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AUTO WALL SYSTEM S3000

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BUILDING THE FUTURE

S3000 AUTO WALL SYSTEM

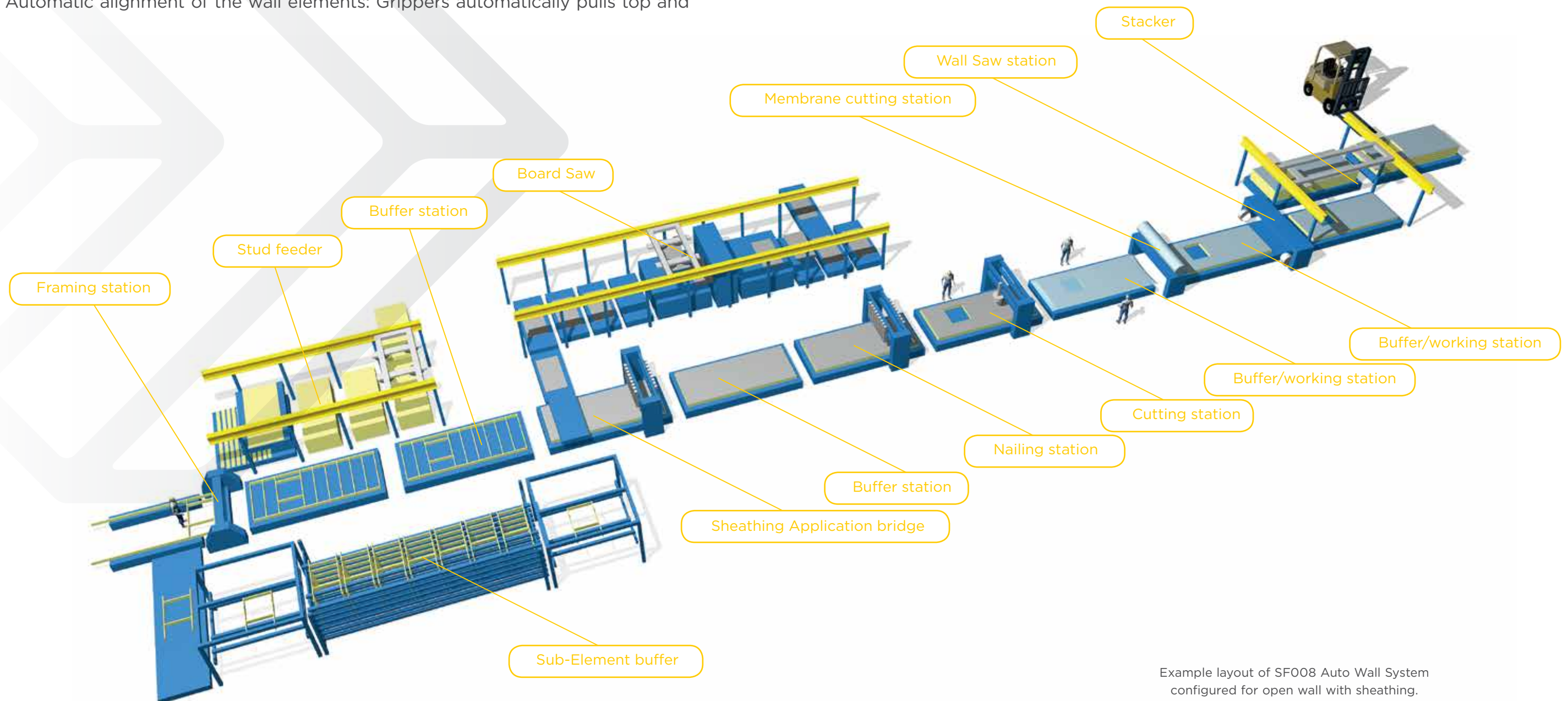
IN BRIEF

The S3000 Auto Wall System is a wall production line for production of wall frames with sheathing and optionally breather membrane on one side. The production line is completely CAD-controlled which means that it's controlled from automatically generated computer files. The walls are produced with maximum length to maximize usage for every station. In the end of the line the walls are cut to size, before stacking.

- Advanced system for manufacturing of wall elements
- CAD/CAM controlled machines
- Automatic setup of the machines: Allows for production with constant change in wall height, length and thickness without losing efficiency or time
- Automatic alignment of the wall elements: Grippers automatically pulls top and

bottom plate against a mechanical stop, clamps and aligns the wall

- Clear and easy graphical instructions on screen at the stations
- High security level: Safety mats between stations. Light beams and run-over protection on the bridges
- Automatic transport of wall elements: Transport between stations with frequency controlled drives to ensure high speed and soft start and stop. Plate-Top conveyors are used to protect the panels and allows for heavy wall elements



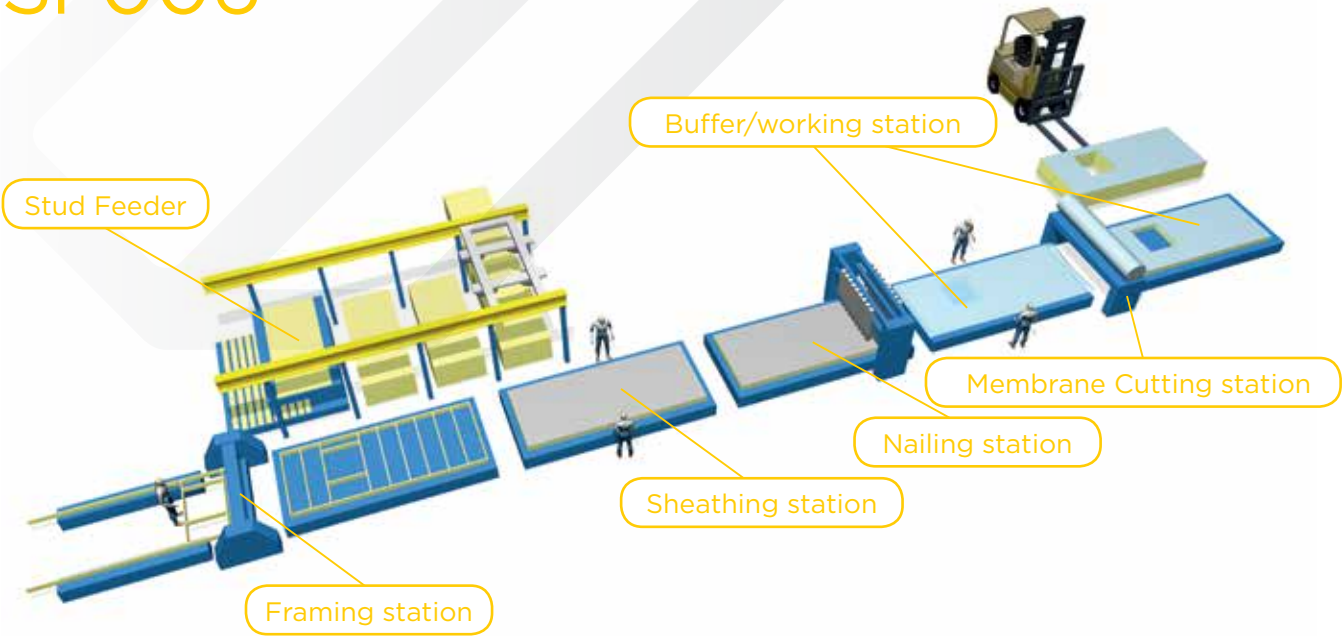
Example layout of SF008 Auto Wall System configured for open wall with sheathing.

