 joules together with our standard 60x40 post and the ST30 or ST20 mesh panels.

## Strong Fix

Robust and durable

Based on 80x80 posts and a strong bracket, the Strong Fix system is the best alternative for harsh environments or when the risk for an impact is high. The heavier posts create a robust impression and together with our ST30 mesh panels the system has been tested to withstand an impact of up to 2000 joules.

### Smart details

The Strong Fix bracket is fixed to the post just like the Smart Fix bracket. The bolt attached to the panel is held captive even when the system is disassembled, fulfilling the current requirements and standards for machine guarding.



**Strong Fix**  
The bracket attaches  
the panels next to  
the post.



**Safe Fix 80x80**  
The bracket attaches  
the panels in front  
of the post.



**Strong Fix** system is tested to withstand an impact of 2000 joules together with our 80x80 post and the ST30 mesh panels.







## The broad perspective

From simple partitioning to a flexible, safe and strong machine guard solution, TROAX provides customers with high quality products for many different application areas.

Combine our fixing systems with our panels as you prefer. Choose from our many door, lock, Safe Lock and switch options that suit your application requirements to create a complete and integrated machine guard system.



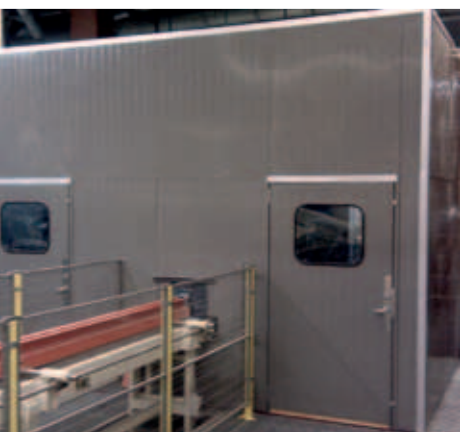
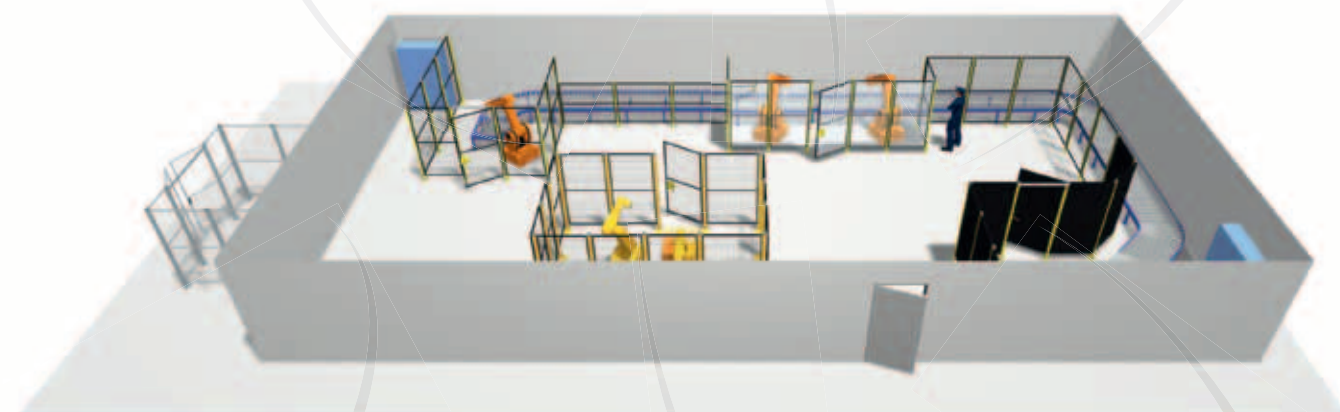
**Robot Cell** Smart Fix system with ST20 mesh panels.



**Production Line** The ST PC polycarbonate panels give good visibility.



**Conveyors** With Rapid Fix system you have easy access.



**Safe Fix**



**Base Fix**

## Combi Fix

Smart Fix and Rapid Fix combined

Combi Fix blends the well-proven and strong Smart Fix System with the flexible Rapid Fix System. Since both systems utilize the identical posts and mesh panels, the unique brackets for each can be interchanged. This can be done either in the design phase or after the fact. Our Combi Fix system has been tested to withstand an impact of up to 1000 joules with either the ST30 or ST20 mesh panels.

