Siempelkamp
Maschinen- und Anlagenbau

Forming and Press Lines with ContiRoll®

www.siempelkamp.com

Innovative technology is our tradition

Since 130 years the name Siempelkamp stands for innovative and robust press technology. We were a pioneer in respect to the development of continuous presses – the key technology for all large-volume manufacturers of wood-based panels looking for economical efficiency. Siempelkamp offers the technology for the production of particleboard (PB), medium density fiberboard (MDF) or high density fiberboard (HDF), oriented strand board (OSB) as well as thin boards.

Our process and system technologies are constantly being further developed in Siempelkamp's own research and development facility in Krefeld. Thus, the range of materials that can be produced on our equipment is always growing. Regardless of whether our customers use mineral fibers or gypsum fibers, WPC (wood plastic compounds), plastics, beech strands for LVL (laminated veneer lumber) or sandwich boards: our continuous press technology allows the economical production of many different board types.

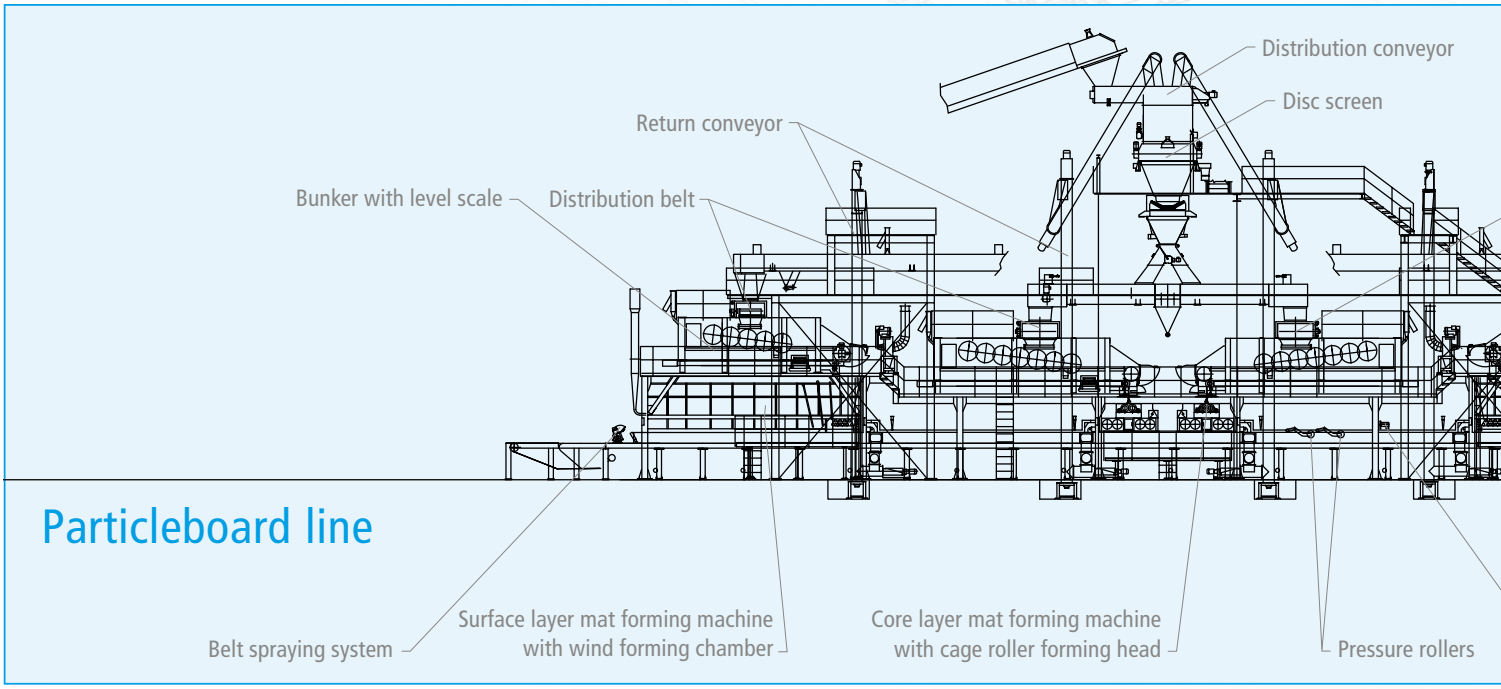
Here, Siempelkamp not only provides its expertise in engineering and process technology for complete plants ranging from the wood yard to the packing line. Beyond these competences Siempelkamp also offers a **full-service package.** This includes:

- Feasibility studies
- Need-specific design and layout planning
- Financing options
- Pre-fabrication, delivery and final assembly of plants
- Start-up and technological optimization to achieve maximum quality at minimal use of resources
- Training of operation and maintenance personnel
- Retrofitting of existing plants by using the latest state-of-the-art technology
- Buyback, dismounting and recycling of existing plants