PRODUCTION LINE CONFIGURATION

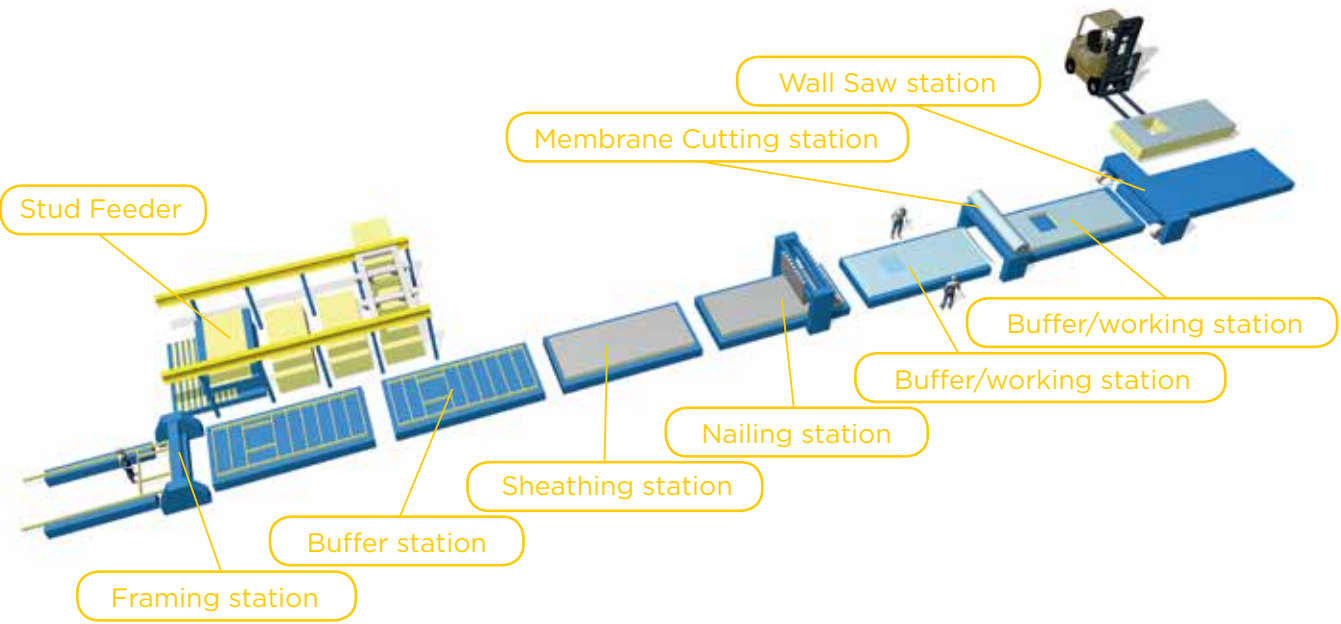
Auto Wall System S3000 allows for total customer configuration. If required, only the frame making station can be used. As more and more stations are used, operations get split up and increases production capacity and reduces bottle necks. More stations can be added to add components to the wall. For example, wall turning can be added to allow for closed wall production. Below you can find three example configurations for open wall production.

Operation	SF006	SF007	SF008
Sub Element handling (infeed, storage and outfeed)	No	No	Automatic
Stud handling and processing (drilling, cutting and outfeed)	Automatic	Automatic	Automatic
Framemaking (nailing of studs and sub-elements)	Automatic	Automatic	Automatic
Board handling and processing (cutting boards to size and outfeed)	Manual	Manual	Automatic
Board assembly (placement of boards on framework)	Manual	Manual	Automatic
Board nailing	Automatic	Automatic	Automatic
Board processing (cutting out openings for dorrs, windows etc.)	Manual	Manual	Automatic
Membrane cutting	Automatic	Automatic	Automatic
Wall sawing (dividing large wall elements into smaller pieces)	No	Automatic	Automatic
Stacking	Manual	Manual	Automatic

