

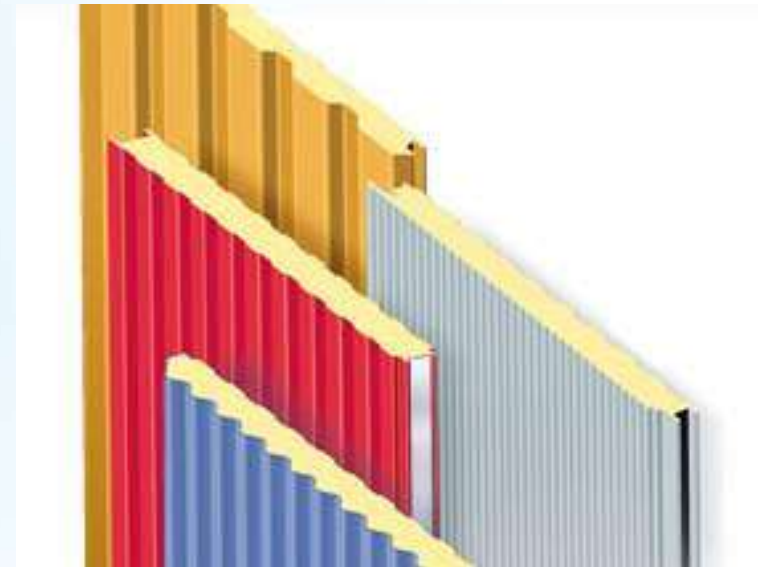
# Sandwich Panel Technology

*made by Hennecke*

FASCINATION  
FASCINATION PUR  
>> PUR

# PUR/PIR Steel Sandwich Panels

- Properties of PUR/PIR Sandwich Panels
- excellent insulation properties
- temperature range from  
- 50 °C to + 110 °C
- high dimensional accuracy and stability
- extraordinary weather resistance
- fire resistance according to International Standards ( B-Class, SBI, LPC)



# Miwo Steel Sandwich Panels

- Properties of Mineral Wool Sandwich Panels
  - average insulation properties
  - temperature range similar to PU Panel
  - high dimensional accuracy and stability
  - acceptable weather resistance
  - excellent fire resistance according to International Standards ( A2-Class)



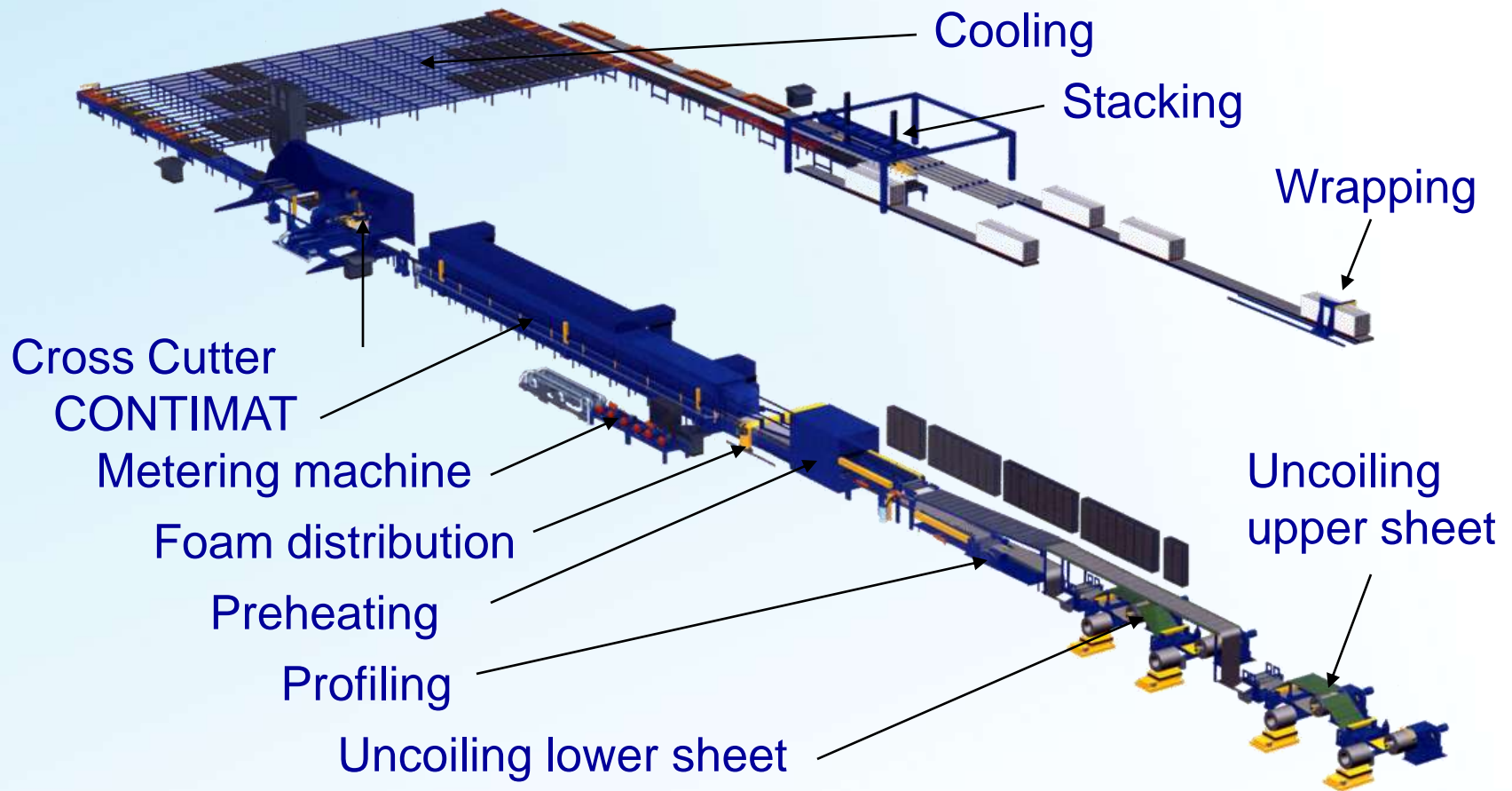
# Hennecke's Technology for High Panel Quality

## Key Parameters for High Panel Quality:

- efficient mixing and precise metering of liquid raw materials
- homogenous and reproducible foam distribution
- even and parallel curing zone within Hennecke CONTIMAT
- stable curing temperature within Hennecke CONTIMAT
- precise and rectangular cut of sandwich element



