

# Plants for wood fiber insulation boards

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**DIEFFENBACHER**

## Advantages of wood fiber insulation boards

- Renewable raw material - green product
- Environmentally compatible building material (e.g. **natureplus**® certificate)
- Recyclable
- Low energy consumption of the production
- Excellent thermal properties
- Suitable cover against cold in winter and heat in summer – phase displacement
- Superior dehumidification - breathable
- Good sound insulation
- Uncomplicated and safe handling for roofers/craftsmen



## Properties of rigid wood fiber insulation boards with different densities

	Density			
Properties	35 kg/m <sup>3</sup>	90 kg/m <sup>3</sup>	170 kg/m <sup>3</sup>	210 kg/m <sup>3</sup>
Tensile strength vertical to the mat surface [kN/m <sup>2</sup> ] (EN 1607)	2	10	25	50
Compression load with 10 % deformation [kN/m <sup>2</sup> ] (EN 826)	-	20	120	200
Water absorption [kg/m <sup>2</sup> ] (with hydrophobising agent, EN 1609)	-	2	1	0,5
Heat conductivity [W/mK] (EN 13171)	0,034	0,038	0,043	0,052

## Ingredients of wood fiber insulation boards

- Wood fibers
- Bonding agent:
  - MDI 3 - 6 %, or
  - MDI with additive, ~ 6 % each for rigid panels with low density ( $< 90 \text{ kg/m}^3$ ), or
  - Plastic fibers 5 - 10 %
- Hydrophobising agent: Depending on the desired board properties 0 - 5%. Typically 1 - 2%.
- Fire retardant agent: Depending on the desired board properties 0 - 8%.

Moisture content of the insulation board 7 - 10 %.



## Functional areas

### Chipping and Refining

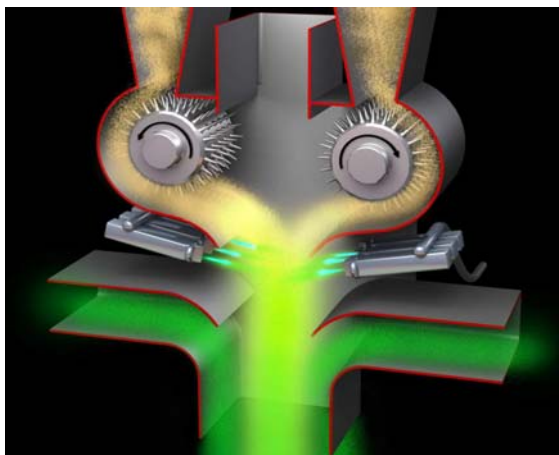
- The production of wood fibers is done with the same machines and the same process as for the production of MDF boards. The logs are debarked and cut to chips and then refined to fibers.

### Drying

- The fibers are dried in a one stage tube dryer with hot air or exhaust gas to approx 6 % moisture content.

### Blending

- Fire retardant and hydrophobising agent are added in the blowline before the drier. The blending of the wood fibers with plastic fibers or MDI is done in two different mechanical blending systems.



## Functional areas

### Forming

- The forming process is the same as for the production for MDF panels. By using special bin discharge rolls, the fibers are dissolved before spreading to the mat. The main compression of the formed mat is done in the pre-press.

### Continuous steaming system – CSS

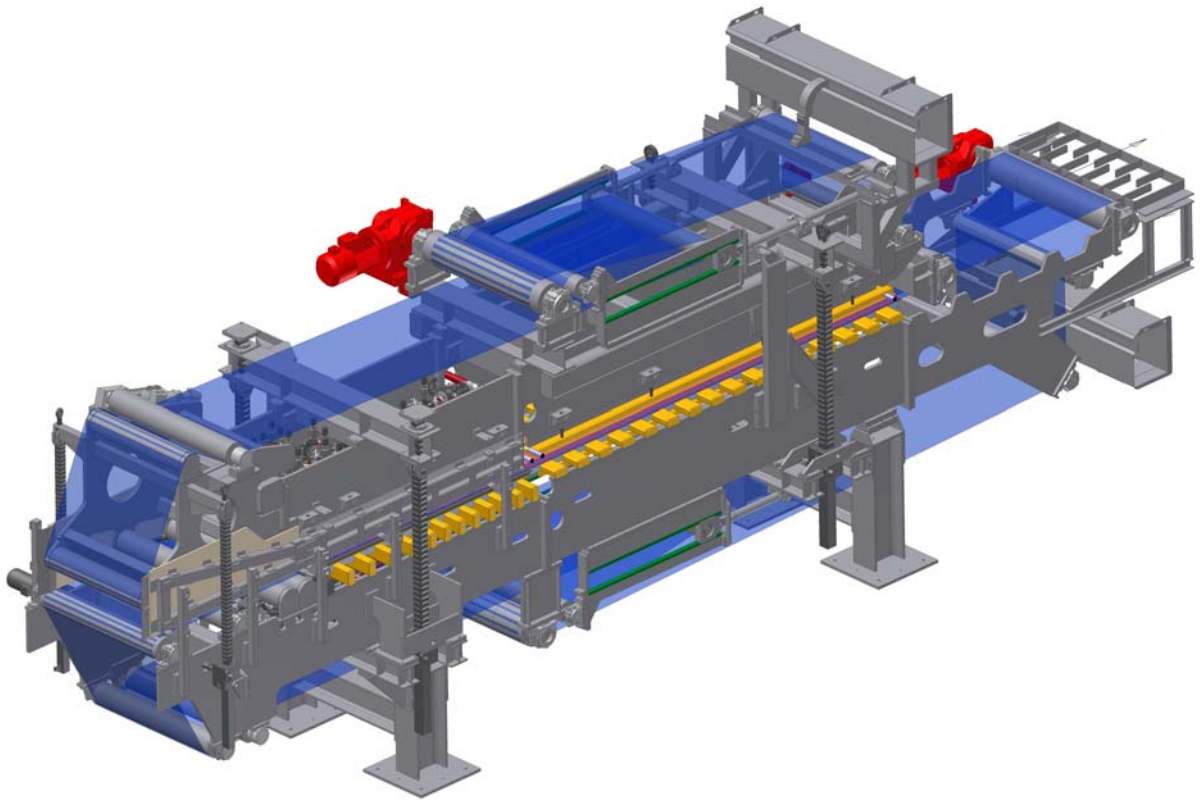
- The mat is compressed to the required thickness and afterwards heated under steam conduction within a few seconds. By using a simultaneous steam discharge at the upper and lower surface a symmetric density profile of the board is obtained. For a total glue hardening the mat remains in the CSS heating zone for a specific period of time.