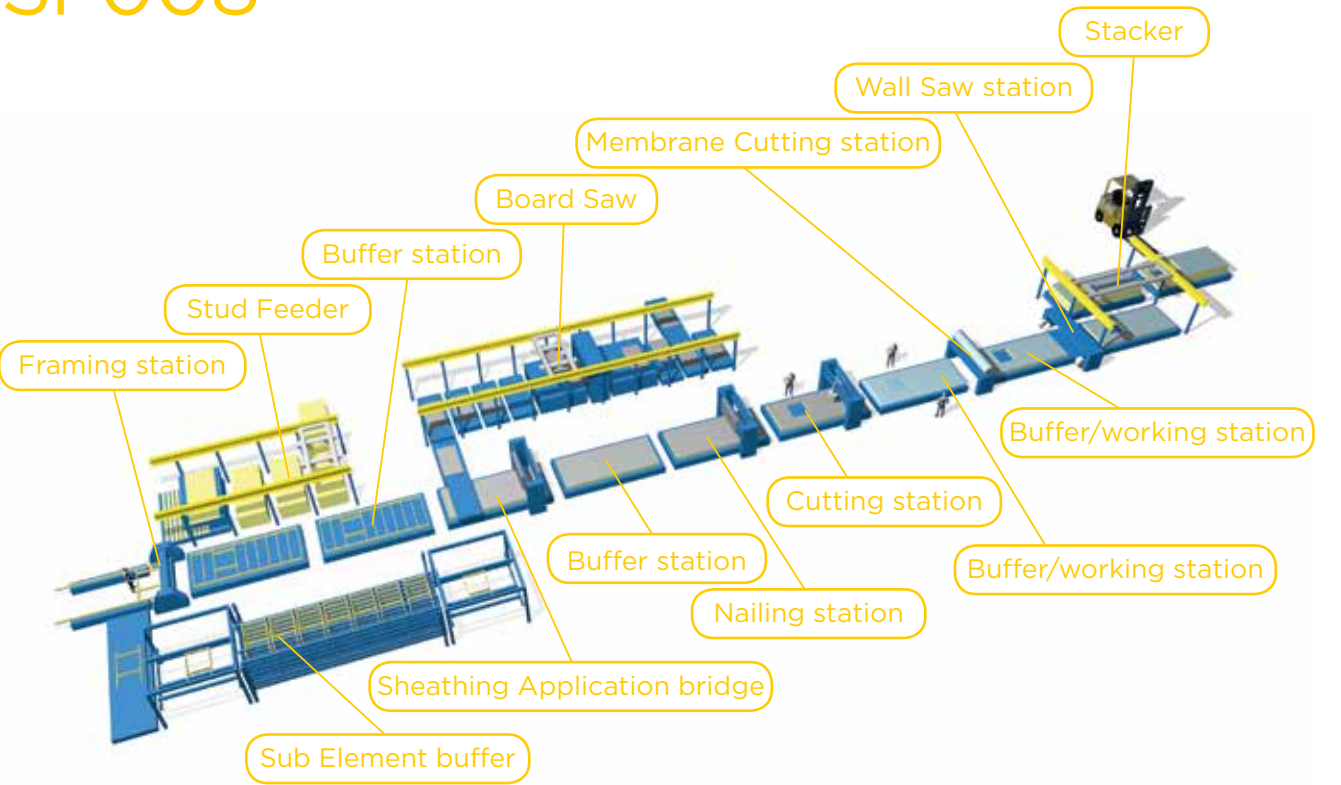
EXAMPLE CONFIGURATION SF006



EXAMPLE CONFIGURATION SF007



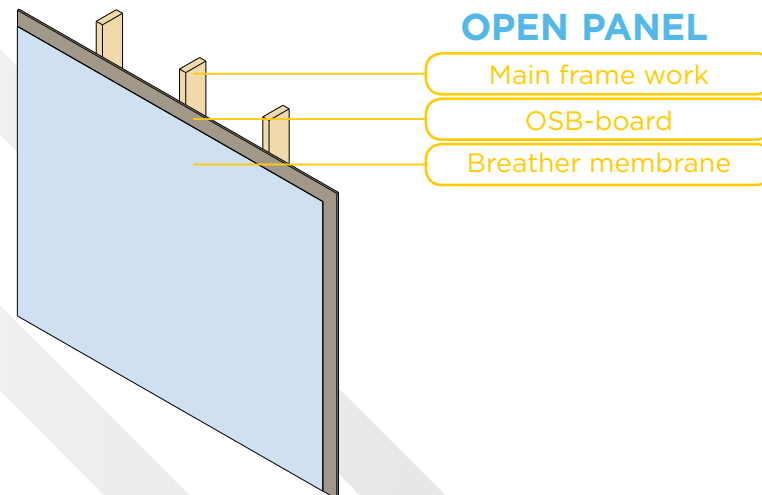
EXAMPLE CONFIGURATION SF008



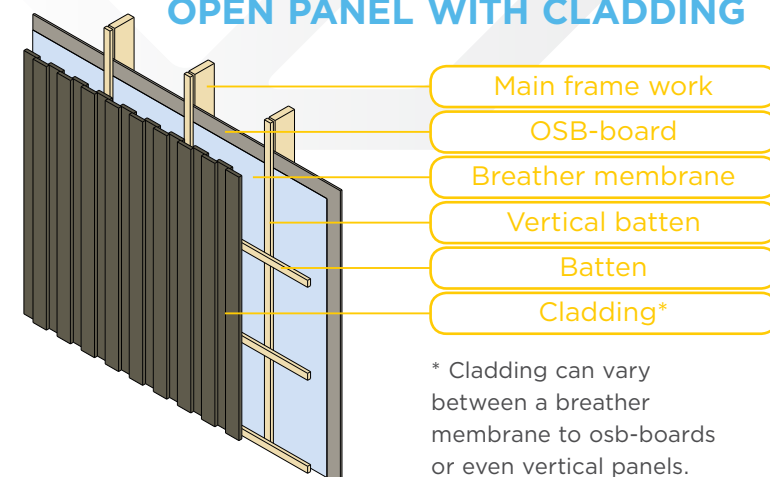
PRODUCTION LINE CONFIGURATION

Auto Wall System S3000 is a very flexible system and can be adjusted to fit every customer's specific conditions. Except the choice of what and how many stations needed, the system is possible to customize according to the parameters below.

- **U- or I-shaped line:** The system can be configured as a straight line or as a U-shaped line, thus the system can fit into all types of buildings.
- **Maximum wall length:** 4.8, 6.0, 7.2, 8.4, 9.6, 10.8 or 12.0 meter determined by the station lengths.
- **Wall thickness:** The machines sets-up automatically to specified wall thickness. This makes it possible to produce walls with changing thicknesses. Therefore it is possible to efficiently produce exterior walls mixed with inner walls, making the packing order optimized for the building site without wasting time for machine setup.
- **Wall height:** The wall height is automatically set-up for most of the machines.
- **Wall layers:** The system can be configured for 1 or 2-layered walls.
- **Capacity:** The system is configured according to the desired capacity. The number of stations in a line, and the degree of automation determine the capacity to be attained.
- **Automation level:** By adding or removing machines the level of automation is adjusted.



OPEN PANEL WITH CLADDING



SUB ELEMENT TABLE

The sub element table is a station for manual production of sub elements and sub parts. The elements are produced and inserted into the sub element buffer (see page 8).

- Working table for the assembly of studs, lintels and noggings to a sub element for windows and doors.
- The component is manually inserted in place and nailed with a hand tool.
- Max. width of sub-element is 2000 mm.
- Max. height of sub-element is 3300 mm.
- Max. thickness of sub-element is 250 mm.
- Min. thickness of sub-element is 63 mm.

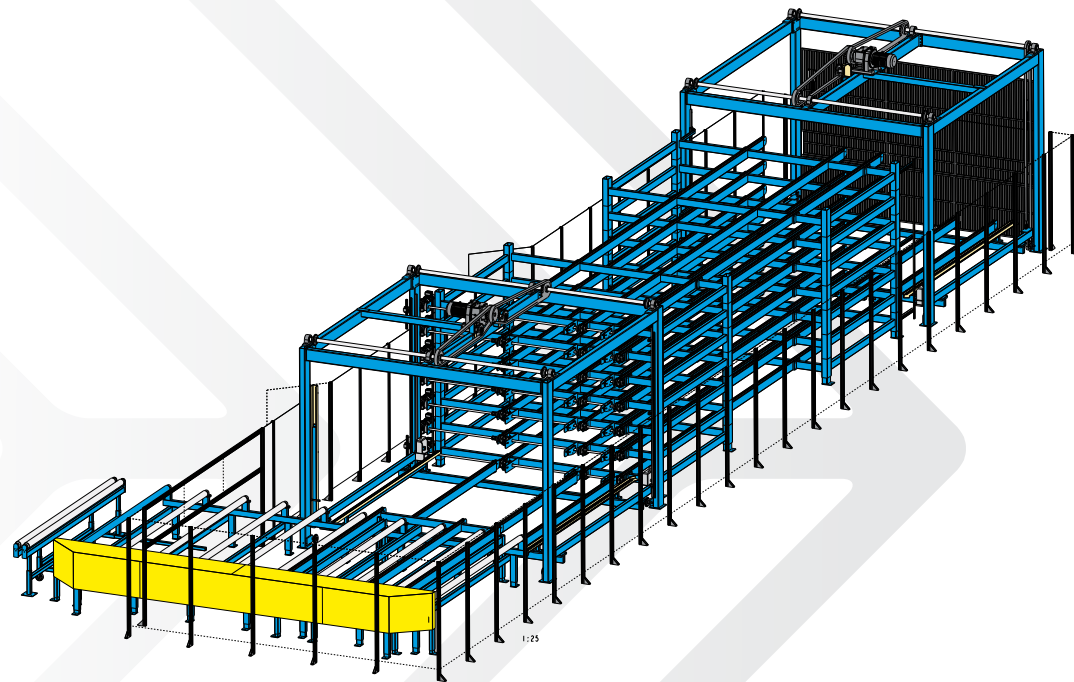


Sub Element table

SUB ELEMENT BUFFER

Station for buffering of sub elements and sub parts. The station consists of seven levels of storage with automatic infeed and outfeed of the elements. It works with the principle "First in / First out".