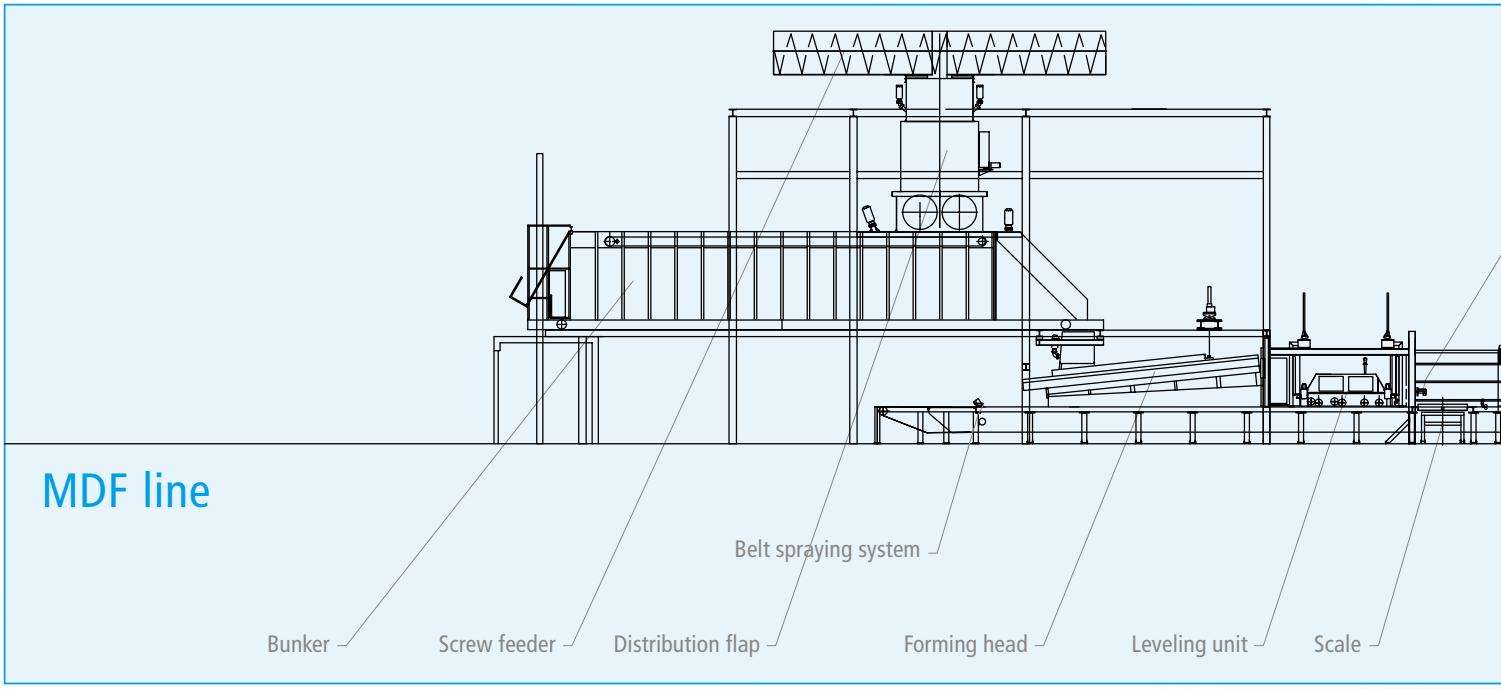
The Siempelkamp concept: high quality, minimal use of resources

The forming and press line is the process-determining system unit within a complete plant. As the main component of a plant, the forming and press line is trend-setting for the capacity and quality of the manufactured products.

We adjust all components optimally to one another: The technical features of our mat-forming machines paired with the pre-press and the continuous ContiRoll® press guarantee boards with optimal technological properties and, at the same time, minimal use of resources. The components all the way to the electrical control are made by Siempelkamp and ensure the highest efficiency.