## Safe Fix

Fully covered machine guard

The Safe Fix bracket adjoins the panels in front of each post, removing the gap between panels and posts. With the polycarbonate or steel sheet panels you can create fully-covered machine guarding for applications with welding or splash risk. The Safe Fix system has been tested to withstand an impact of up to 309 joules with either the polycarbonate or steel sheet panels.

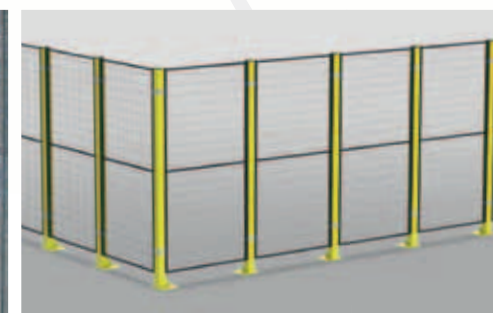
## Base Fix

A foot instead of a post

The Base Fix foot can be used to replace posts in installations with our ST20 mesh panel and is best suited for low height partitioning. The foot and panels are fixed with bolts and nuts that remain captive in the guard even when the system is disassembled. The Base Fix foot combined with our ST20 mesh panel has been tested to withstand an impact of up to 309 joules.



**Galvanized** Panels and posts for damp environments and outdoor use.



**Robust** Strong Fix system with ST30 panels withstands impacts up to 2000 joules

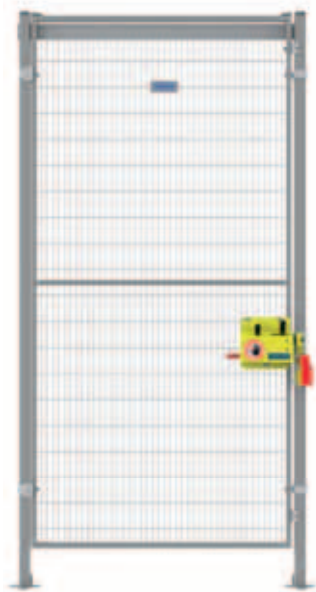


**Welding** Steel sheet panels protect from sparks, dust, liquids and welding light.



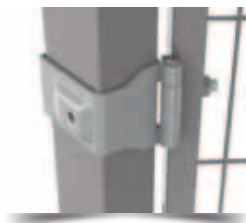


# Hinged doors



Hinged doors can be made with mesh, polycarbonate or steel sheet panels in a variety of widths and heights. Doors can be ordered either pre-assembled from our factory or as separate panels, posts and door fixing for easy on-site assembly.

A variety of lock options - from a simple magnetic lock to Safe Locks with integrated switches - are available to complement your machine guarding system.



Hinge



Magnetic Lock



Cylinder Lock



Safe Lock

# Double hinged doors



With a double hinged door you can create openings from 1400-3000 mm. The doors are made with mesh, polycarbonate or steel sheet panels and can be supplied with the same lock options as for single hinged doors.

## Technical information hinged doors

### Standard dimensions for all hinged doors

**Door leaf** Height 1250, 2050, 2500, 3300 and 4100 mm

**Door leaf** Width 700, 800, 1000, 1200 and 1500 mm

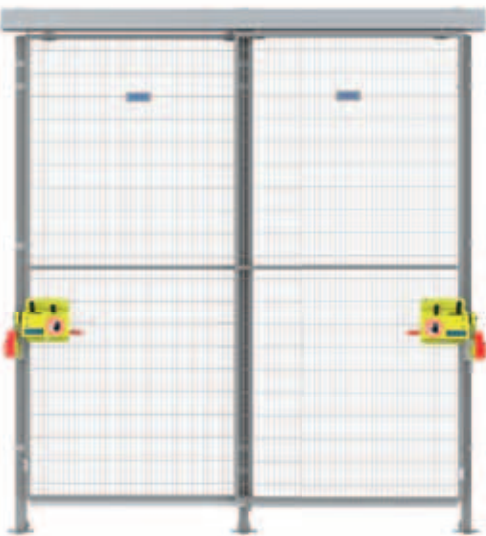
# Sliding doors



The sliding doors have either single or double track rails where the runners keep the panels in position within the aluminum rail. The doors can be made with mesh, polycarbonate or steel sheet panels and can be ordered either partly pre-assembled from our