- Automatic in and out feeding of sub elements
- Large storage area in a small space
- First in / first out, makes the logistic automatic

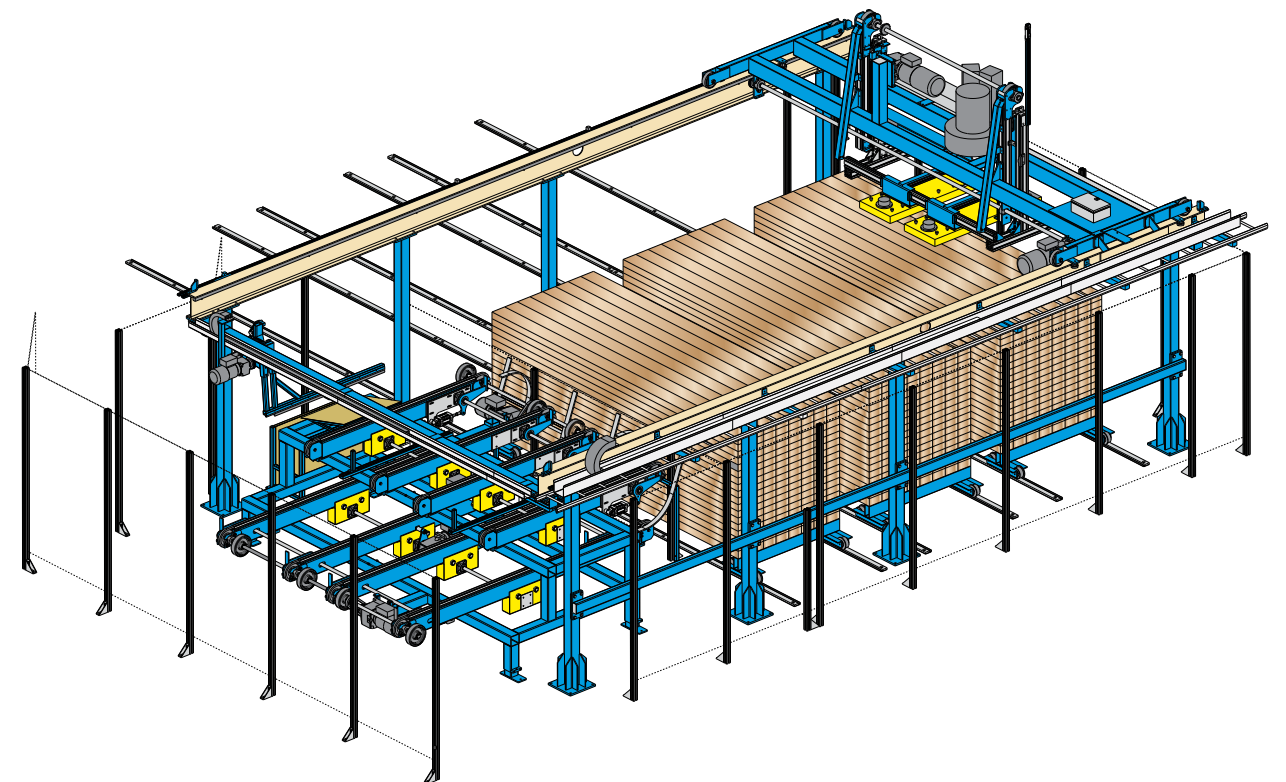


Sub-Element buffer

STUD FEEDER

Feeding of studs can be done automatically, in order to increase the capacity or to utilize the production area better and decrease the handling of timber and material, thus improving the logistics. The Stud Feeder automatically feeds studs to the Framing station. It can pick studs from multiple stud packs with a vacuum lifter. The machine automatically removes sticks from the timber packs.

- Several packs of different dimensions and length of timber
- Vacuum picker for one whole layer of timber gives high output
- Automatic remover of sticks in the packages
- Input of stud packs from the side or from the end
- Optional drilling of holes in the studs, for electricity etc
- Optional cutting of stud length, useful when the studs have fluctuating lengths
- Optional counting of the the number of studs and return of studs to the package



Stud feeder

FRAMING STATION

In the framing station the sub components, top and bottom plates and studs are mounted together to a framework. The framework is built effectively and precise. The information is presented graphically step-by-step according to the production process on a large HMI-screen; this eliminates need of drawings in the production.

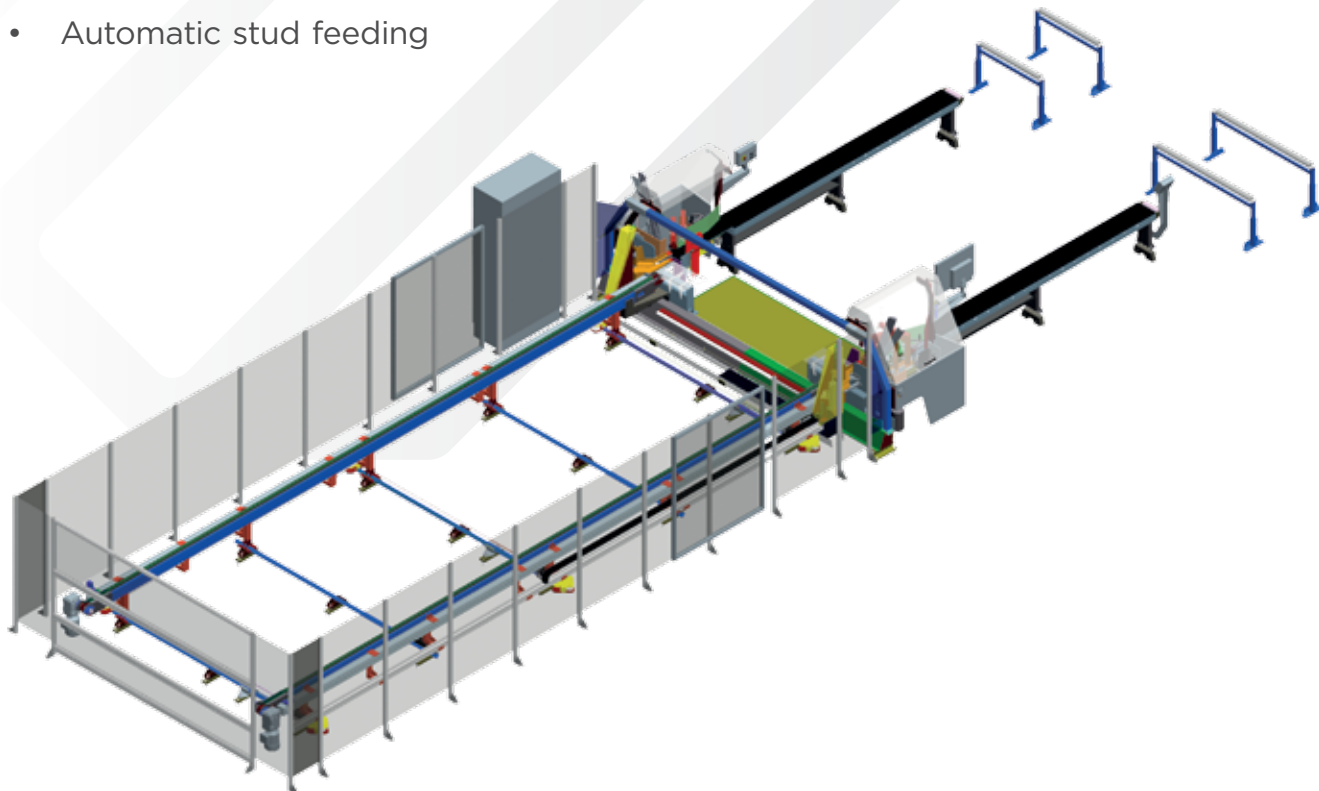


Production process

The framing station is automatically set-up according to the current wall drawing using CAD/CAM data. Top and bottom plates are placed in the machine. Grippers clamp and separate them in order to easily place studs to the framework. The studs are placed automatically if the framing station is equipped with a stud feeder. Sub components are lifted into the line. The

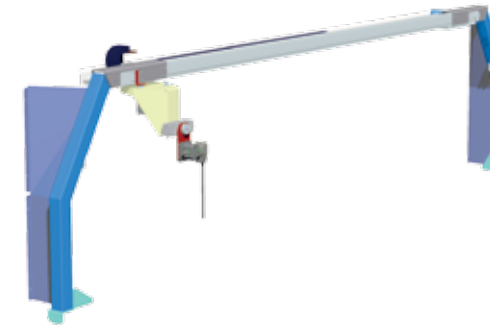
framework is nailed automatically according to the drawing and holes in top and bottom plate are drilled.