# Continuous Production Process (Steel facings)



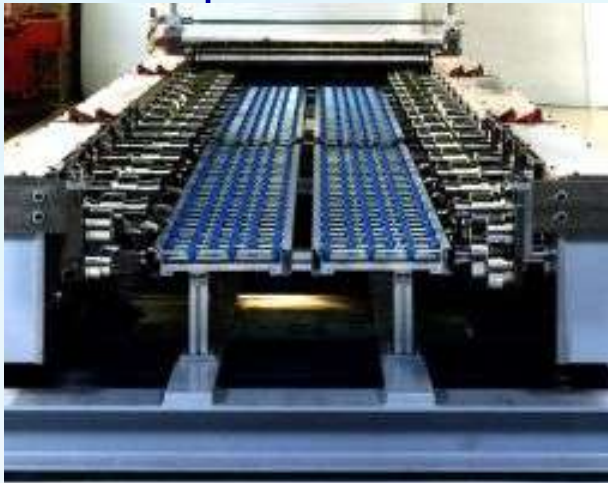
# Uncoiling area

- Uncoilers with hydraulic side adjustment and wedge-type mandrel expansion
- Loops for coil connection and to separate sheet tension between uncoiler and profiling
- Coil feeding groups with extendable pneumatically operated in-feed tables
- Speed-controlled driven pinch rolls for correct coil feeding
- Compliance to factory requirements for no-touch operation of the coiling process



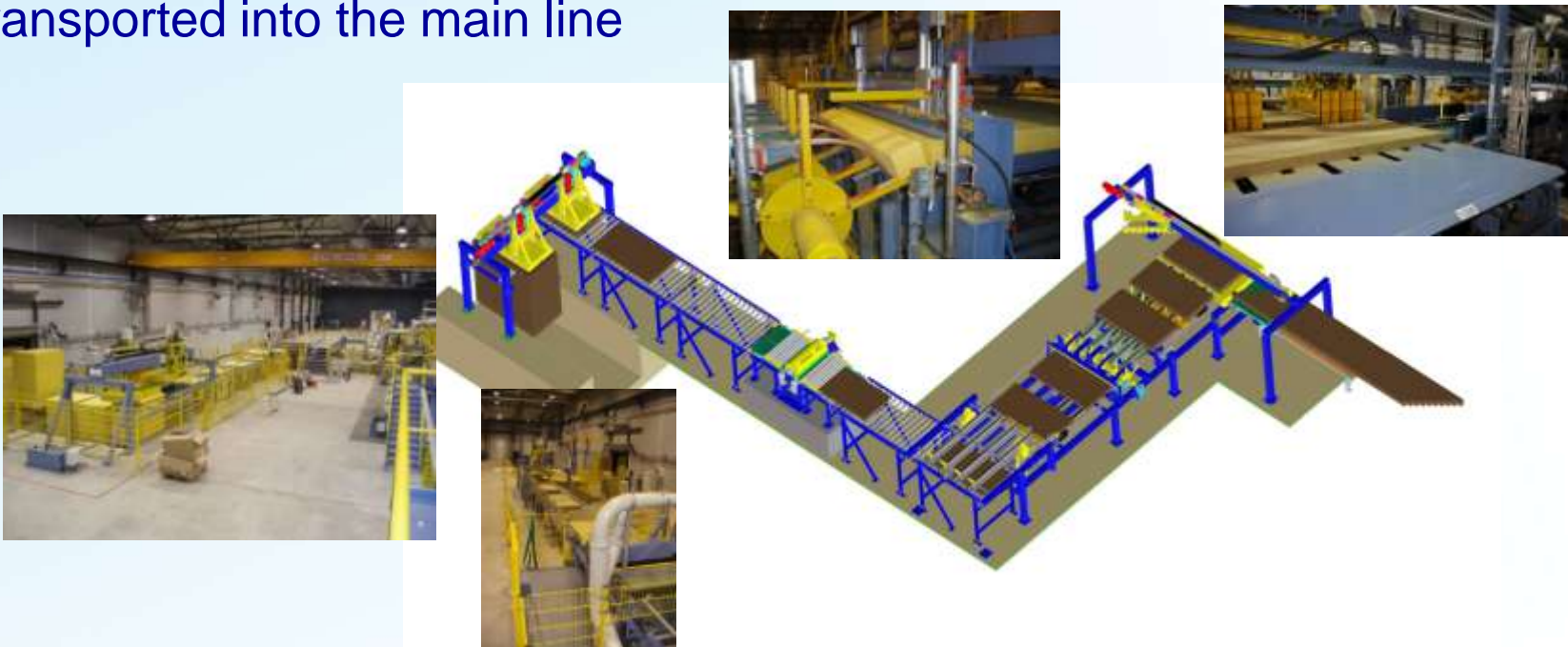
# Profiling area

- Shaft and tool diameters designed for “ZERO” deflection under all given loads within the line parameters
- highest standard machine tool quality, hardened and optionally chromium-plated for roof and edge forming tools
- complete distortion-free machine beds and sub-frames and machined tool mounting areas for added accuracy
- Cover-protected and oversized gear and chain drives for increased safety



# Complete mineral wool section

- Mineral wool boards are:
- automatically loaded from stack with high-speed needle picker
- cut into strips, rotated and
- transported into the main line





# Preheating



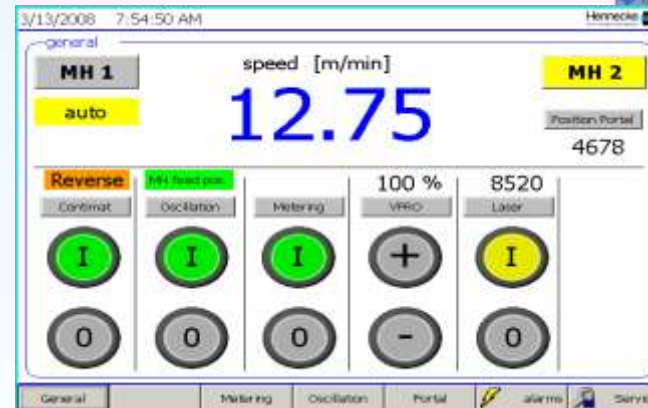
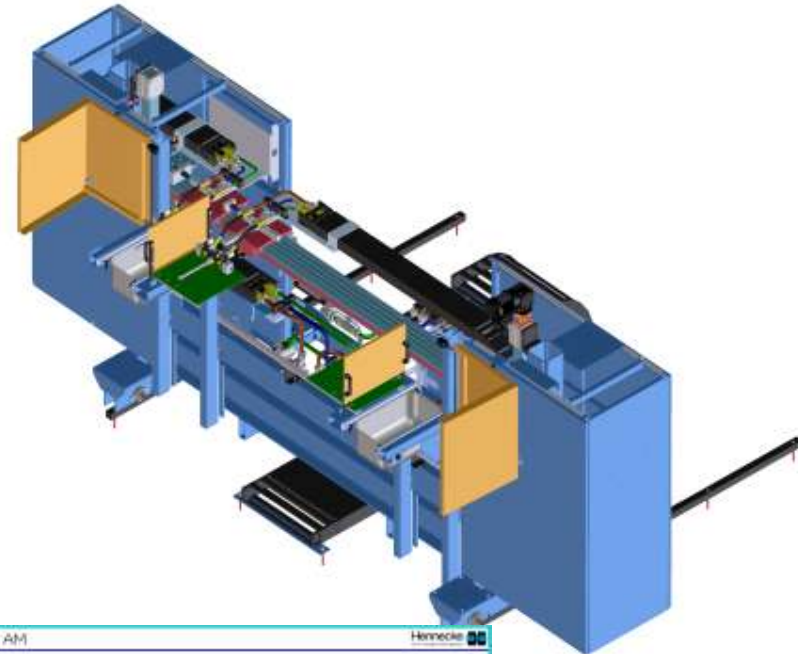
## For better adhesion/reaction:

- temperature 35-50°C
- heating by circulated hot air
- Heating capacity 120 kW
- 2 independent air circuits

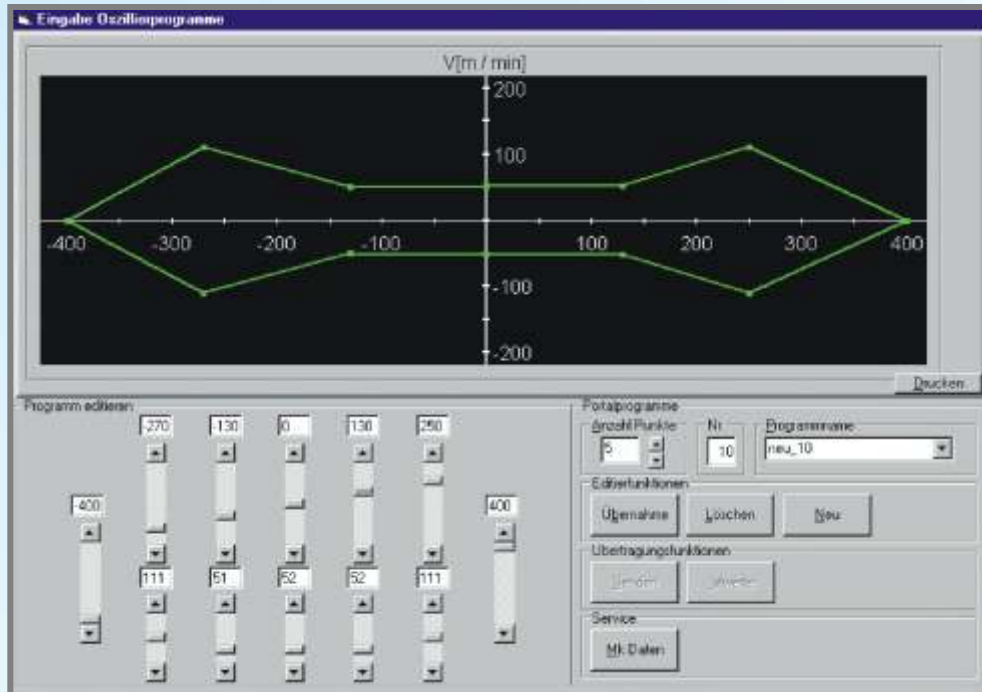
# TwinHead Portal

## Re-designed Single or TwinHead Portal

- one or two independent driving axis
- new driving system
- better access to service station
- reduced installation time
- improved operating elements
- ready for new fixed-poker-systems



# VarioControl - Display



- Different speed profiles can be programmed
- Different speed profiles can be related to different types of elements and chemical formulations.

# Metering machine



Mixing and metering  
of raw materials



# Special Metering Pumps for Additives and Activators

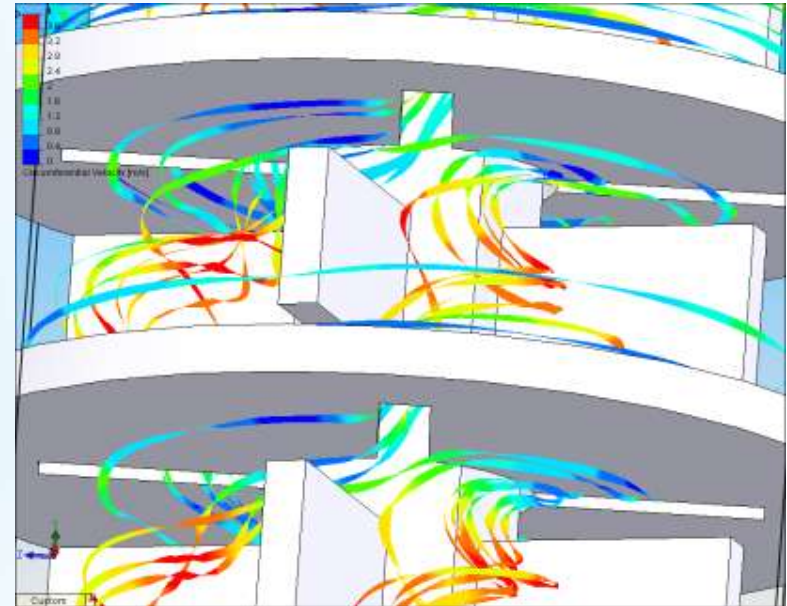
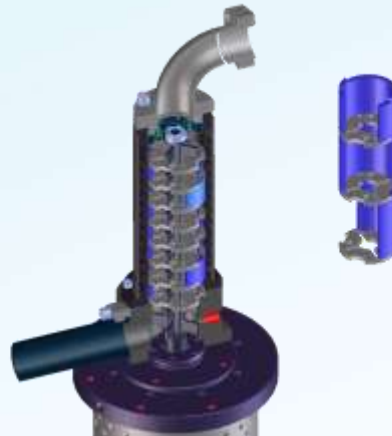
output quantity: 0,01 - 3 l/min