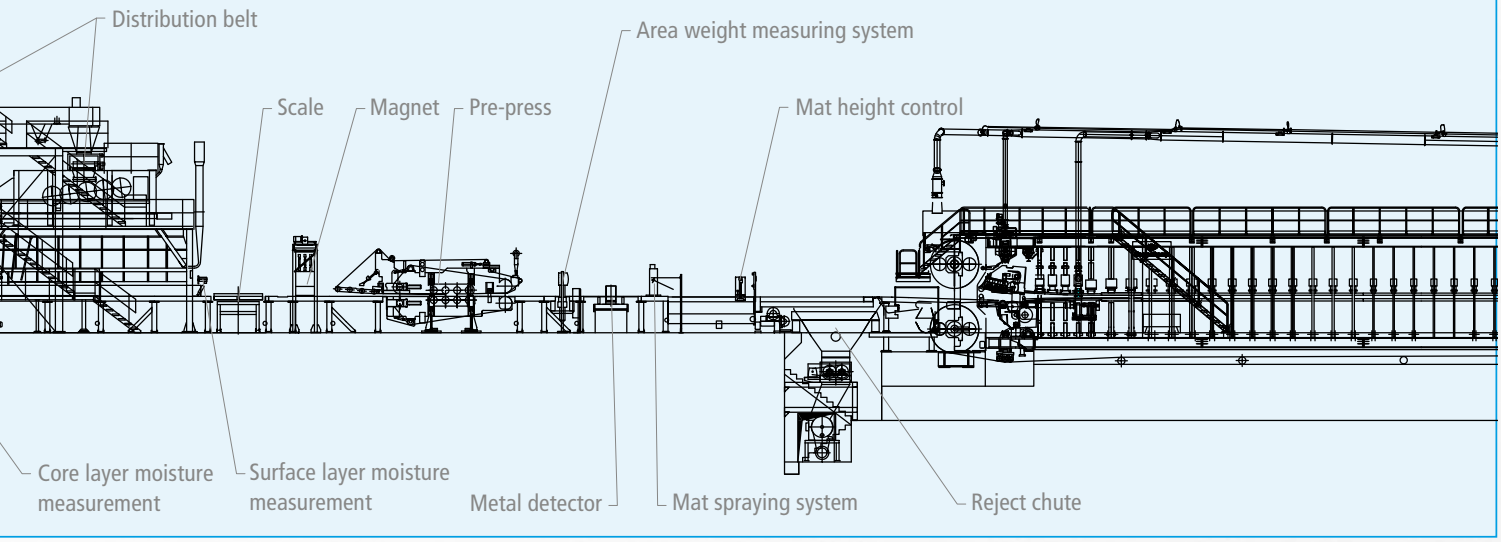
Particleboard line

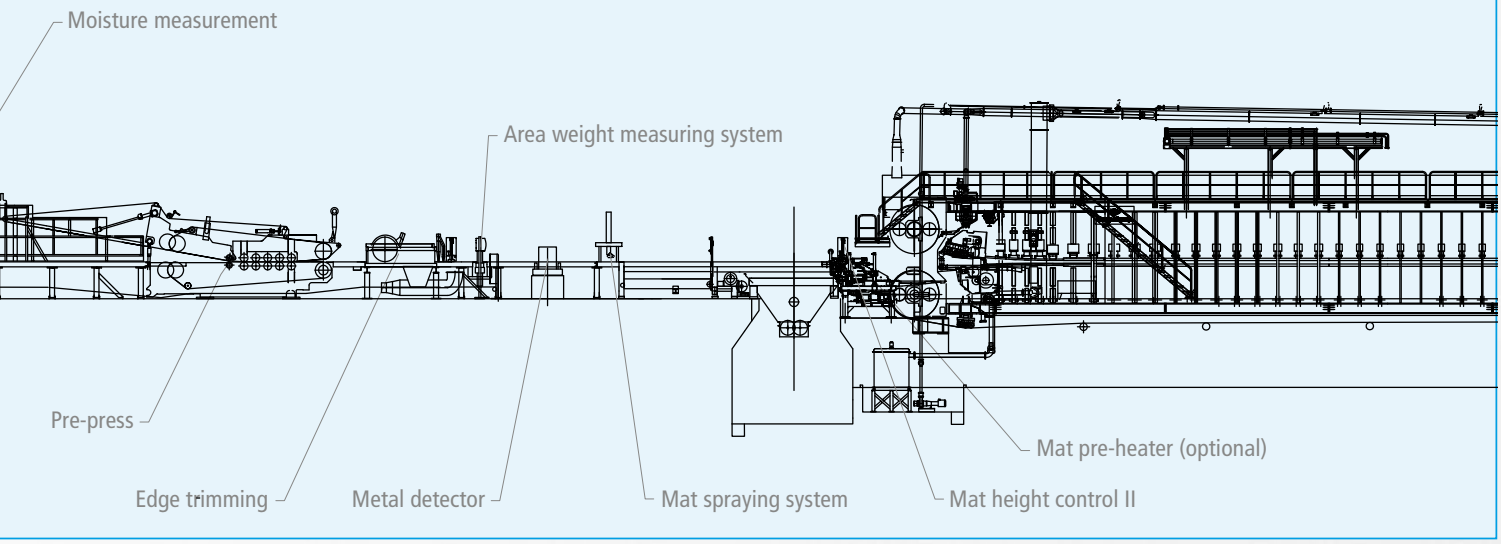


MDF line

Siempelkamp plants are **economical** for the following reasons:

- Due to the ‚all from a single source principle' we control all interfaces.
- They quickly achieve three-shift operation.
- They are unbeatably technically flexible.
- They provide a broad product spectrum without compromises.
- They produce boards with tight thickness and density tolerances and good mechanical and physical properties.
- They ensure low consumption values for electricity, thermal energy, and lubricants.
- They operate reliably with high availability at long maintenance intervals.