- Effective and flexible production of framework
- Automatic stud feeding



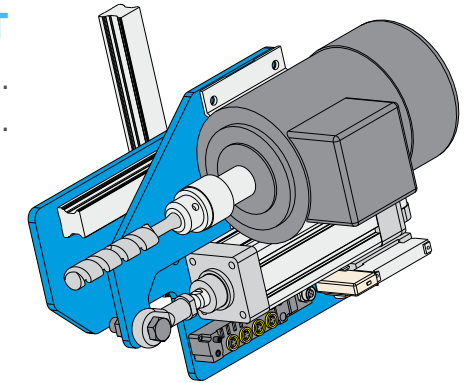
INSULATION KNIFE

The framing station can be equipped with an insulation knife as an alternative to the advanced insulation handling station. The operator places the insulation manually in the station and then the insulation is cut to the right dimension.



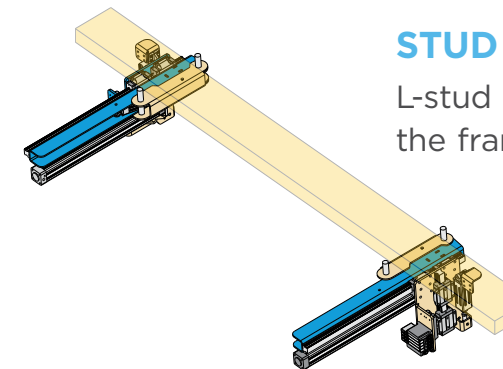
DRILLING UNIT

Drills holes for lifting straps etc. automatically with the drilling unit.



STUD HOLDER

L-stud holder, when nailing of L-studs to the framework.



PRINTING UNIT

Print the order number etc. directly on the framework and achieve simplified identification and handling of walls in the factory and on the building site.



AUTOMATIC STUD FEEDER

The automated vacuum picker picks timber layers from different stacks of timber. The studs are stored in the stud feeder and are fed one by one into the framing station. As an option the right numbers of studs are fed into the machine and the remainder are returned to the right stack again. (see page 9)

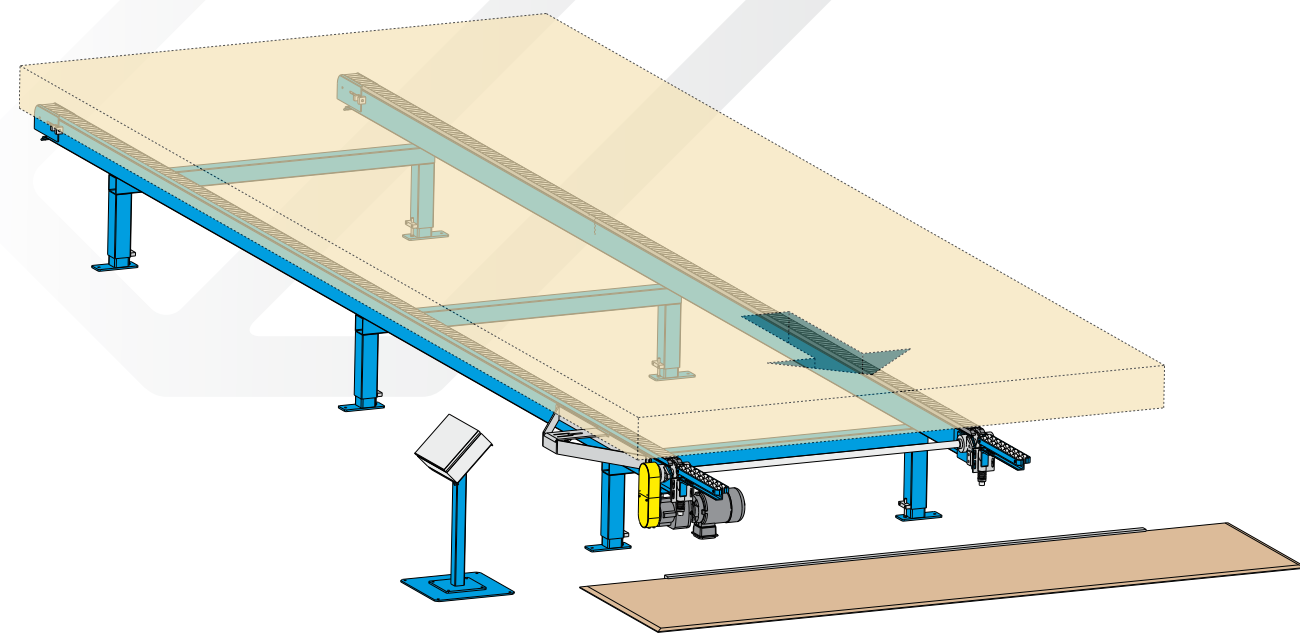


BUFFER / WORKING STATION



This station can be used as a buffer station or as a combined buffer and working station. Transport speed is frequency controlled, gives soft start and stop with a high transport speed. Safety mats for high security are placed between the stations.

- Equipped with safety mats for high security
- Frequency controlled chain conveyors for high transport speed and soft start and stop