factory or as separate panels, posts and door fixing for easy on-site assembly. Finish your machine guard system by choosing a lock from our broad range of options and you are ready to go!

# Double sliding doors in double rail



The double sliding door with double rail configuration offers a door that can be opened in two directions.

## Technical information sliding doors

### Standard dimensions for all sliding doors

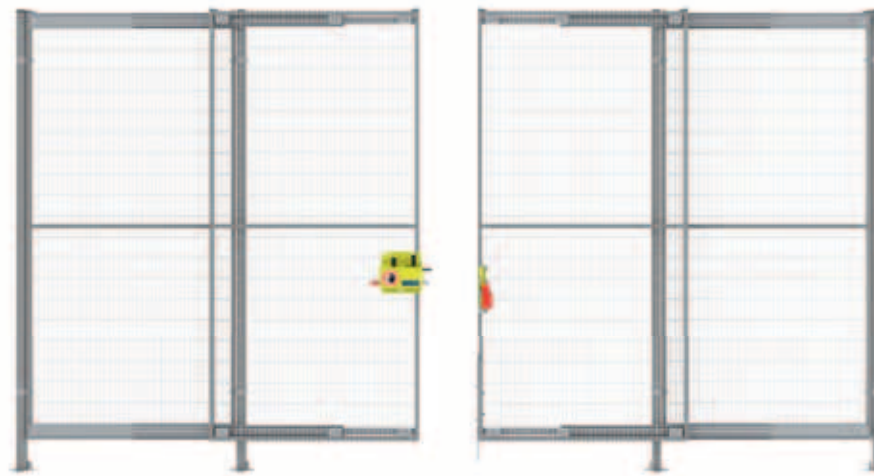
**Door leaf** Height 1250, 2050, 2500, 3300 and 4100 mm

**Door leaf** Width 700, 800, 1000, 1200 and 1500 mm





# Telescopic sliding doors



Telescopic sliding doors can be made from mesh or polycarbonate panels which are fixed to a telescopic rail situated at the top and the bottom of the panel. This allows for a stable sliding door with un-interrupted access both above and to the side of the panel, with opening width up to 3000 mm.

Choose either our cylinder lock or Safe Lock options to accompany this door. The door can be ordered either pre-assembled from our factory or as separate panels, posts and door fixings for easy on-site assembly.

## Technical information telescopic doors

### Standard dimensions for all telescopic doors

|                         |                             |
|-------------------------|-----------------------------|
| <b>Door leaf</b> Height | 1250 and 2050 mm            |
| <b>Door leaf</b> Width  | 800, 1000, 1200 and 1500 mm |

# Panels and posts



## ST20 panel

TROAX standard machine guard mesh on a lighter frame, tested for impacts up to 1600 joules.

Frame: 19x19 mm, Wire: 3 mm  
Mesh size: 20x100 mm

**Heights:** 1250 and 2050 mm

**Width:** 200, 300, 700, 800, 1000, 1200 and 1500 mm



## ST30 panel

TROAX standard machine guard mesh on a rigid frame, tested for impacts up to 2000 joules.

Frame: 30x20 mm, Wire: 3 mm  
Mesh size: 20x100 mm

**Heights:** 1250 and 2050 mm

**Width:** 200, 300, 700, 800, 1000, 1200 and 1500 mm



## URSP steel panel

A steel sheet panel for protection against welding sparks, light dust and liquids. Tested for impacts up to 309 joules.