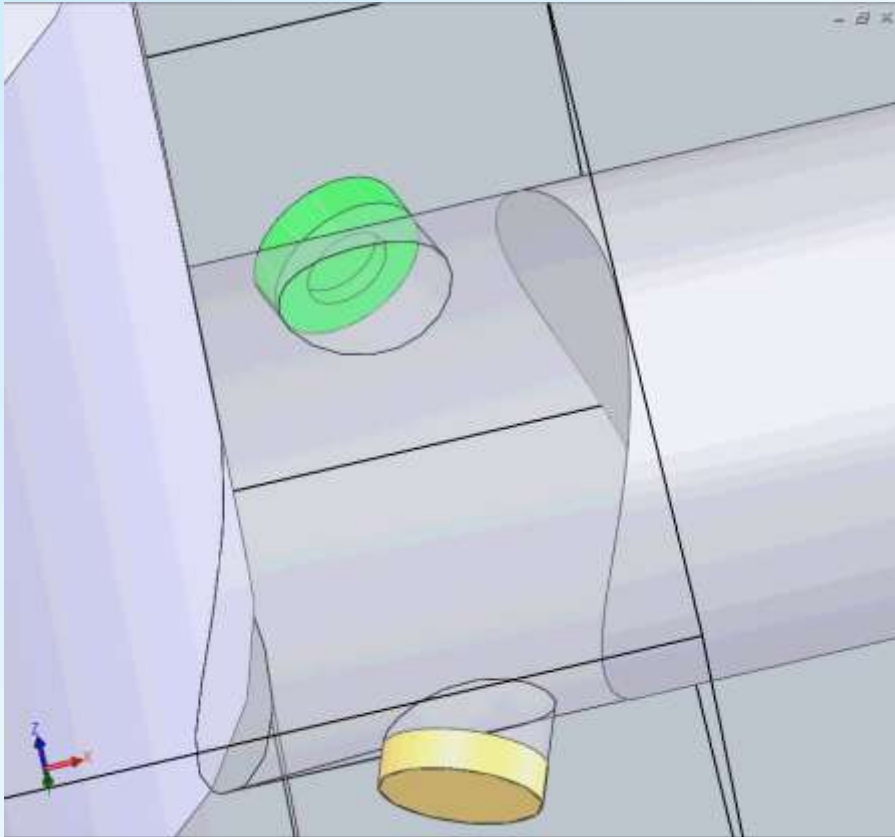
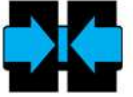


viscosity: 1 - 3.000 mPas for  
standard foam systems

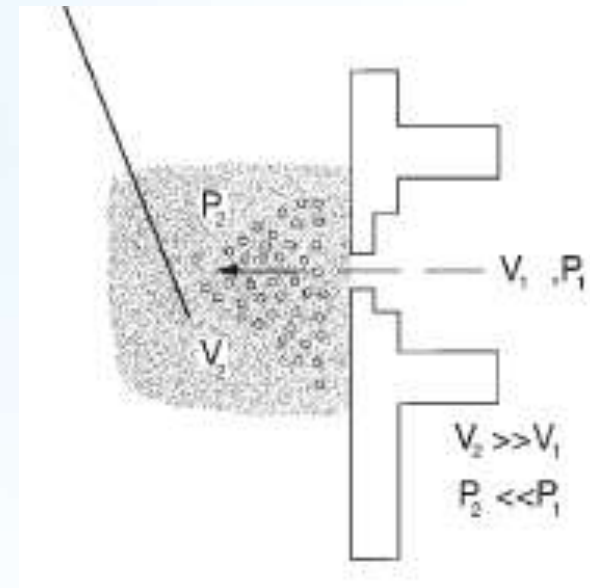
# Low Pressure Mixing

- Pre-Mixing Chamber – New Design
- optimised mixing chamber (diameter and length)
- cross-blade mixer with several mixing zones
- repeated acceleration and deceleration of the fluid



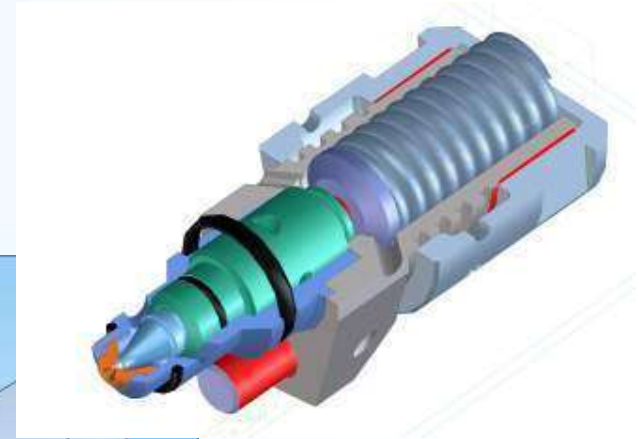
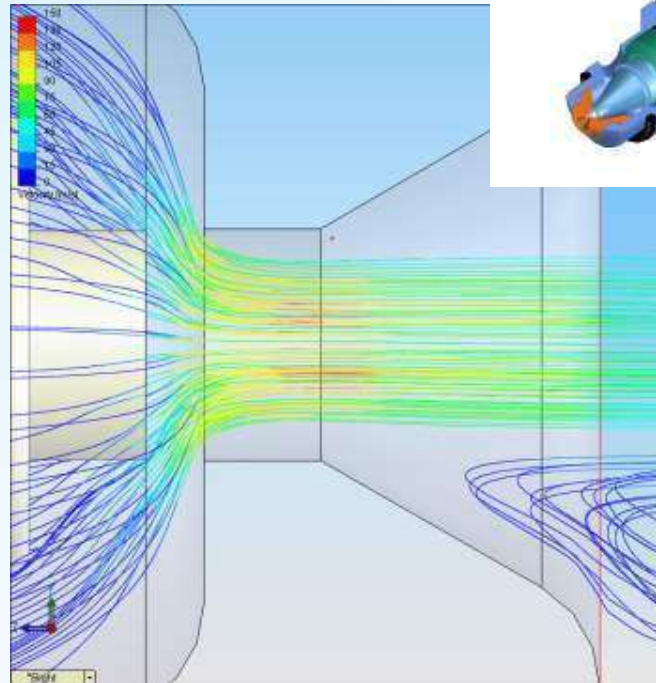


- To create even and fine cell structure
- Convert pressure into velocity
- Finest turbulences



# Mixhead Injector

- Optimized Injector
- constant foaming pressure
- reduced pressure loss
- higher injection speed
- foaming pressure adjustable during production
- finest cell distribution





