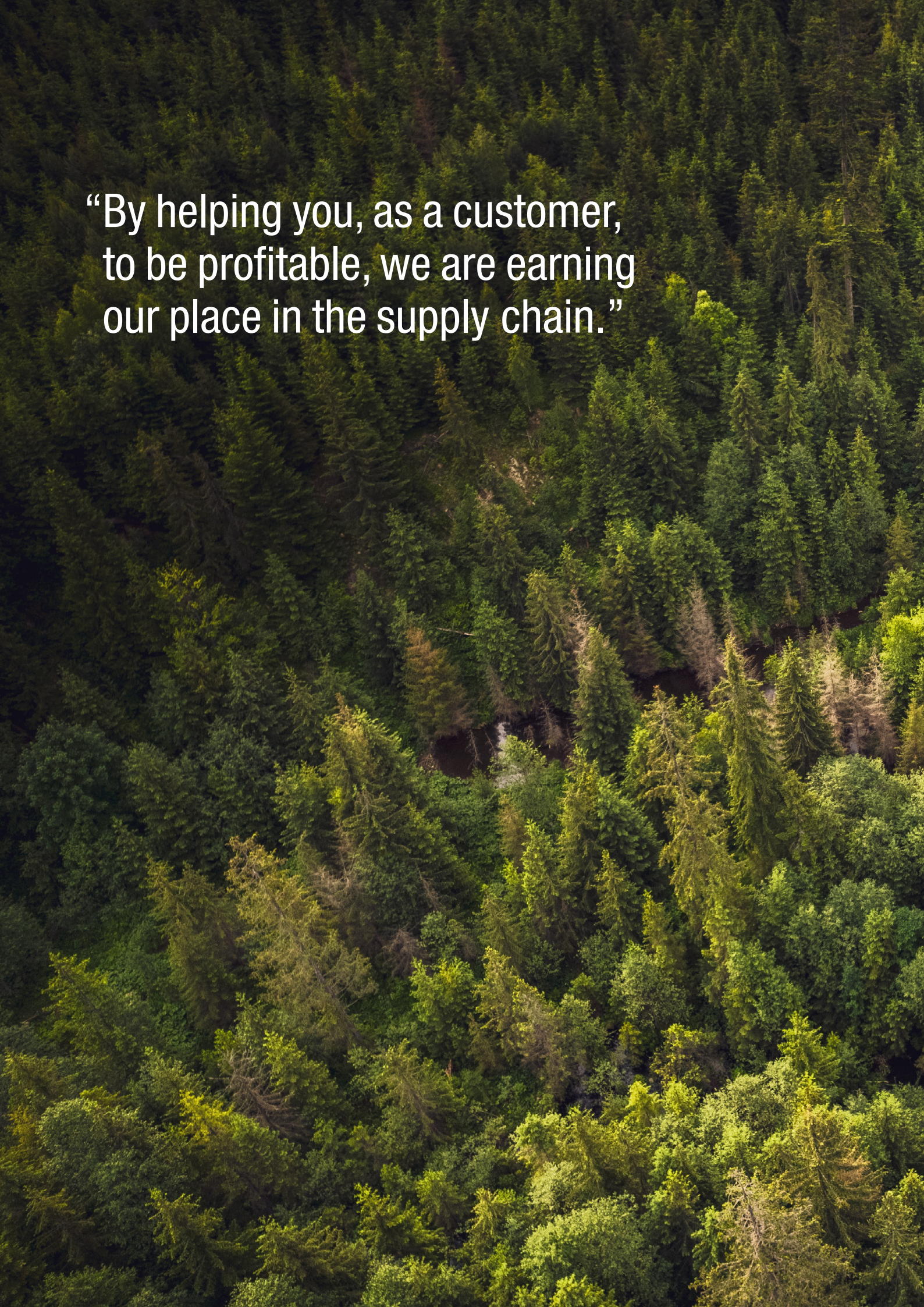


# Continuous kilns



Continuous kilns combine high capacity and economy of operation with the right drying quality.



An aerial photograph of a dense, lush green forest. The trees are tall and closely packed, with varying shades of green indicating different species or light exposure. The perspective is from directly above, looking down on the canopy. A quote is overlaid in the upper left quadrant in white text.