Frame: 19x19 mm, Thickness: 0.7 mm

**Height:** 2200 mm

**Width:** 200, 300, 700, 800, 1000 and 1200 mm



## PC panel

A polycarbonate sheet adhered to a rigid frame to allow good visibility. Tested for impacts up to 309 joules.

Frame: 30x20 mm, Thickness PC: 2 mm

**Height:** 2050 mm

**Width:** 200, 300, 700, 800, 1000, 1200 and 1500 mm



## Post 60x40

TROAX standard post with a welded foot plate creates a stable and strong design.

Tube: 60x40x1,5 mm

**Heights:** 1400, 2200, 3000



## Post 80x80

TROAX strong post with a welded foot plate for applications with a high impact risk.

Tube: 80x80x3 mm

**Heights:** 2200, 3000

# Linear sliding doors



The linear sliding doors run on roller bearings situated at the top and bottom of the door leaf, creating an opening with un-interrupted access both above and to the side of the panel. The doors are available in widths up to 4000 mm.

Our linear sliding doors can be built from mesh panels and can be supplied with either a cylinder lock or Safe Lock. The door can be ordered partly pre-assembled from our factory, or as separate panels, posts and door fixings for easy on-site assembly.

## Technical information linear doors

### Standard dimensions for all linear doors

|                         |                                  |
|-------------------------|----------------------------------|
| <b>Door leaf</b> Height | 1250 and 2050 mm                 |
| <b>Door leaf</b> Width  | 700, 800, 1000, 1200 and 1500 mm |

# Additional solutions



## Roller door

We offer high quality Albany machine guard roller doors from ASSA ABLOY Entrance Systems.



## Door interlocking devices

We offer a broad variety of switches and interlocking solutions from Euchner, Fortress, GuardMaster, Pilz, Pizzato, Schmersal, Sick, Jokab, Telemecanique and many more.



## Stainless steel

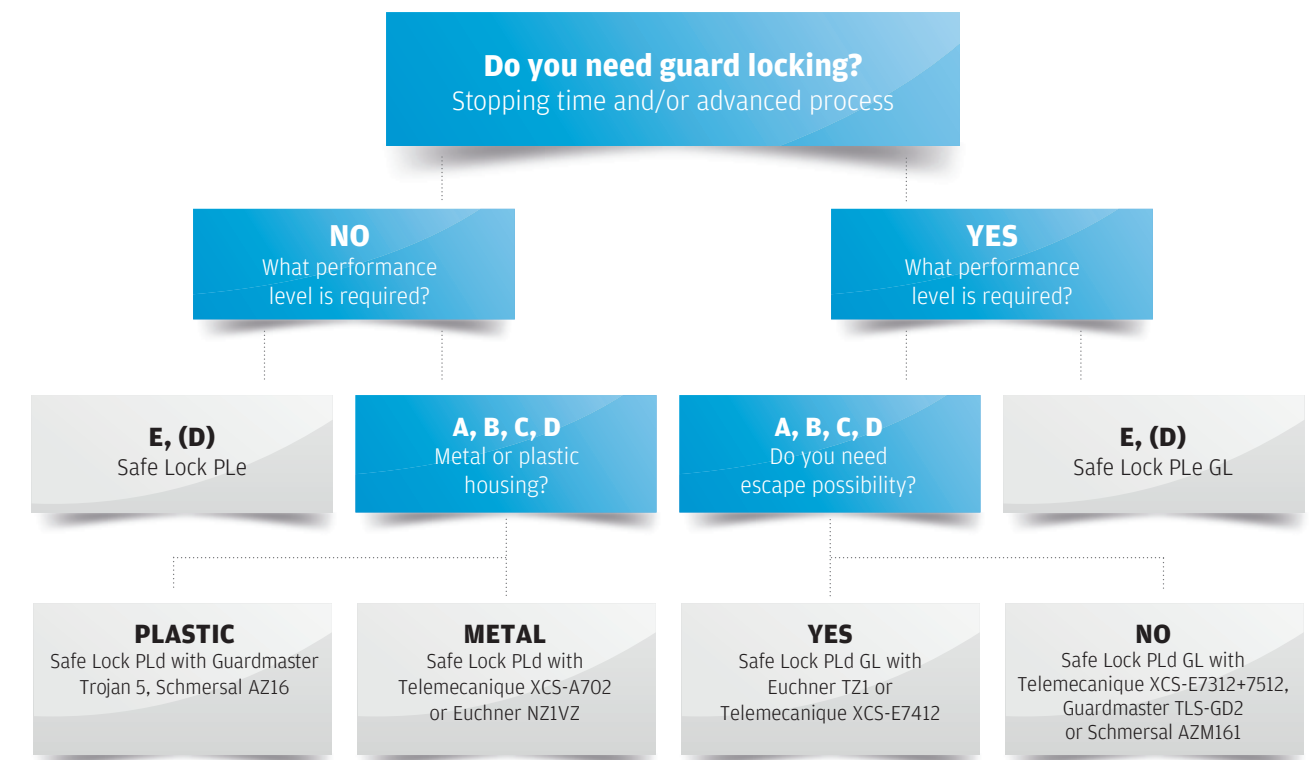
We offer hygienic stainless steel machine guard systems from NTF Aalborg. Solutions are available in both AISI 304 and 316.