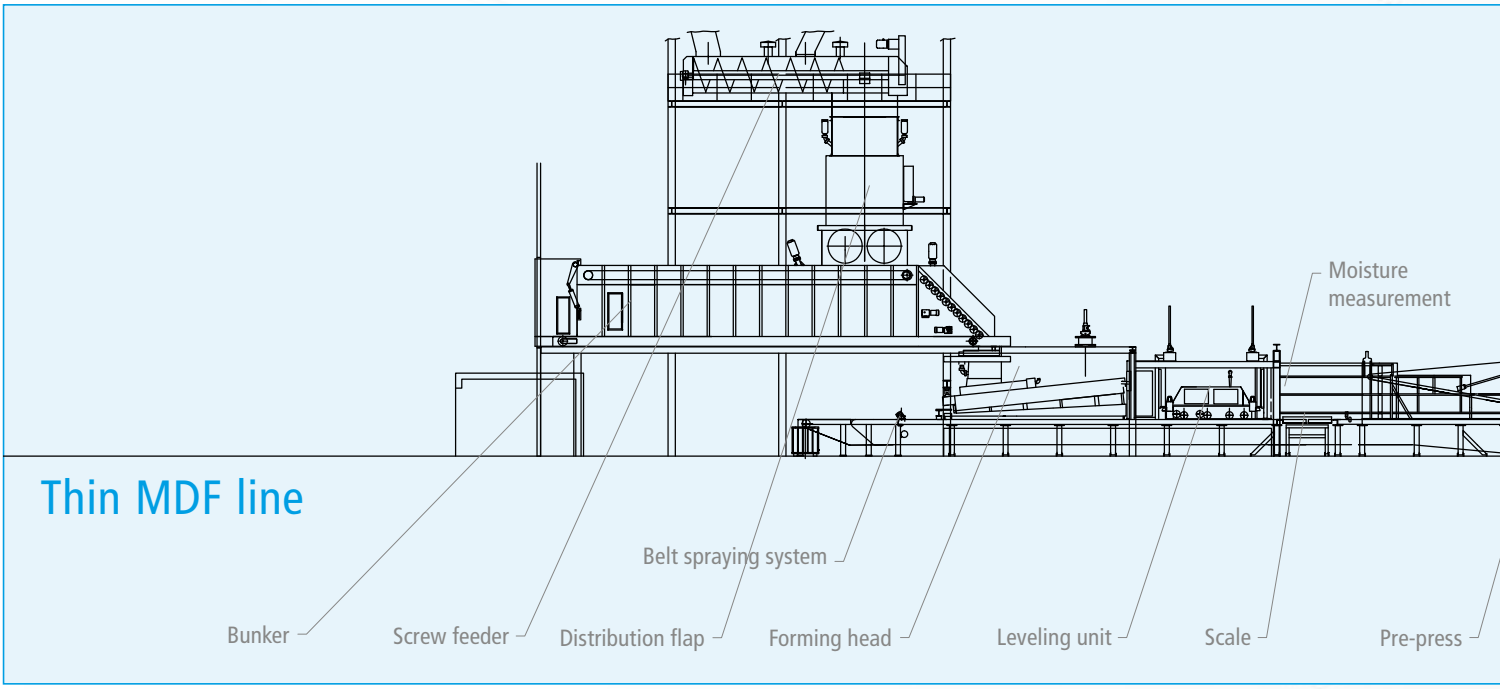




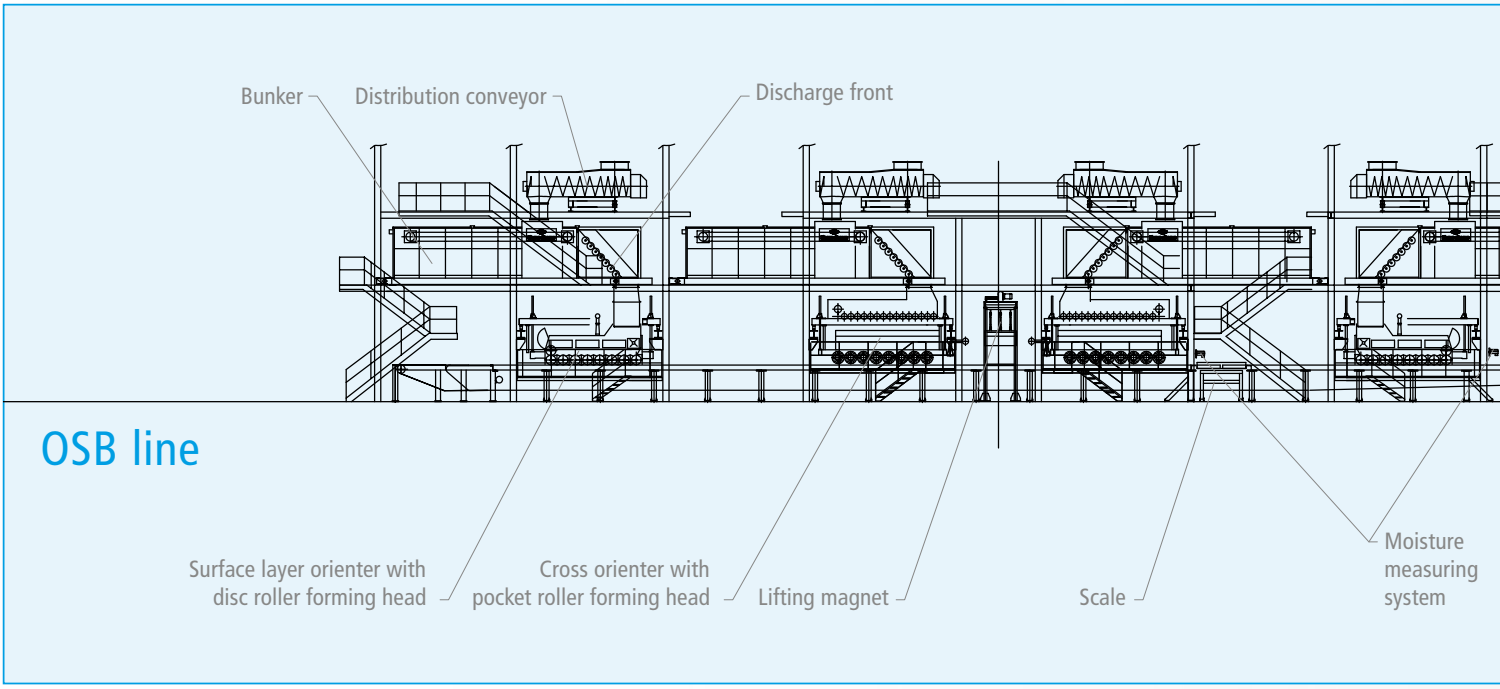
Flexibility for each requirement

The forming and press line can be ideally tailored to the requirements of our customers. The flexible setting of recipes during mat-forming, pre-pressing and during the pressing process inside the ContiRoll® press allows the production of optimal density profiles – all that with board thicknesses ranging from 1.3 to 45 mm as well as speeds of up to 2 m/sec. This flexibility includes easy adjustment of the production width with minimal material losses during mat-forming and trimming.