“By helping you, as a customer,  
to be profitable, we are earning  
our place in the supply chain.”





# Valutec is Europe's biggest supplier of lumber kilns.

## And the reason for its success?

There are, of course, many different explanations for Valutec's market successes. Factors such as our offering high quality timber kilns and control systems tailored to our customers' needs may be one reason. Another may be that we have both the expertise and the desire to drive development forwards. However, I feel that the most important reason for our success is really something more basic.

We believe in our continuous improvement and optimisation of the drying process. We are also absolutely convinced that it enables us to contribute to better timber products and the increased competitiveness of wood. In turn, this leads to increased use of wood. This is the foundation of our long-term right to exist. By helping you, as a customer, to be profitable, we are earning our place in the supply chain. It also constantly inspires us to develop new, innovative concepts.

With the above attitude as our base and with a mind that is open to customer processes and challenges, we jointly continue to take the technology to new levels. Our timber kilns and our industry-unique control systems enable you to work from the factors that are most important for each individual end product and control the drying process to achieve the desired properties. In other words, they enable you to optimise quality, capacity and energy consumption – all at the same time. This was long the ultimate goal of our development department. It is now one of the basic functions in our control systems.

In the following pages, you can read about our continuous kilns and the various possibilities they offer.

We hope that this brief brochure can serve as a basic aid when you are choosing a timber kiln.

Nonetheless, I would still recommend getting directly in touch with us at Valutec. Together, we can find the drying solution that is exactly right for your operations.

John Karbin , MD



# TC Continuous kiln







The TC kiln combines the capacity advantages of continuous kilns with the flexibility of batch kilns. The TC principle is based on feeding lumber packages length-wise through zones in which the air circulates laterally across that drying zone. Hence the name, the Swedish abbreviation for cross circulation. This enables the separate regulation of the climate in different zones in a schedule that comes very close to an ideal batch kiln schedule.

**Flexibility and high capacity.** The TC principal has created conditions for high-capacity continuous kilns with great flexibility when it comes to mixing lumber dimensions. The advantages include minimum moisture content variation and a reduced risk of checking. The TC kiln is also well suited for efficient heat recovery.

**Multiple unique solutions.** The latest models in Valutec's TC program were developed to take full advantage of the capabil-

ities of the TC principle. All of the designs, components and control systems are based on advanced technology, and in many cases solutions that are unique in lumber drying (see Technical Solutions on page 14–15).

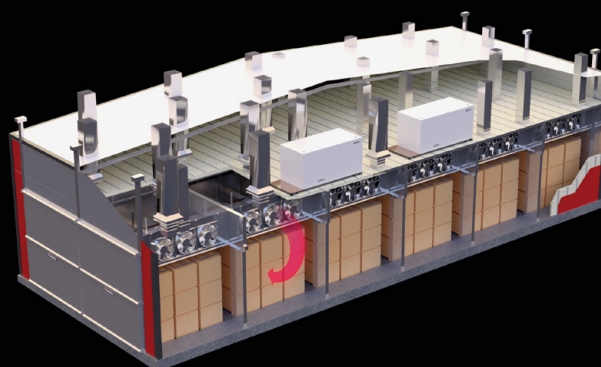
**Lumber types and capacity.** Valutec's TC kilns were specially developed for the production of boards and planks and have an annual capacity of up to 200,000 m<sup>3</sup> (85 MMBF) and a target moisture content down to approx 12–18%.

#### PRINCIPLE

The timber is dried as it indexes through a number of zones that have separate climates. Once loaded lengthways on trolleys, the timber is fed into the channel from a buffer track at the kiln's input end.

A fully automatic feed system carries the wood through the stainless steel kiln and out through its output end.

Via heat coils, laterally located axial fans blow circulation air across the channel's longitudinal direction and through the wood. The system is also equipped with automated doors at entrance and exit.





# 2-zone (FB) Continuous kiln







Drying takes place in two separate zones in the 2-zone continuous kiln. This type of kiln is also known as FB (Feedback), as the climate in zone 2 is fed back to zone 1, where general ventilation takes place.