## Automatic sliding door

We offer Besam automatic sliding door solutions from ASSA ABLOY Entrance Systems.





## Interlocking devices that meet the requirements for door safety

Our Safe Locks are designed to protect your personnel and to keep your production process running.

The result of the risk assessment determines the required performance level of your safety control system. The performance level is a measure of the reliability and architecture of a safety function using a scale from “a” to “e” with “e” being the highest level.

To calculate the performance level of a safety function a number of things must be considered, including frequency of use, cabling and production environment. With TROAX Safe Lock components adapted for a variety of switches you can easily find a suitable solution for your machine guarding requirements.

Safe Locks with guard locking protect hazardous areas where the hazard is not immediately removed after a stop request. On many machines, removing power to the motor will not immediately stop the dangerous motion. Typical applications are high inertia rotating machines and machines where high pressure needs to be released from pneumatic and hydraulic valves.

Our Safe Locks are equipped with a red handle for emergency exit. It also prevents the door from being locked when an operator is on the inside. The emergency exit is depending on the type of switch chosen for the Safe Lock.

Further information about performance level is available in EN ISO 13849-1 and EN 954-1. Information about interlocking devices in combination with guards can be found in EN 1088 and ISO 14119.



All Safe Locks fit our hinged and sliding doors. For safe maintenance a padlock can be used to secure the Safe Lock in open position.

### Safe Lock PLd



For low to medium risk applications where the machine stops immediately when the door is opened.

#### Standard switch:

Guardmaster Trojan 5, Telemecanique XCS-A702, Schmersal AZ16-12 ZVRK, Euchner NZ1VZ-2131D

### Safe Lock PLd GL



For low to medium risk applications. The safety switch locks the key and prevents the door from being opened until the machine is in a safe state.

#### Standard switch:

Guardmaster TLS1-GD2\*, TLS2-GD2\*, Telemecanique XCS-E7412 +7312\* +7512\* Euchner TZ1, Schmersal AZM 161\*

\*No emergency exit

### Safe Lock PLe



For medium to high risk applications where the machine stops immediately when the door is opened. Equipped with either a coded non-contact switch or double electromechanical switches.

#### Standard switch:

Telemecanique XCS-A702 +XCL-J1656, Guardmaster Sensaguard, ABB/Jokab Eden, PilzPSEN cs 3.1, Euchner CES-AP-CL/CR2

### Safe Lock PLe GL



For medium to high risk applications. Either double electromechanical switches or a multifunctional gate box prevents the door from being opened until the machine is in a safe state.