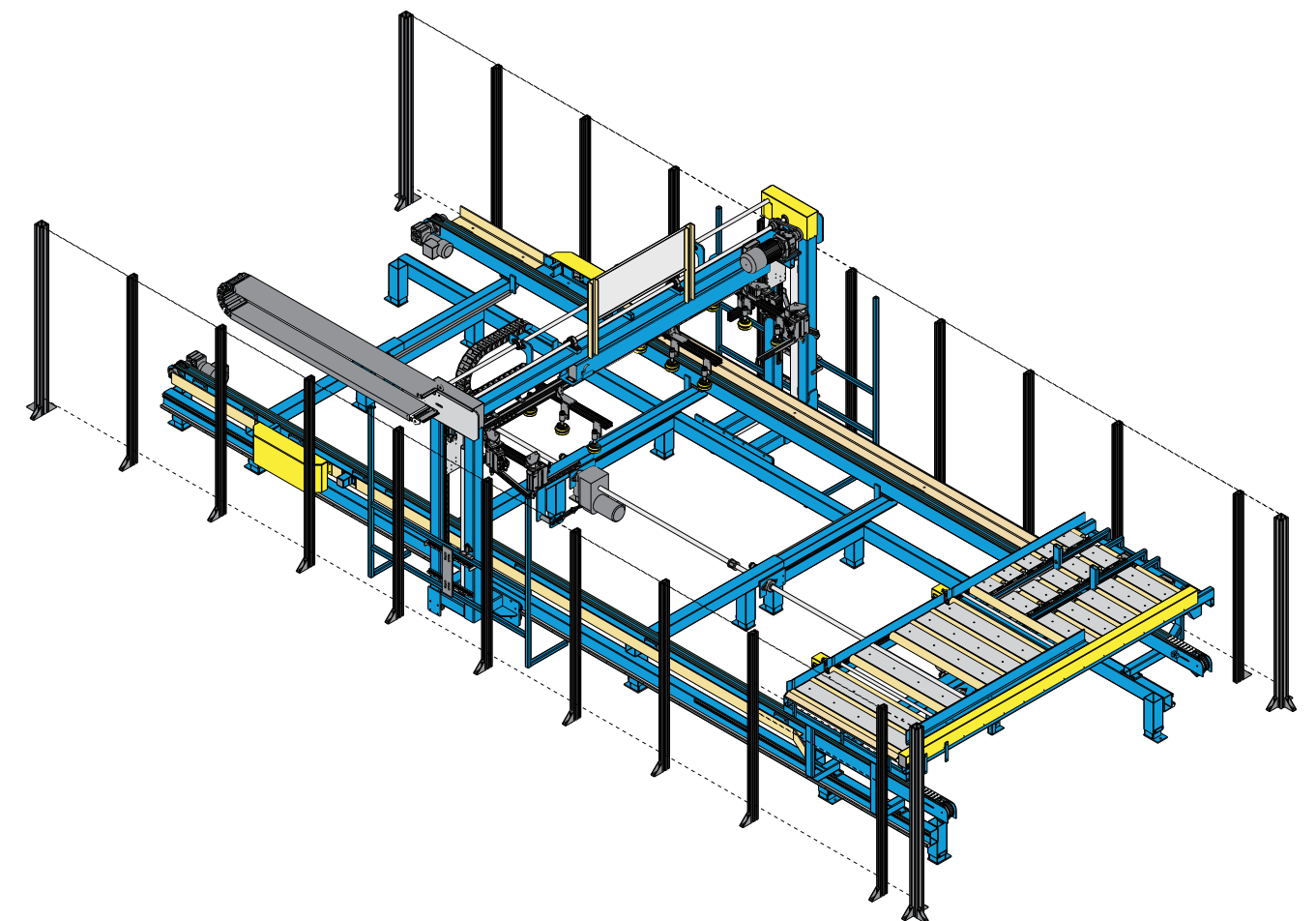


Buffer station

SHEATHING APPLICATION BRIDGE

Once the wall element arrives to this station, it is fixated and straightened. The boards are placed with great accuracy and are tacked to the framework with nails or staples. The transportation of the boards are done with vacuum lifters and the fixating to the framework is done with built-in tools on the bridge. Normally the full area of the wall is covered with boards. Later in the production line other stations will remove parts of the boards where there are openings in the wall, such as doors and windows.

- Alignment of the wall element in the station
- Separate alignment table for the boards
- The bridge is equipped with vacuum lifters and nail/staple guns to automatically tack the board to the framework

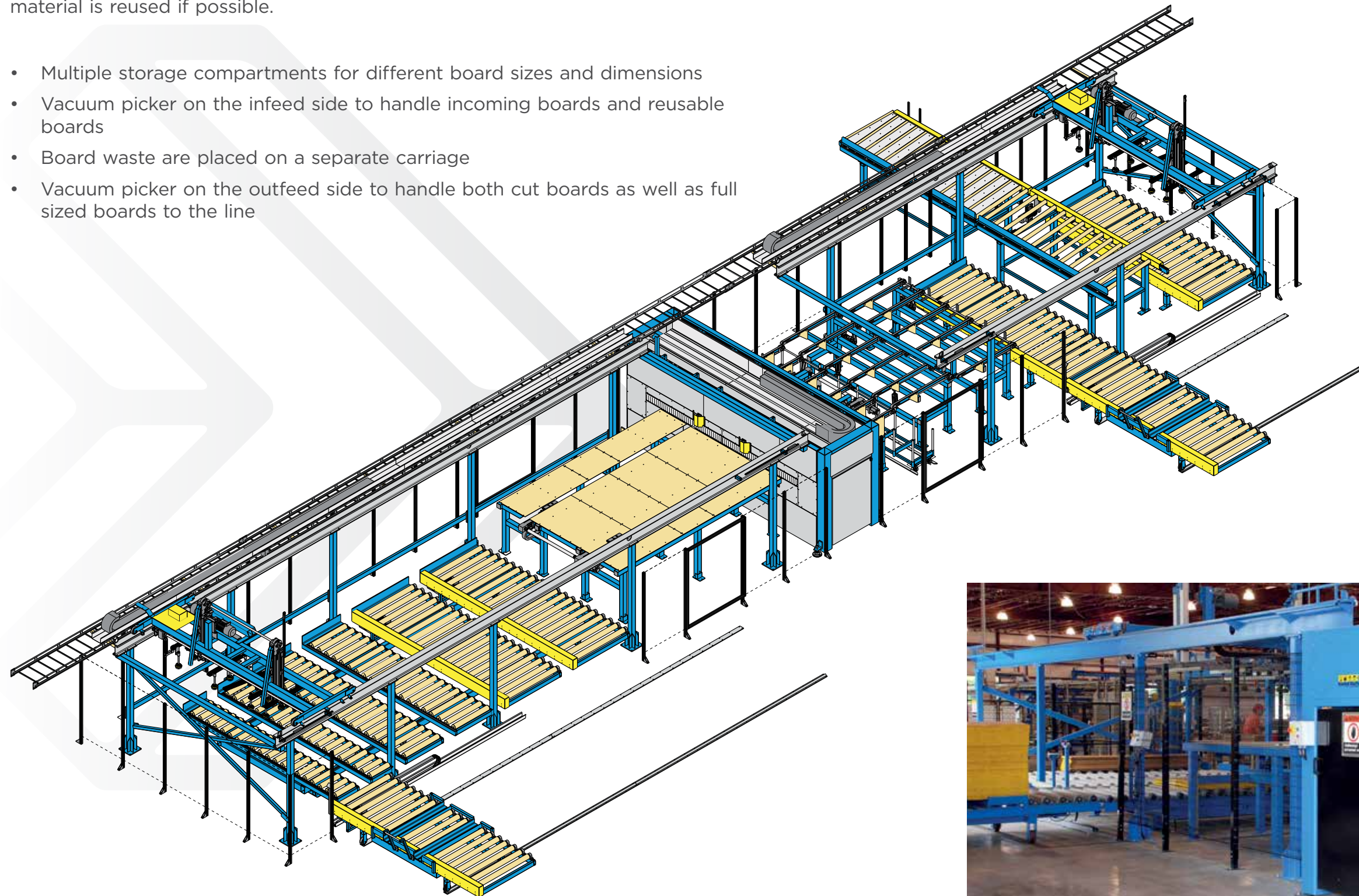


Sheathing Application Bridge

BOARD SAW

The Board Saw supplies the production line with boards in correct size, format and in correct order. The saw feeds in, cuts and feeds out the precut boards to the production line. It will also handle boards without any need for cutting. Waste material is reused if possible.