# CONTIMAT (double belt conveyor)



To determine the

- production speed
- element thickness
- element width
- curing temperature



# Spindle driven height adjustment

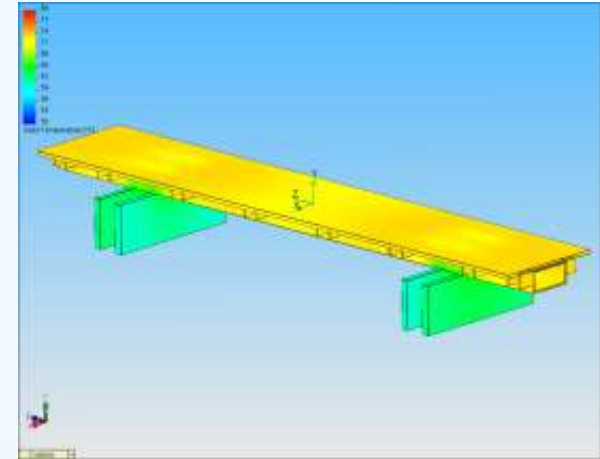


- no spacers
- automatic height setting
- very precise adjustment
- stepless element thicknesses can be produced



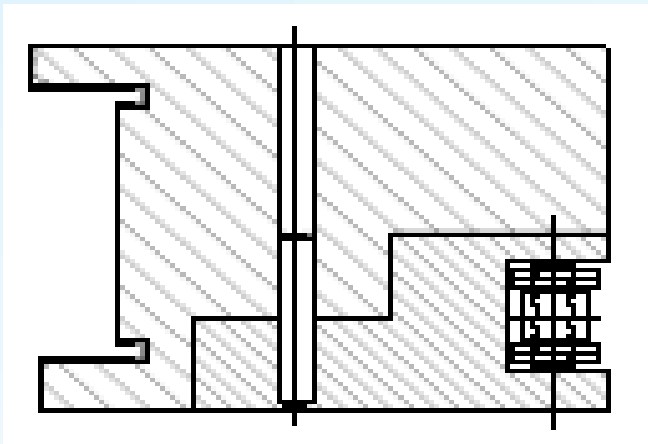
# Highlights

- CONTIMAT Heating System
- reduced heat-up time
- reduced energy consumption
- homogeneous temperature distribution
- for PUR and PIR foam systems



# Master block system

- profile blocks stick to a master chain
- change of the side sealing blocks during production
- easy storage in boxes



# Supporting blocks (roof elements)

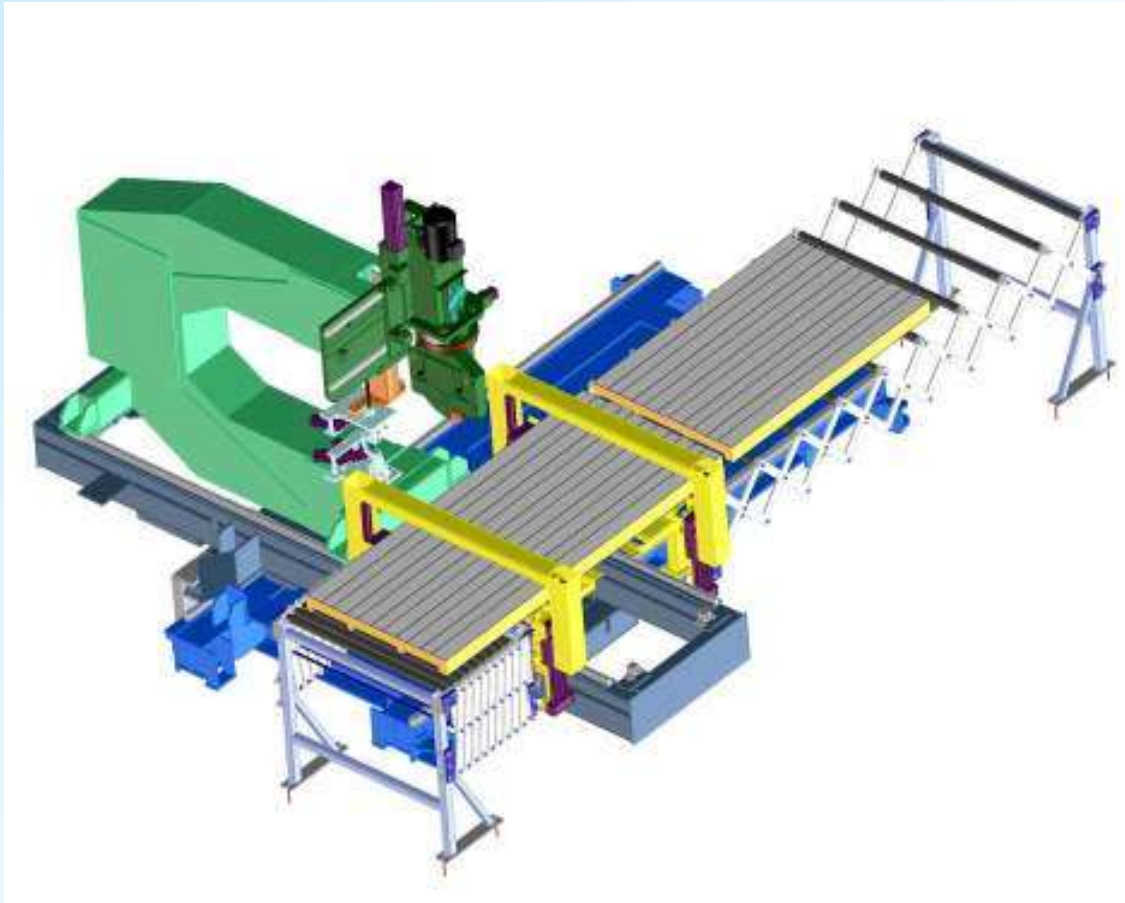


- supporting blocks attached to the supporting chain

- supporting blocks attached to the lower conveyor plates



# Cutting machine (band saw)



- synchronised to the production speed
- to cut the endless element strand
- to perform the overlap cut
- to clamp the element during cutting process

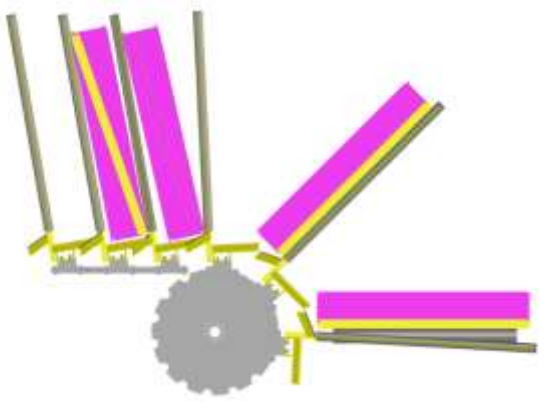
# Transport of panels

- Maintenance-free design of transport conveyor systems
- Solid-welded steel frames with no influence on the long-time performance of the conveyors from vibration of drives and from moving of heavy panels
- All rollers with low tolerance diameters and tight protective covers (optional)
- Sturdy chain drive and solid steel hub for a long lifetime of conveyors