Thin MDF line

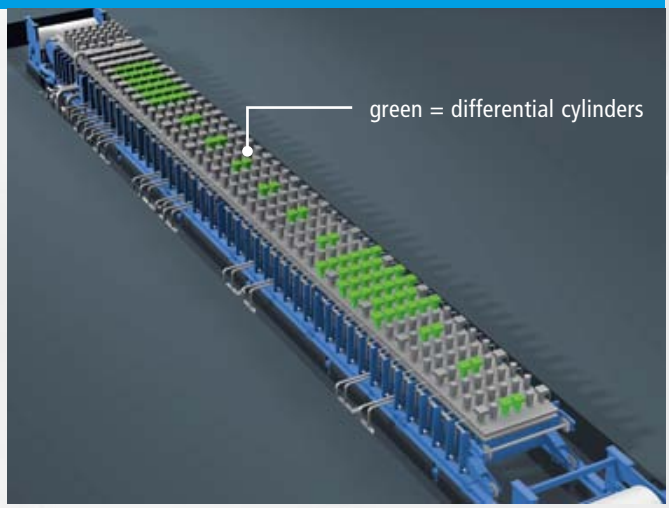


OSB line

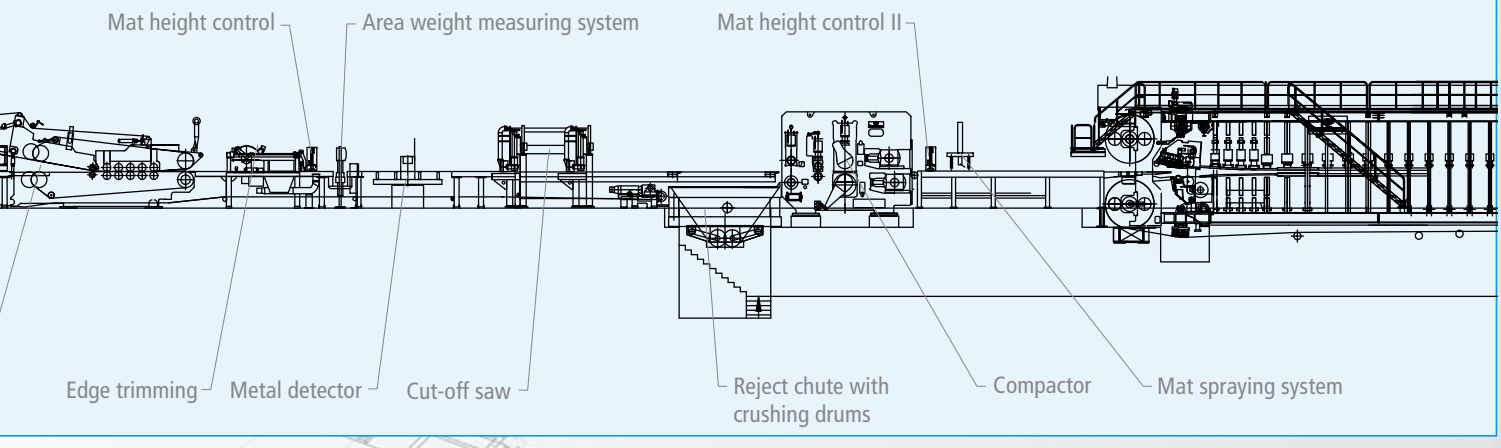


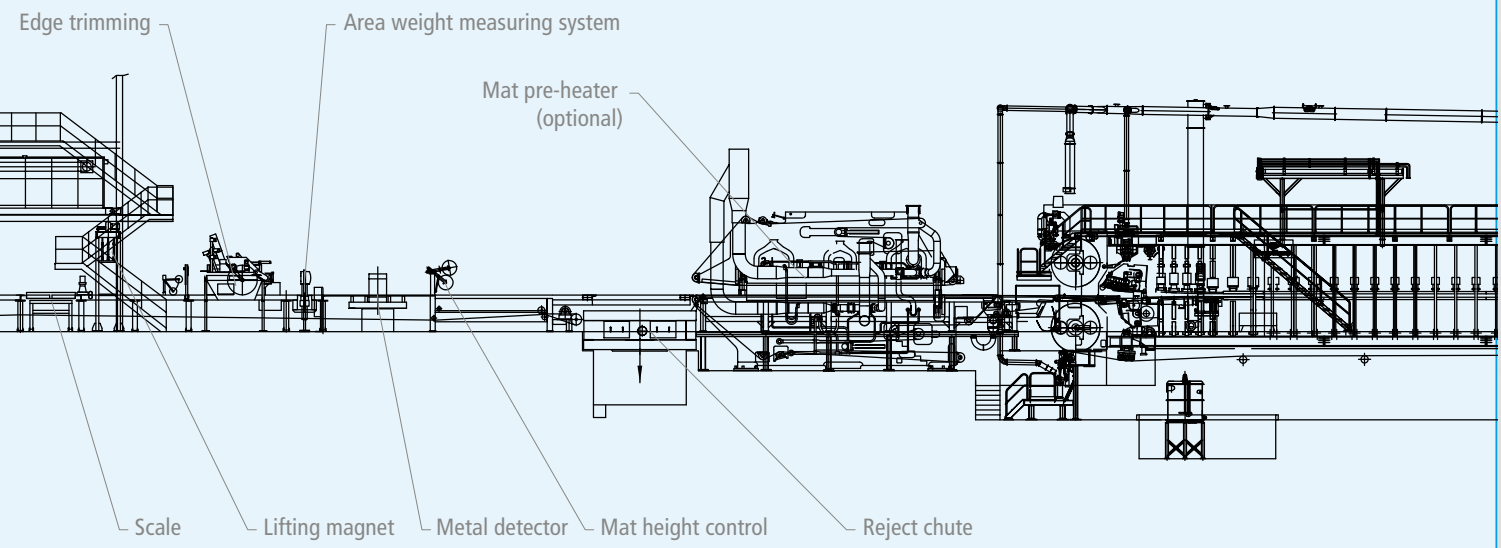
ContiRoll® for lightweight or thin panels

For the optimal production of lightweight or extremely thin wood-based panels, special pressure profiles in longitudinal and crosswise direction to the press are required. In order to provide such pressure profiles, our proven ContiRoll® press can be equipped with additional differential cylinders which allow the active lifting of the upper hot plate or the reduction of the specific pressure in the outer edges of the board. In this way, Siempelkamp customers benefit from best pressure distribution and a broader product range.



ContiRoll® Generation 8 with additional pull-back cylinders





Mat-forming systems

With the mat-forming system the technological requirements for optimal mat-forming characteristics are implemented by mechanical engineering. Siempelkamp offers the optimal mechanical mat-forming system for any type of wood.

Mat-forming systems for particleboard production

For the production of particleboard a combination of Windformers for the surface layers and Cageformers for the core layers is used. In this way, smoothest surface layers for top-quality laminating or direct painting are possible. At the same time a homogeneous core layer with high internal bonds and low resin consumption is achieved.

Mat-forming systems for MDF production

For the mat-forming of MDF, mechanical Starformers with roller banks are used. Neighboring rollers rotate in opposite directions. The capacity is variable via the adjustable distance between the rollers and the rotation speed. The roller geometry provides for homogeneous fiber distribution and density in the mat. A leveling head balances thickness fluctuations in the mat without extensive fiber recycling.

Mat-forming systems for OSB production

Our mat-forming system for OSB production consists of specific modules for the surface and core layers. With our Discformers for the surface layer, the material discharge takes place at the front of the bin discharge across a disc roller head which orients the strands in production direction. The Finformer for the core layer orients the strands crosswise to the production direction.

Mat-forming system for MDF

Mat-forming system for particleboard

Forming line

Our forming line takes care of the optimal conditioning of the mat before entering the press. It carries out quality tests with the help of mat scales, metal detectors, the SicoScan moisture meter, the area weight measuring system, and the mat height control.

Pre-presses

To ensure high board quality, the air has to be removed from the particleboard or MDF mats before entering the press. This is done with Siempelkamp's belt pre-presses which pre-compress the mats.

Pre-heating

If the mat is uniformly pre-heated before entering the press, the production capacity is increased by up to 30 percent. Our patented pre-heater ContiTherm®, which is installed directly in front of the press, applies a mixture of hot air and steam to the mat. Thus, the mat is heated to a temperature of 60 to 80 °C