### Board handling

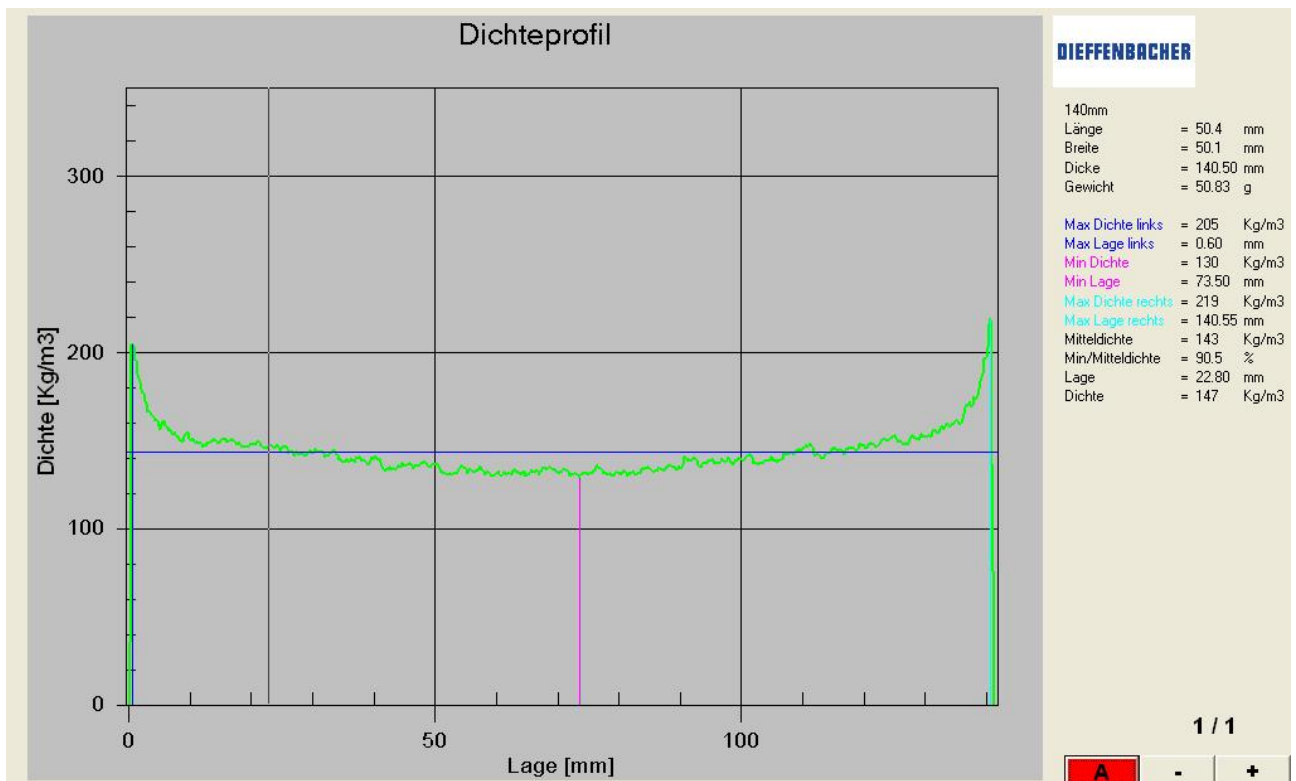
- After the CSS the „endless“ mat is trimmed on the edges and cut with a diagonal saw to the desired length. On-line tongue and groove shaping and stacking on pallets can also be realized.