# Cooling section

- Cooling conveyors with accurate and durable alignment of cooling arms
- Conveyor pockets open and close at panel pickup
- New generation T-shaped pockets for panel hand-over at entrance not exit
- Long full-length steel support arms with flexible and durable long-life panel support protection
- Central drive station for even and smooth conveyor motion
- Special guide rails for jitter-free motion of the conveyor arms





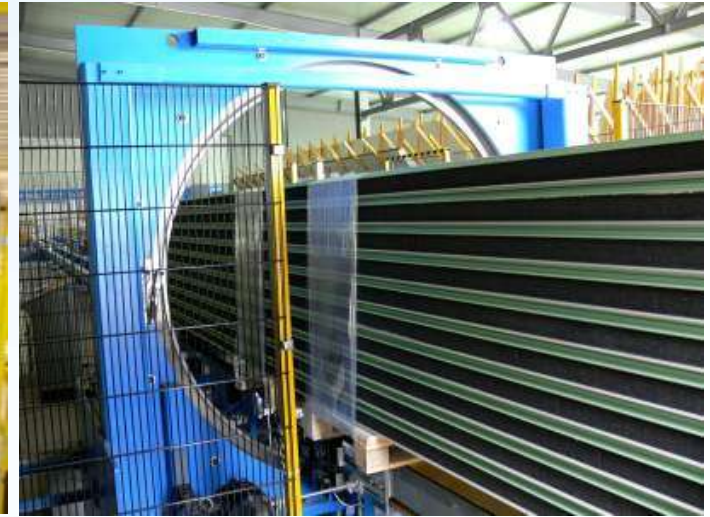
# Stacking area

- Individually designed custom-tailored stacking and packing solutions
- Secure stacking of heavy panels with vacuum-assisted panel lifting and turning
- Maximum speed for moving and stacking the panels rives and devices designed for
- Fastest stacking plants in the industry
- “Rough-industry” design for stack conveyors and forklift truck pick up station with heavy welded steel frame and protective end bumper bars



# Packing area

- EPS strip feeder with special strip retain clamp to prevent regular jams of the strips being pushed in
- Stretch packer with adjustable pre-stretch unit that stretches the film for a tight packing of the panel stack and for material-saving
- Optional automatic or semi-automatic feeding of protective boards or pallets



# Safety area

- Complete safety plans and individual safety evaluation
- Safety fences and guarding according to EN machine safety regulations
- Correct machine access evaluation for operator access with doors and gates
- Safety guarding of moving products with approved light curtains
- Isolated hard-wired emergency stop and sensor system acc to EN regulations