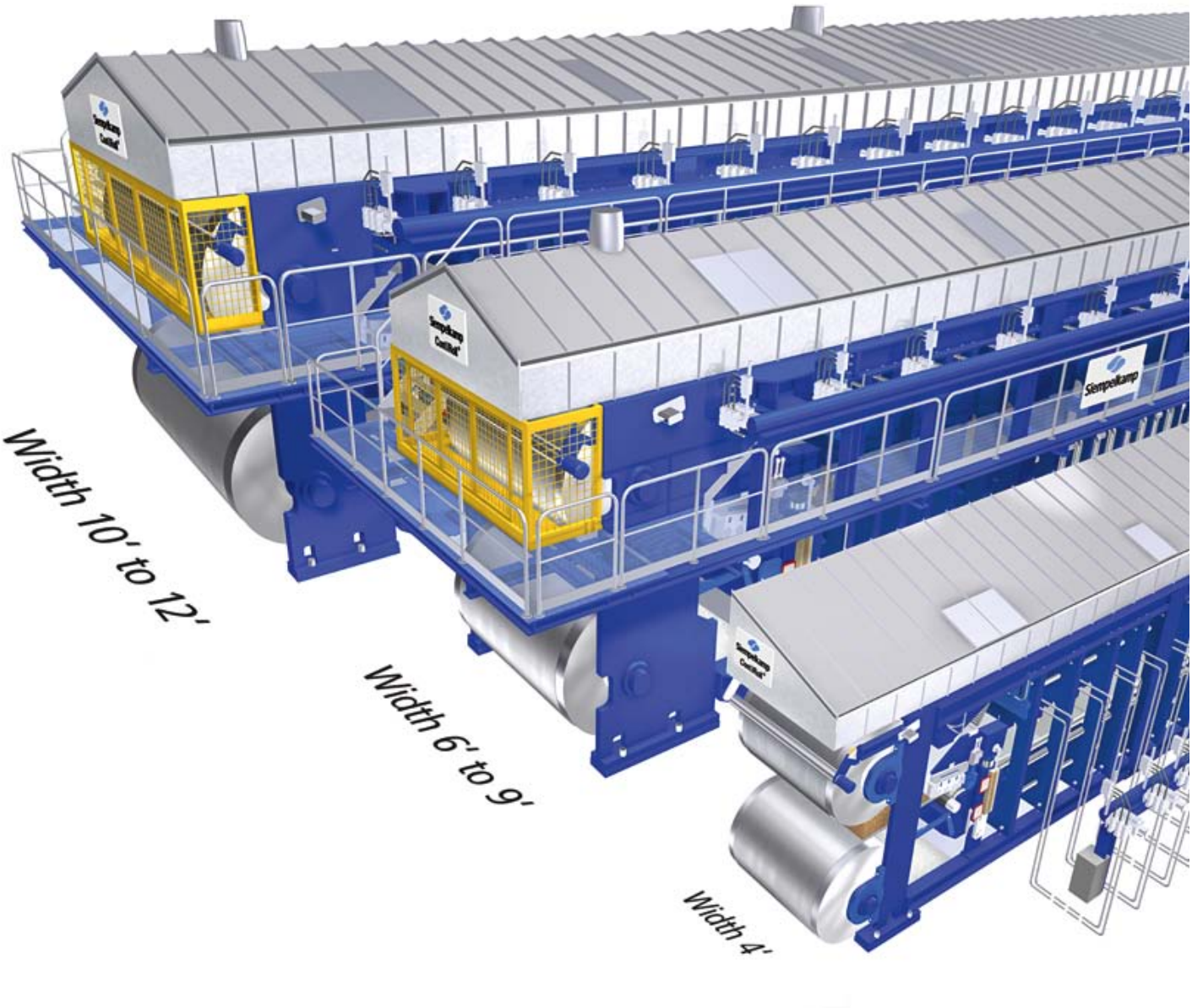
Forming line of a particleboard plant

The ContiRoll® press – the Siempelkamp principle

The ContiRoll® by Siempelkamp has been well-known in the wood-based materials industry since 1985 and has become a synonym for advanced and continuous press technology. With more than 250 sold presses we hold a top position in the wood-based materials industry.

Optimized installation and start-up times, steep ramp-ups and high reliability have made the ContiRoll® an attractive investment for decades. The press concept has been further developed over the years and allows a production process which meets high demands on product quality and efficiency. A number of international patents prove the press' innovative strength on which this concept is based.

To offer our customers the optimal design for each requested production capacity, we developed the ContiRoll® press in three different sizes:



ContiRoll® – one concept – three sizes

Flexible infeed head

The flexible infeed head of our ContiRoll® is characterized by a downward-curved lower hot plate and a highly flexible upper hot plate which can be adjusted with a variable curve (e.g., S-shaped). As the mat enters the infeed area, it can be compressed quickly. The mat pressure during the remaining time in the infeed area is decreased. As a result the maximum amount of heat is pumped into the board. In this way, the board surface quickly cures to achieve a stable and high surface density. Due to the curvature of the infeed, the compression speed and the amount of air to be removed decreases with increased mat density. Blow-outs are effectively avoided. The flexible infeed head is an important feature of the ContiRoll® which ensures process safety even at high production speeds.

Press cylinders

Hydraulic cylinders controlled via proportional technology apply the press force to the product. Depending on the process, pressure levels ranging from 500 to 200 N/cm^2 can be set. To ensure good density distribution even for smaller board widths, the cylinders are individually controlled in crosswise direction. Individual pull-back cylinders allow extremely dynamic pressure profiles.

Hot plates

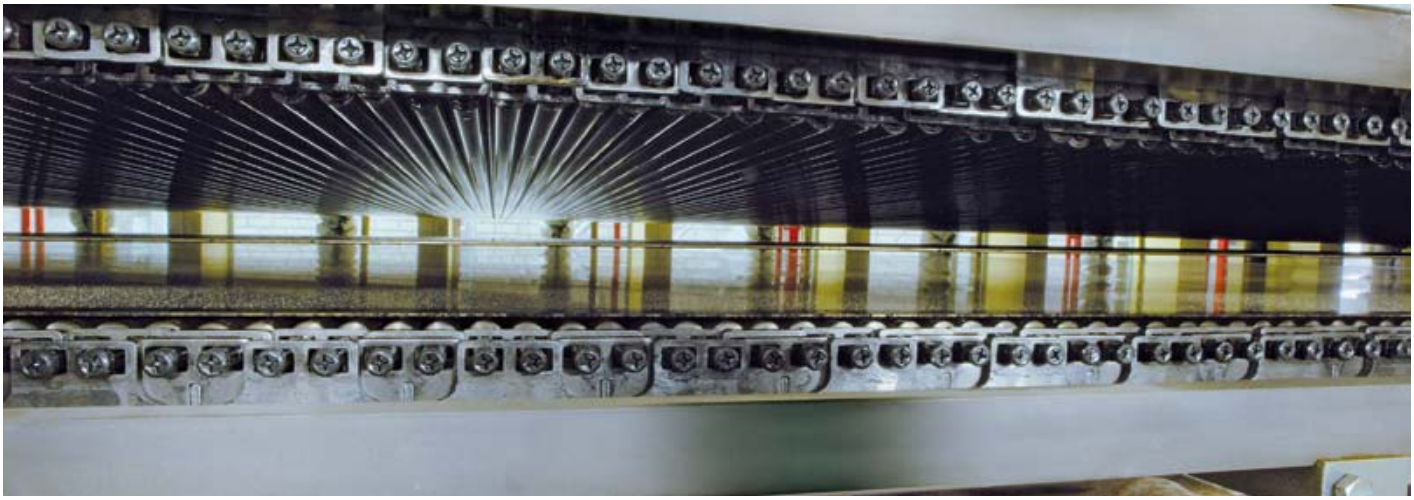
The ContiRoll® hot plates are manufactured from special steel which is characterized by its high strength and surface hardness. Due to special mechanical machining the finest surface finish is achieved which ensures excellent heat transfer and low rolling resistance as well as long lifetime. The hot plates are thermally insulated resulting in a highly efficient transfer of heat from the thermal oil to the product.