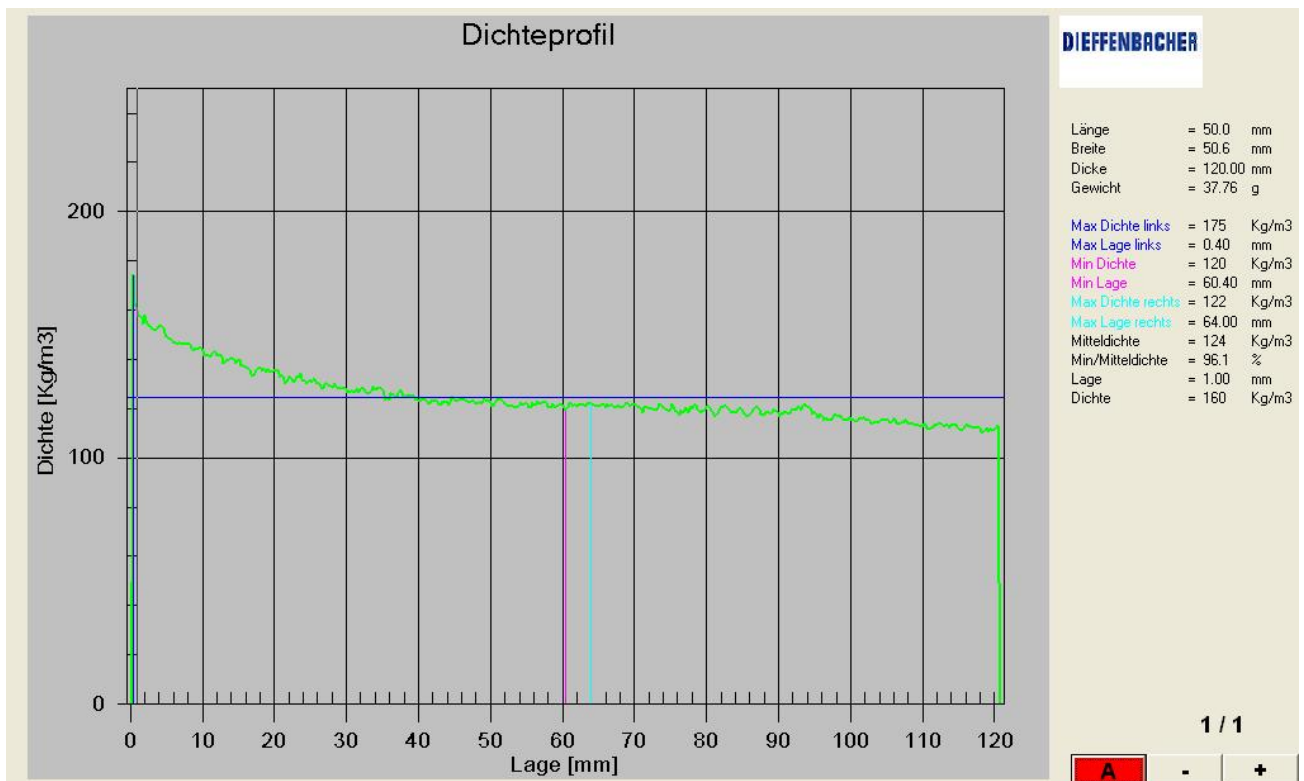
## Continuous steaming system - CSS



# Density profile of boards out of the CSS system



## Other systems



## Plant specifications

- Board thickness: 20 - 250 mm
- Board width: 1,2 - 1,3 m
- Fiber throughput: 1 - 6,5 t/h
- Production speed: 15 - 140 mm/s
- Board density: 35 - 250 kg/m<sup>3</sup>

### Installed electrical power:

- From 3.000 - 4.900 kW depending on the plant equipment

### Energy demand (~ 6,5 t/h fiber throughput)

- Steam demand of the refiner and CSS 5 t/h ~ 4 MW
- Dryer ~ 6,8 MW



## Examples for production capacities

Thickness [mm]	Density [kg/m <sup>3</sup> ]	Production speed [mm/s]	Plant capacity [m <sup>3</sup> /day]	Bonding agent
20	200	140	288	MDI
90	200	73	686	MDI
160	150	57	923	MDI
240	110	50	1.260	MDI
40	40	130	535	MDI with additive
90	35	130	1.205	MDI with additive
160	35	85	1.400	MDI with additive
240	35	57	1.400	MDI with additive
80	50	80	673	Plastic fiber
120	50	80	924	Plastic fiber

## Why choose Dieffenbacher?

**Dieffenbacher systems have the best available technology with many advantages for our customers:**

- Extended board thickness range
- Wide range of possible board density
- Different bonding agents can be used
- High temperature in the CSS due to the use of steam
- Best rigid board properties due to symmetric density peaks at the surfaces
- Energy efficient process
- The whole plant engineering in one hand
- Dieffenbacher has extensive experience with complete plants for wood based panel products