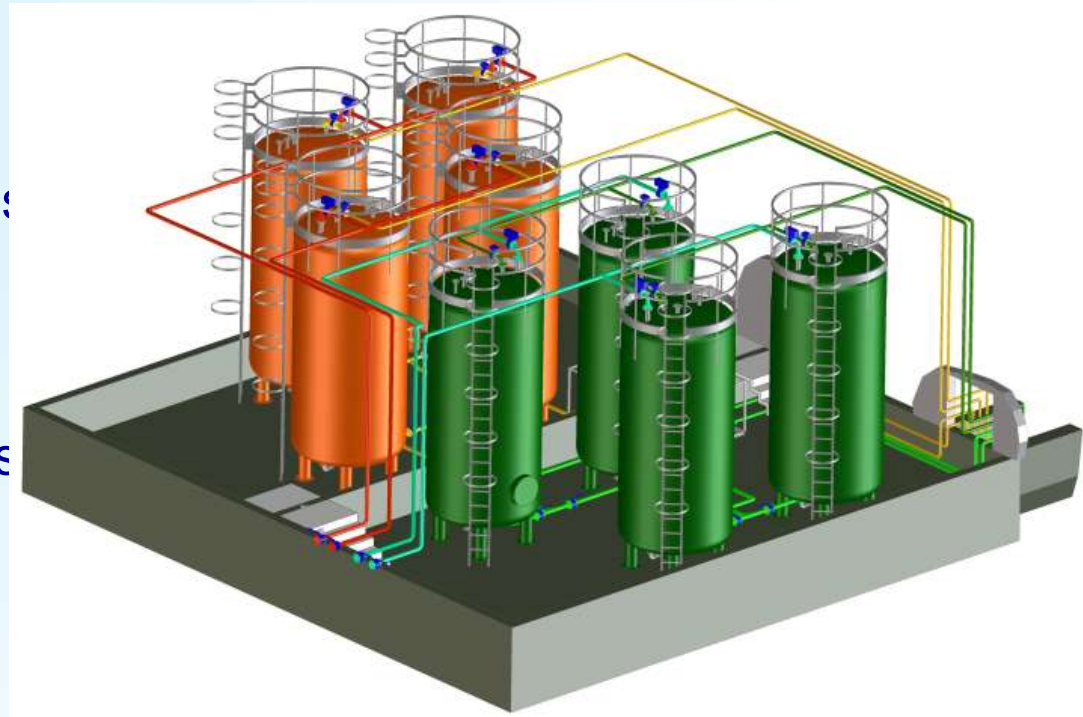


# Hennecke Process Data Control (PDE)

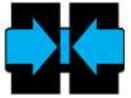


# Tank Storage equipment

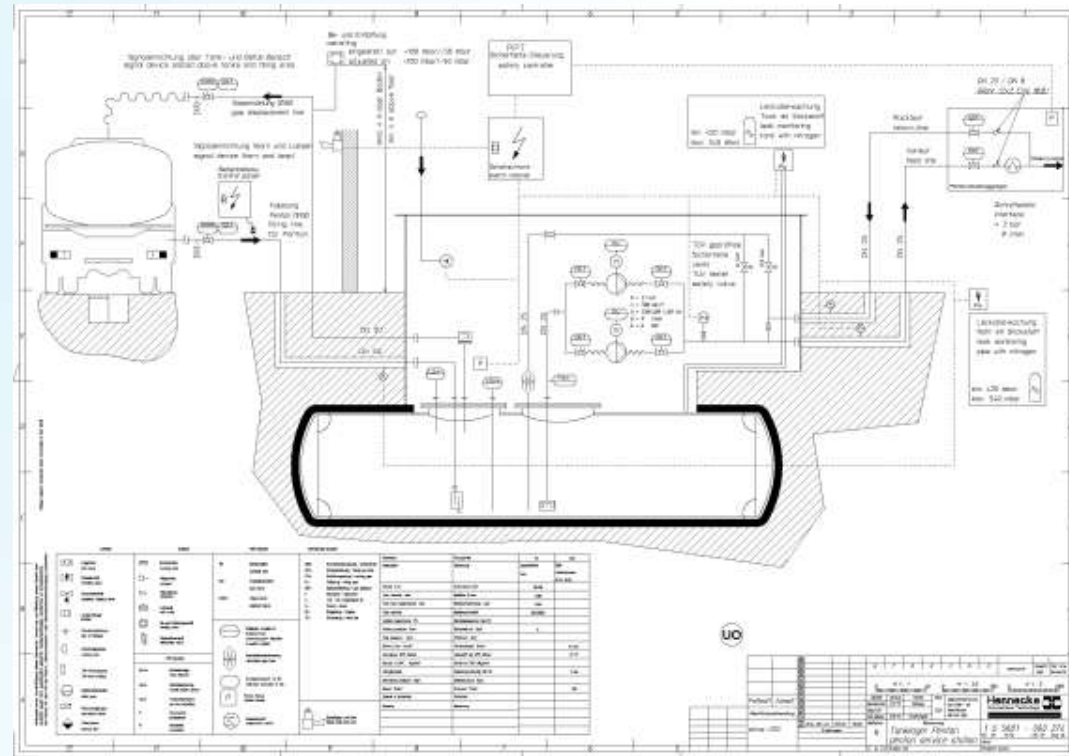
- complete and customized solutions for Polyol and Isocyanate tank storage farms
- design acc. to customer's requirements
- design acc. to European rules and regulations or local requirements



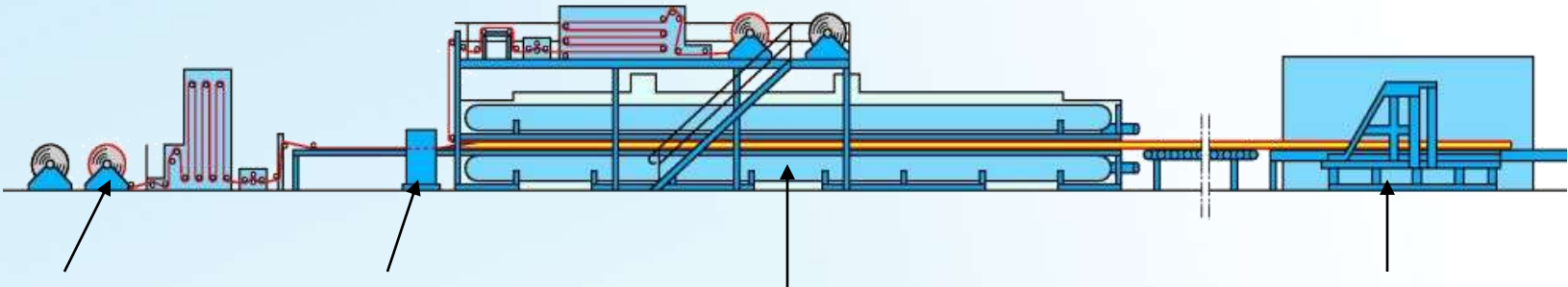
# Pentane Tank (underground)



- unloading by gravity or pump
- double walled underground tank
- feeding line with recirculation and cooling
- tandem pump
- designed acc. to ATEX
- electric control system