Roller rod carpet

A carpet of calibrated roller rods runs between the steel belts and the hot plates. The equally spaced rods span the full width of the hot plate. These rollers freewheel, transmitting the pressure and heat via the steel belt with optimal efficiency onto the product.

Drive technology

All frequency-controlled drives are equipped with digital controls. This ensures accurate speed synchronization between press steel belts, roller rod chains, pre-press and forming belt drive.

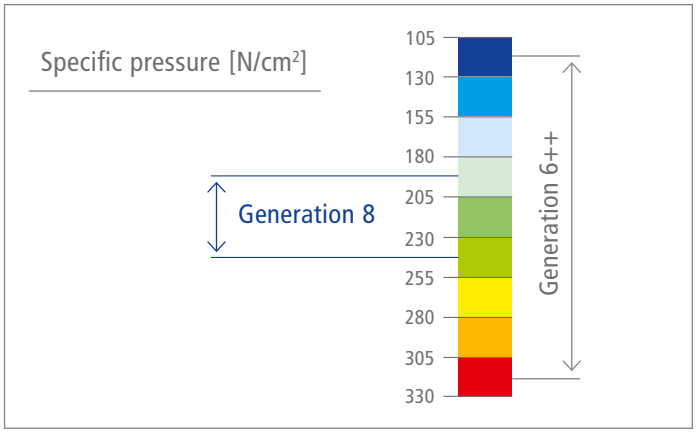


Hot plates and roller rods inside the ContiRoll®

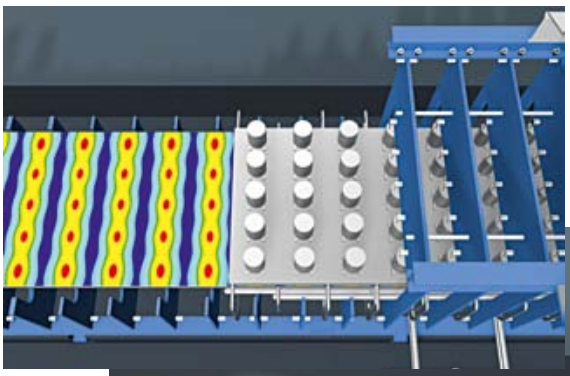
ContiRoll® Generation 8 sets new standards

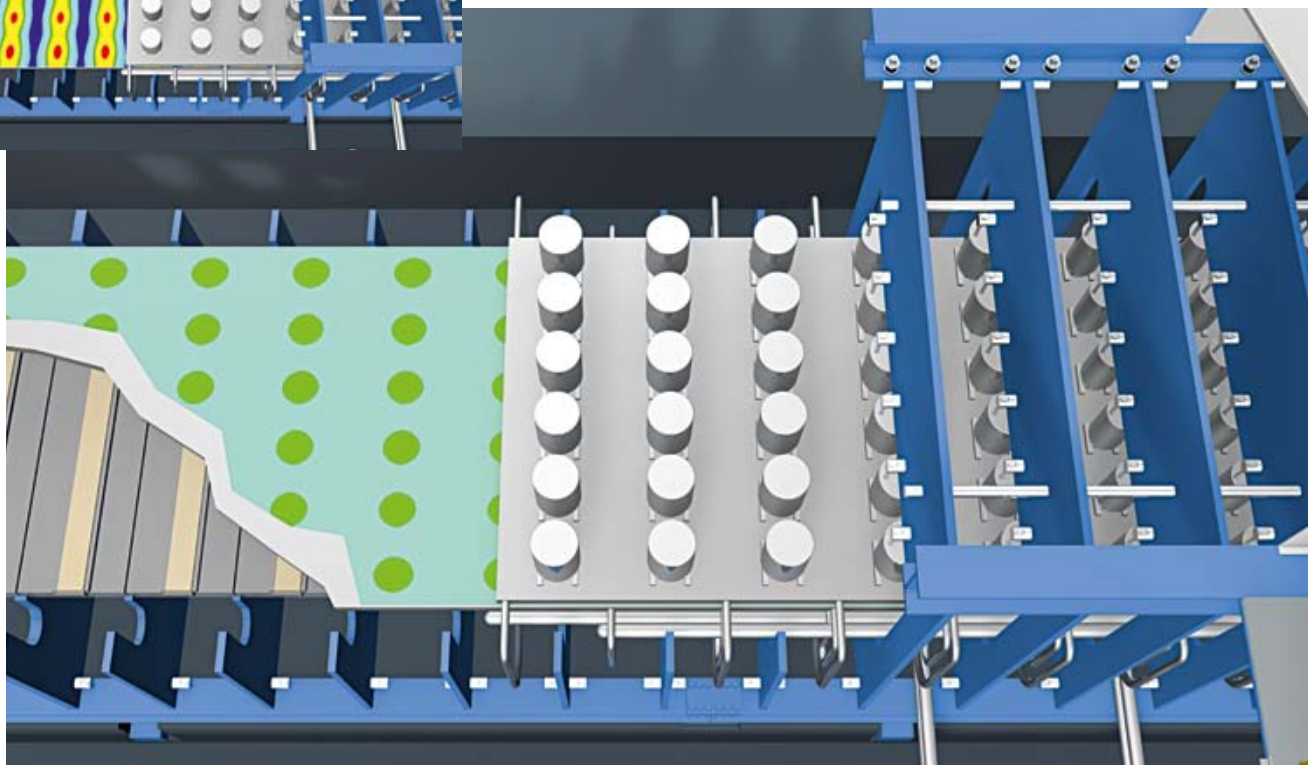
With Generation 8 of the ContiRoll® Siempelkamp offers customers a press concept which provides significant material savings while maintaining the same high quality!

The influence of frame and cylinder spacing on the pressure profile could be decreased to an extent as never before. The "isobaric press" has become a reality. The system operates with a precision that is ten times higher than before. This significantly higher accuracy in pressure distribution is directly reflected in the resin and wood consumption. Without sacrificing quality, boards can be produced using less resin and wood. For our customers this translates into material savings of up to 15 percent.