- Multiple storage compartments for different board sizes and dimensions
- Vacuum picker on the infeed side to handle incoming boards and reusable boards
- Board waste are placed on a separate carriage
- Vacuum picker on the outfeed side to handle both cut boards as well as full sized boards to the line



Outfeed bench



Vacuum lifter on infeed side



Board Saw Station

NAILING STATION

The nailing station straightens and fixates the framework and then nails the boards according to the CAD data file. If the nailing tools should run out of nails or staples it will automatically return to a refill position, allowing the operator to refill the magazines.

- Alignment of the element in the station with grippers
- Nail/staple tools with multi charge enables the magazines to be filled when the bridge is in home position
- Nailing and stapling monitoring as well as magazine monitoring secures nailing in the material
- Option to align vertical studs. Useful when low grade material are used such as bent or crooked studs

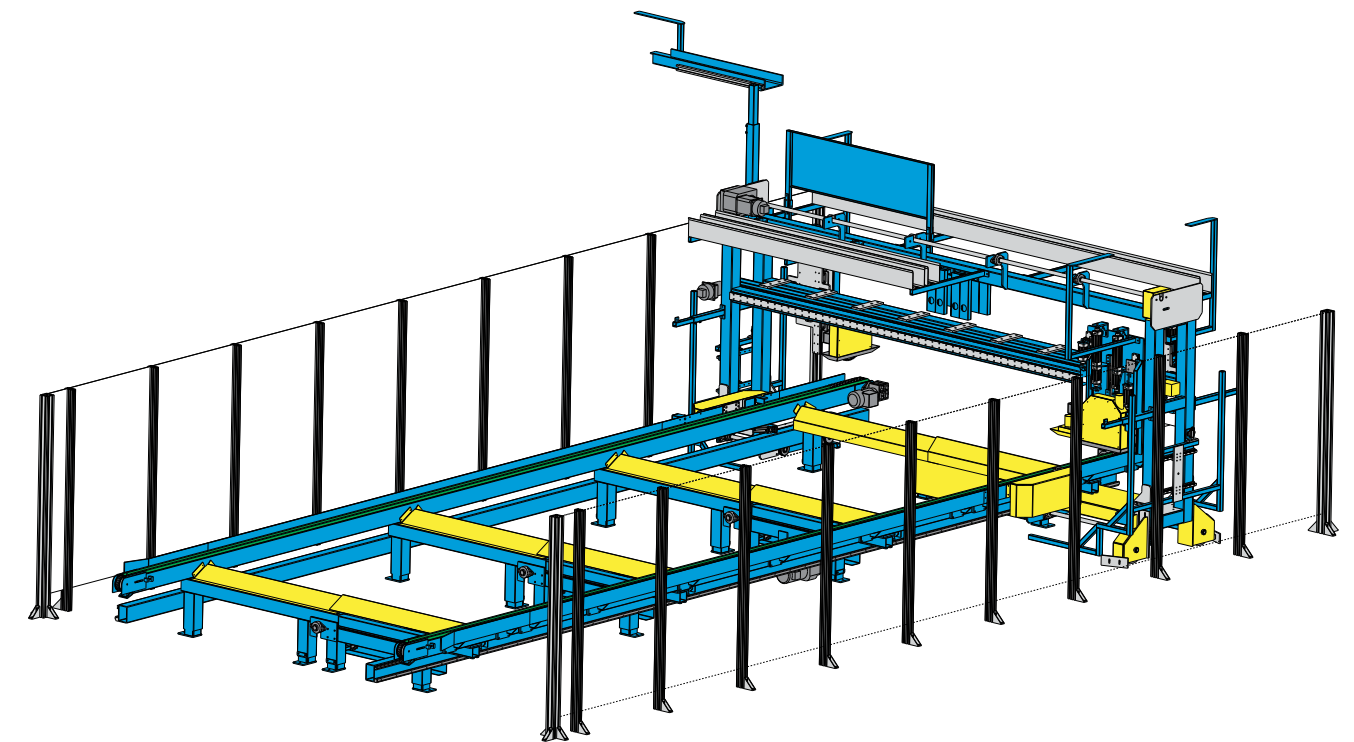


Nailing station

CUTTING STATION

In the Cutting station the boards are processed with three circular saws and a router. The bridge opens up for doors and windows but also for electrical sockets and adjustments of the outer edges of the wall frame.

- Alignment of the element in the station with grippers
- Saws and router processes the boards which are already nailed to the framework
- Three saw units, two for horizontal cuts and one for vertical cuts
- Router, for the openings that cannot be made with the saws, such as openings for electrical sockets etc.
- Sawing and routing is done according to CAD/CAM information
- The station is connected to a dust exhaust system
- Waste material is manually removed

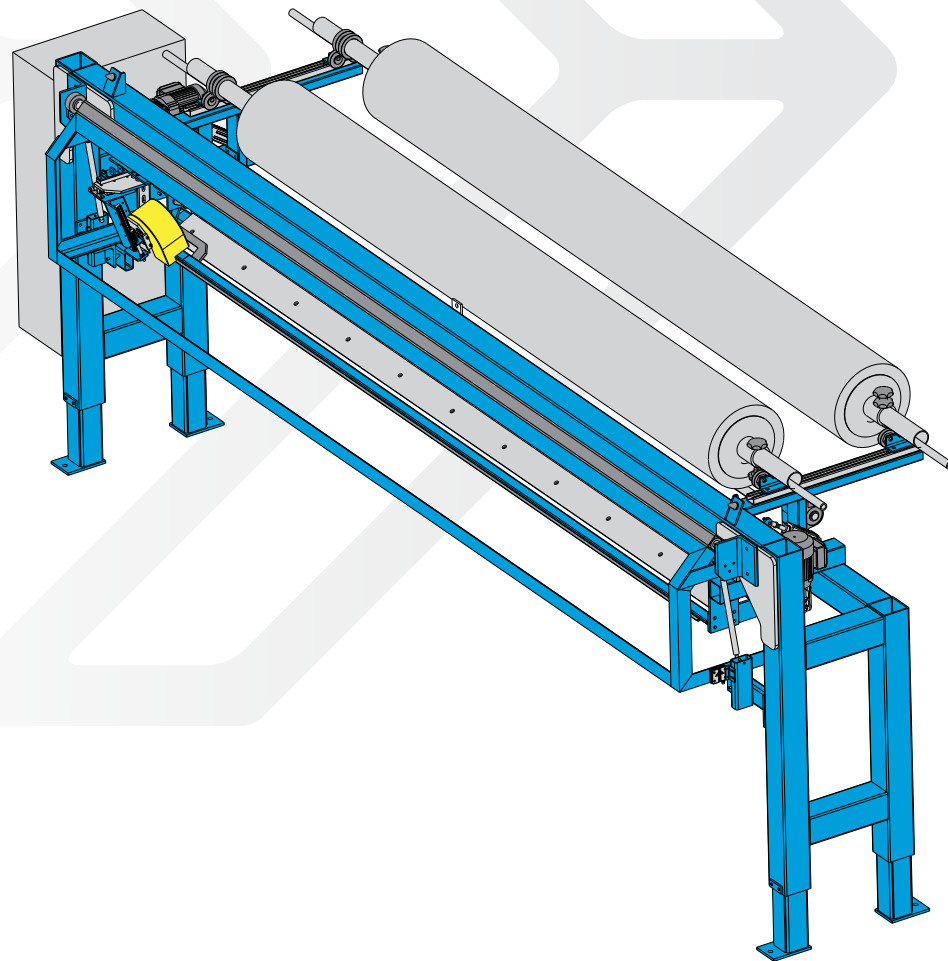


Cutting station

MEMBRANE CUTTING STATION

The membrane cutting station automatically feeds membrane to the correct length according to the CAD data file and then cut it. The operators place the membrane and staples it to the wall element.