# Continuous Production Process with flexible facings

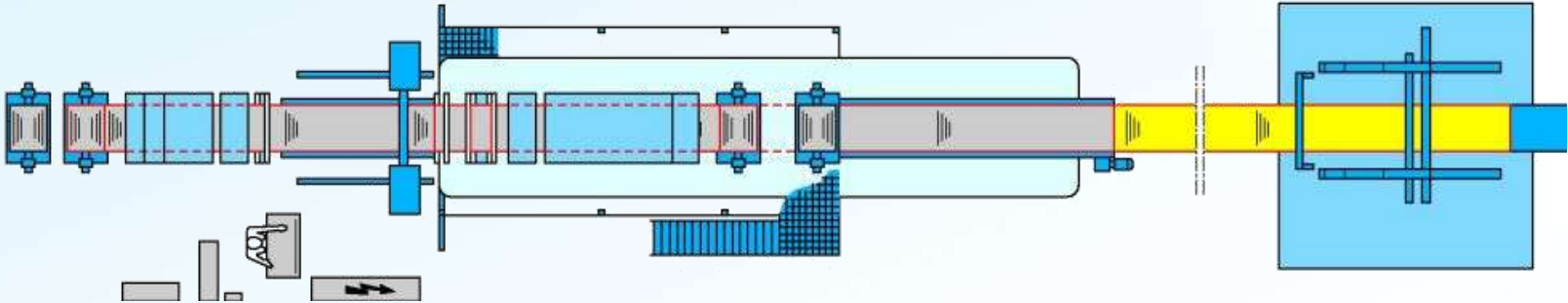


Uncoiling of flexible facings

Foam application

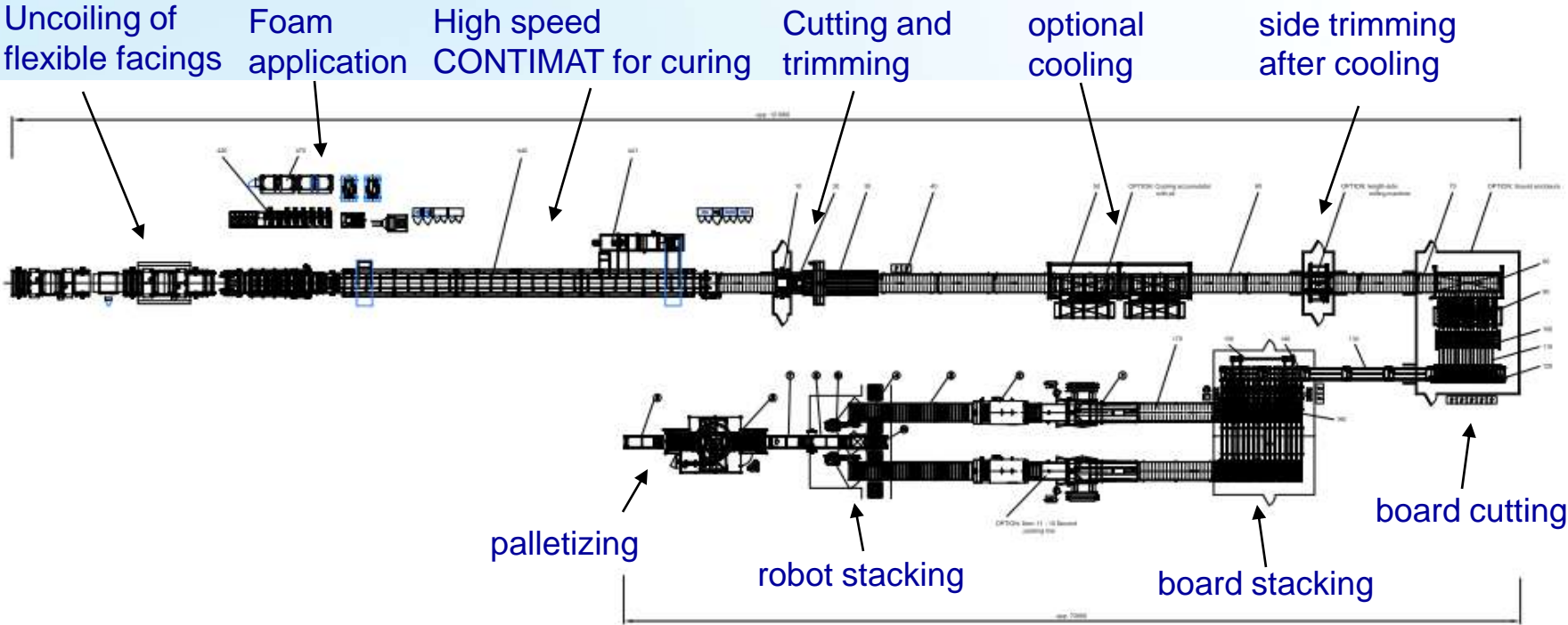
High speed CONTIMAT for curing

Cutting and cooling



# Typical basic line layout

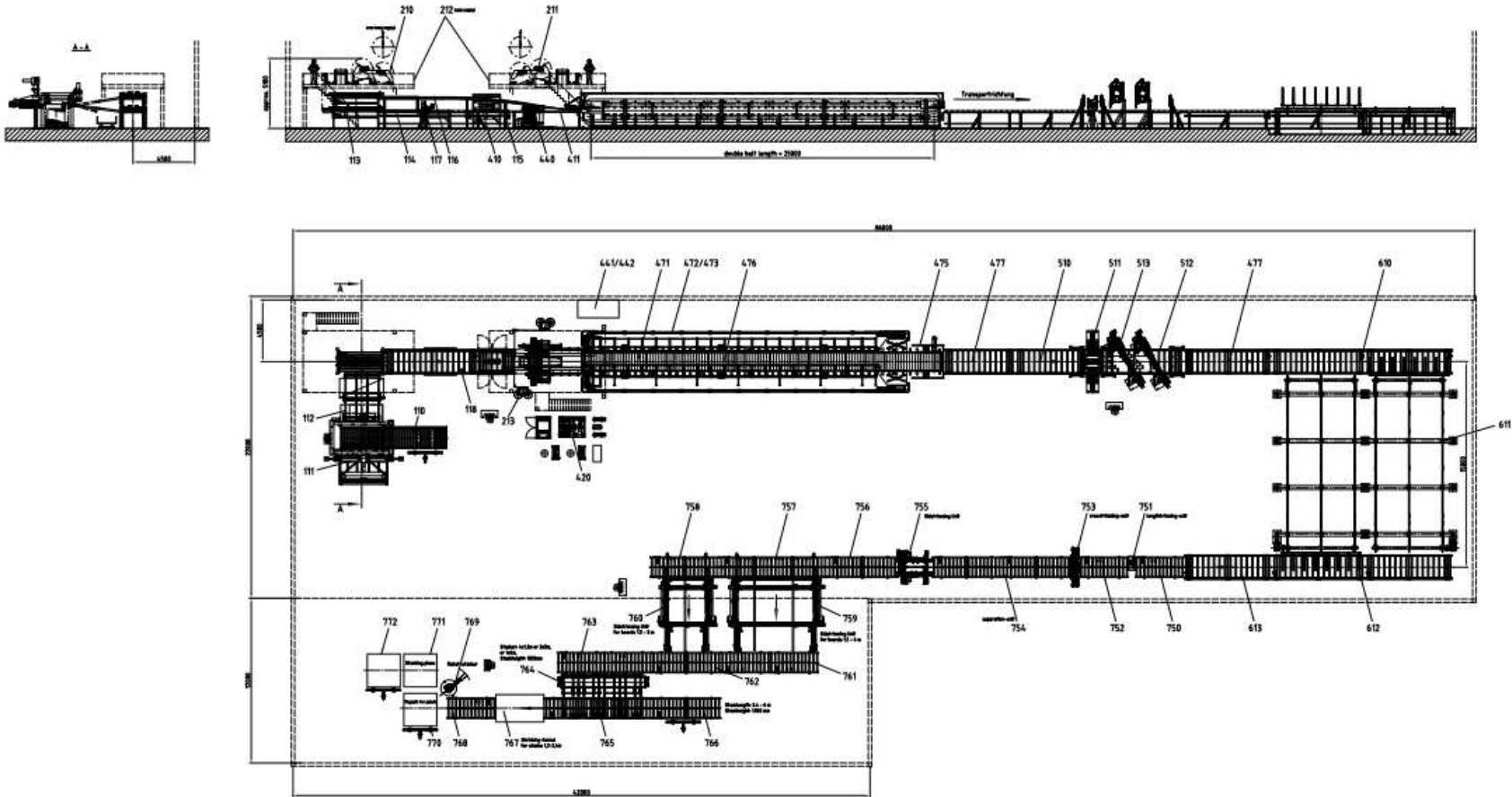
for boards w/ straight edge 600 x 1.200 mm at 60 m/min line speed





# alternative line layout

plant speed 15 m/min with alternate cooling section , 4-side tongue- and-groove milling, stacking and board packing



# Uncoiling of flexible facings



- Uncoiling
- Guiding
- Automatic facing change

- Paper based
- Aluminium based
- Bitumen based
- Glas fiber based



# Foam application (multi stream laydown)



## Recirculation mixhead type MN

- with hydraulically constant pressure injector



# High speed CONTIMAT



## Curing at

- 1 m/sec
- 80°C

# CONTIMAT for insulation boards (cross section: fixed side angles)



Screwed  
on side  
sealing  
angles

Quick  
add on  
plate  
elongation



# Cutting and Trimming



## Two processes:

- Cut to length after curing
- Cut to shape and side trimming after cooling



# The PUR Company

ATION  
PUR  
PUR