Pressure distribution ContiRoll® Generation 6++





New: ContiRoll® Generation 8 with pressure distribution plates and six rows of cylinders for 8' press for optimal pressure distribution

Due to new pressure distribution plates below the lower hot plate, the reaction forces upwards and downwards are displaced against one another. Frame distance and elasticity of the hot plates are adjusted in such a way that the ripples of the pressure profile are almost fully eliminated. The result is even pressure distribution in the press that allows for the adhesive bonds to cure homogeneously.

Another update in Generation 8 is an additional row of cylinders in the calibration area. Thus, the pressure per unit of area becomes even more uniform in the crosswise direction. Due to the fact that the ripples in the pressure profile were reduced, the thickness tolerance of the pressed board improves significantly. With the low material allowance for the sanding process, customers save wood, resin, energy as well as the tool costs for the sanding process.

ContiRoll® Generation 8 at costumer's location

Control technology

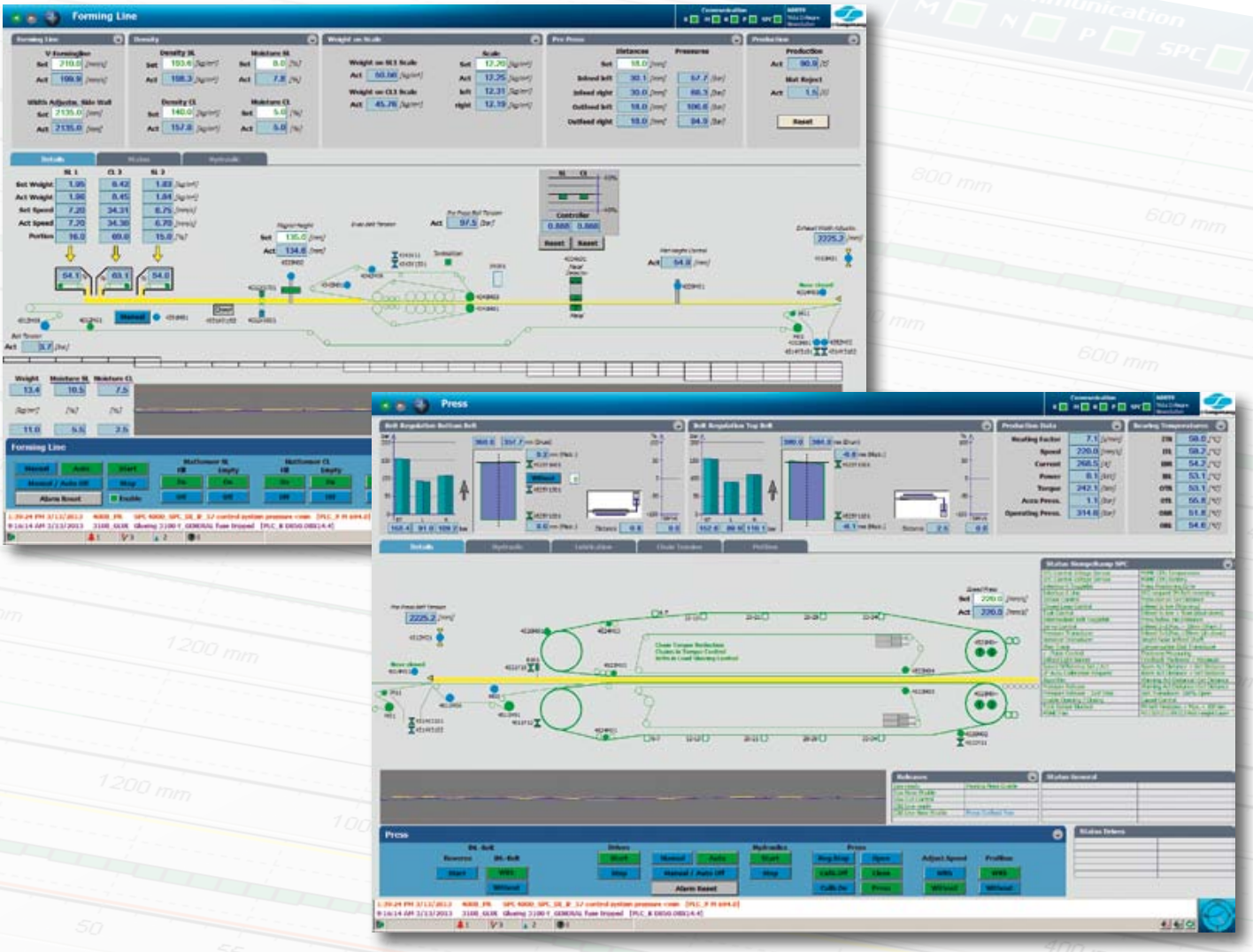
Our control concept consists of a combination of programmable controllers for logic and process functions. This includes the Siempelkamp-Press-Controller (SPC) for pressure and position control, the integrated measurement system SicoScan and a modern visualization system for the operation of the plant.

To ensure optimal production processes, the control system measures and processes all process parameters and measurement data from raw material preparation to the finishing line. The production data is displayed on control room monitors enabling the operators to easily identify changes in production and make appropriate adjustments. The functions which are monitored and controlled include:

- Plant overview for quick operation and monitoring
- Detailed views of blending system, forming line, presses (e.g., hydraulics, compression distance curves, pressing pressures, etc.)
- Central input of adjustments and product-oriented storage in recipe management system and input of customer data
- Quality control integration with all SicoScan measurement systems (e.g., thickness measurement / blow detection and online board weighing downstream the diagonal saw)

All process data is collected and recorded in a central database and processed with the control technology system ProdIQ®. Plant conditions, total consumptions, production quantities and costs, system downtimes, etc. are clearly displayed. Through a connection to the order control department of our customers, the complete order process of the production line is implemented by means of the production management system.

Control room of a production plant for wood-based materials



Moisture analyzer

Thickness measurement / Blow detection

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Siempelkamp Maschinen- und Anlagenbau GmbH & Co. KG Siempelkampstraße 75 47803 Krefeld Germany Tel.: +49 (0) 21 51/92-30 Fax: +49 (0) 21 51/92-56 04 www.siempelkamp.com