- Automatic feeding and cutting of membrane according to CAD/CAM data or manually entered values
- Round blade against a support when cutting the membrane
- Two separate magazines for membrane enables quick switches to a new roll or different dimensions



Membrane Cutting station

WALL SAW STATION

Since the production line maximizes the wall lengths as much as possible, the Wall Saw station divides them up at the end of the production line. The station squares and fixates the wall element and cuts the top and bottom sill to length. The saw can make straight and/or angled cuts when making bay windows etc.

- Alignment of the element in the station with grippers
- Bridge with saw units who can tilt for sawing in top and bottom plate in different angles
- The station can divide already produced walls in smaller elements according to CAD data
- To better utilize the capacity of the line one can combine smaller wall elements into one longer. In the end of the line the elements are divided in this station.

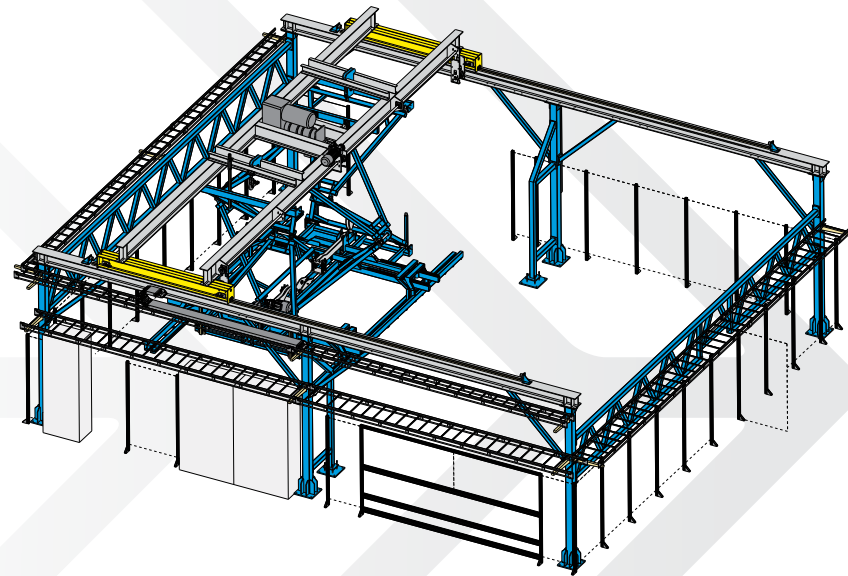


Wall Saw station

STACKER

The Stacker picks up the element, moves sideways and places the element horizontally on top of the stack until the stack are done or full. The completed stack then moves out on roller conveyors and are lifted out with a fork lift truck.

- Lifting unit with motorized width adjustment and clamping function
- Possible to stack multiple smaller elements at the same time
- The elements are placed in a specific order according to the CAD/CAM data



Stacker

SAFETY

Randek Auto Wall System has a high security level and is CE-marked according to the present machine regulations. The machines are equipped with security equipment according to the specific condition for each machine. The situation in the factory is also taken into consideration. The walls act as natural barriers and open areas is protected by safety nets or other safety equipment.

- Between all stations there are safety mats placed for eliminating the risk for operators to get pinched between the station and a moving wall element.
- The bridges requires extra safety and are therefore equipped with light beams that can stop the machine if necessary.
- Run-over protection stops the machine in case of collision between operator and machine.
- Machines that require encapsulation and where no access of operator is necessary are surrounded by safety nets.
- Light towers, placed on the machines, indicates if any safety feature is activated.
- All safety processes are logged in the machine.



Run-over protection eliminates risk for personal injury when the nailing bridge is moving.



Safety mats between the stations eliminates the operators to get pinched between the station and a moving wall element.



Light beams ensures that only the wall element is transported into the machine.



Light beams and safety mats between the stations.

CONTROL SYSTEM



Randek machines in the Auto Wall System have a high degree of automation with intelligent machines that are controlled by generated data from a CAD-system. The operator does not need to program or instruct the machines to do operations. Each machine analyses the CAD generated data and performs the operations automatically.

The machines are equipped with industrial computers connected to a network. Because the machines in the 3000-series production line are connected to an Ethernet network, each machine can be accessed individually. Randek has the possibility to connect for remote support through secure VPN-connection. The control system for the machines is a soft-PLC system. Both the operators interface and control system can be accessed, locally or remotely. This makes it possible to review the status of the machines during live production.

- The machines are controlled by CAD-generated data. The operator does not need to program the machines.
- Modularly designed machine with optional equipment.
- Individual machines with it's own intelligence. Communication with adjacent machines is done with a standardized interface.
- Automatic set-up of machines for each building component and automatic transport of building component station to station.
- Minimal need for technical drawings. The digital identity of the building component follows the physical transport from station to station; the stations can present the required information, drawing, operator instructions etc.
- Monitor on the stations with step by step instructions and graphic display of the building component. On the stations that require operator instructions, the operator is informed what to do next and the actual detail of the building component is graphically highlighted in red.
- Alarm management on the stations with presentation on monitor for actual event alarm.
- Light towers on the machines shows the status of alarm and operation of the machine.
- Remote support with connection to the machines.
- High degree of personal safety with safety mats, light beam and collision protection.

TECHNICAL DESCRIPTION



All stations for wall production in the Randek range can be customized for different maximum wall lengths. The length steps are: 4,8m, 6,0m, 7,2m, 8,4m, 9,6m, 10,8m and 12 meters. All stations are robust and designed with well tested components to ensure high reliability and longevity. In the production line chain conveyors are used as transport method.

The chain conveyors ensure an effective and non-damaging transportation of the walls. Auto Wall System is scalable and can be configured according to your requirements, therefore the air and power consumption varies for each production line. Below we have specified the technical information general for Auto Wall System.

Technical description	Min	Max
Wall dimensions		
Wall length	1200 mm	4800 mm - 12000 mm
Wall height	2100 mm	3300 mm
Wall thickness (Main framework. Total wall thickness by demand)	63 mm	250 mm

RANDEK IN BRIEF

Randek develops, manufactures and markets high-performance machines and systems for prefabricated house manufacturing. The product range consist of: cut saws, wall-, floor- and roof lines, roof truss system, butterfly tables and special machines. The automation level stretches from fully automated to manual.

The company history goes back to the 1940s and began working in close cooperation with the first prefabricating house producers. Today leading house producers in 38 countries are using Randek machines and system.

CUT SAWS

High quality and well tested saws with different automation levels. Also specialized saws for custom applications.



WALL-, ROOF- AND FLOOR LINES

Complete product program for manufacturing of walls, floors and roofs. From manual to fully automatic systems.



ROOF TRUSS SYSTEMS

Adapted equipment for rational manufacturing of roof trusses. From traditional systems to fully automatic.



BUTTERFLY TABLES

Flexible and well tested butterfly tables. Simple or advanced with a wide range of options.



SPECIALIZED MACHINERY

Customized machinery developed for specific applications, Automatic stucco machine, Beam insulating machine, Roof board machine and Window frame machine.



SERVICES

A wide range of services such as Factory Layout designs, Machine maintenance, House building systems and Financing.