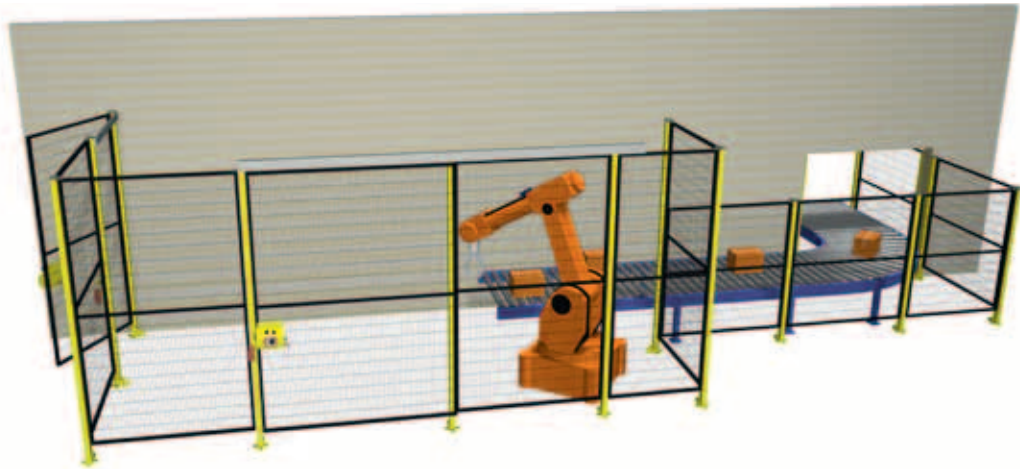
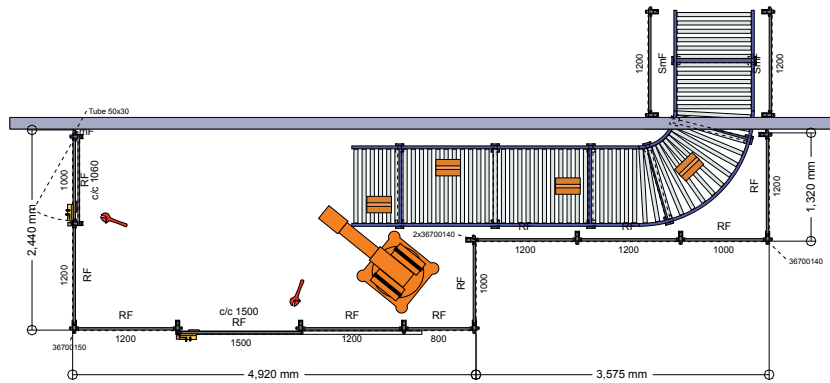
#### Standard switch:

Telemecanique XCS-E7412 +XCL-J1656 Euchner NZ1 RS Euchner MGB, multifunctional gate box



# Drawings and overview in 2D and 3D

Imagining how a system might look before the material has been ordered can be difficult. At TROAX we solve that by using our Configura drawing and rendering program so that before you order your material from us you can view our proposal via 2D and 3D generated drawings.



## TROAX CAD

For our CAD support, we work with both Solid Components and Trace Parts, who are digital 3D content companies that provide CAD part libraries.

Via our web site and myTROAX, you can find the link to TROAX CAD, where all of our products are stored as CAD files ready to be downloaded as a STEP file, DWG file and many more variants. You can also download our products for a 3D pdf view.



# myTROAX

myTROAX is an online resource with great tools for your everyday work with TROAX and our products.



- TROAX CAD
- 3D PDF
- Product data sheet
- Photographs
- Videos
- And many more

[troax.com/mytroax](http://troax.com/mytroax)

## Perfect workflow with Configura

Configura is the in-house program that TROAX uses for drawings and quotations. Using five easy steps we create an easy flow from idea to order.

Configura is also available as a “Light” version, developed specifically for customers use so that they can design specific layouts using TROAX products. With either a blank worksheet or an imported CAD drawing as a background, Configura Light’s unique “drag and drop” feature allows you to place our products onto the drawing surface to help create the ideal solution for your requirements.







**[www.troax.com](http://www.troax.com)**



**Int. Head Office:** TROAX AB P.O. Box 89 SE-330 33 Hillerstorp Sweden  
 Phone +46 (0)370 828 00 Fax +46 (0)370 824 86 [info@troax.com](mailto:info@troax.com) [www.troax.com](http://www.troax.com)