#### Advantages of this kiln type

2-zone kilns offer both improved quality and greater capacity. In principal, the first zone acts like a short 1-zone continuous kiln where the air is humidified more quickly. This reduces surface drying and thus the risk of checks at the input end. The second zone acts as a balancing zone to reduce moisture content variation.

#### Capacity and drying economy

By collaborating closely with researchers and customers, we have developed 2-zone models that ensure the optimum use of capacity and the very best drying economy. To their ad-

vantage, the kilns can also be equipped with a heat recovery system. Everything from the building's structure to technical solutions and the control system is based on a combination of expertise, experience and advanced international research (see Technical Solutions on page 14-15).

#### Lumber types and capacity

Valutec's 2-zone kilns were especially developed for small-dimension lumber and center lumber and have an annual capacity of up to 100,000 m<sup>3</sup> (42.5 MMBF) and a target moisture content down to approx 8–18%.

#### PRINCIPLE

The timber is dried during transport through the various climates in a drying channel that has 2 separate zones. Once loaded on trolleys, the timber is fed into the channel from a buffer track at the kiln's input end.

A fully automatic feed system carries the wood through the stainless steel kiln and out through its output end. Via heat coils, axial fans in each zone blow circulation air through the timber.

In the first zone, the air is blown in the opposite direction to timber travel. In the second zone, it is blown in the same direction as timber travel.





# OTC Continuous kiln



## HASSLACHER, SACHSENBURG

Start-up:	2016
Capacity:	Approx. 80,000 m³/year 34 MMBF/year





The OTC model (optimized two-stage continuous) is a patented solution developed to create a climate profile that resembles a batch kiln's drying schedule.

The blowing direction is opposite to that of the conventional 2-zone FB model.

**Larger dimensions.** The solution has enabled the development of a continuous kiln that minimizes the risk of checking in larger dimensions. The combination of the continuous kiln's high capacity and the batch kiln's high quality provides a kiln that also manages rapid drying to a low final moisture content. The kilns can advantageously be equipped with a heat recovery system.

**Unique in the market.** OTC continuous kilns are a good example of Valutec's ambition and long-term investments aimed at putting new ideas and opportunities from the cutting edge of

research to good use. Valutec introduced the OTC principle to the market, which combined with smart technical detail solutions, has resulted in a unique product concept that meets all of the high standards we demand of our products (see Technical Solutions on page 14–15).

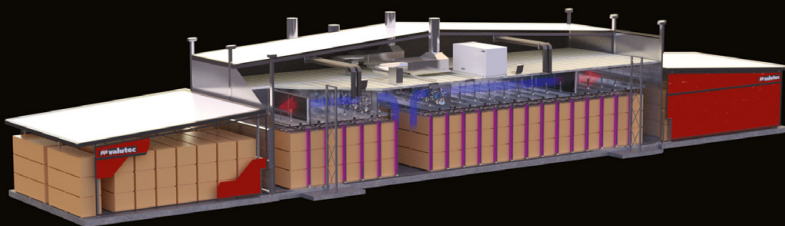
**Lumber types and capacity.** Valutec's OTC kilns were developed for boards and planks and have an annual capacity of up to 100,000 m<sup>3</sup> (42.5 MMBF) and a target moisture content down to approx 8–18%.

#### PRINCIPLE

The timber is dried during transport through the various climates in a drying channel that has 2 separate zones. Once loaded on trolleys, the timber is fed into the channel from a buffer track at the kiln's input end.

A fully automatic feed system carries the wood through the stainless steel kiln and out through its output end. Via heat coils, axial fans in each zone blow circulation air through the timber.

In the first zone, the air is blown in the direction of timber travel. In the second zone, it is blown in the opposite direction to timber travel.





# 3-zone Continuous kiln







Our 3-zone continuous kilns add a further zone to the two found in our FB and OTC models. This zone has its own climate and is operated purely as a conditioning zone. This makes it possible to achieve better quality, even at really high capacities.

**Advantages of this kiln type.** A third zone opens the possibility of using continuous kilns for drying to low moisture contents. Previously, this was something usually reserved for batch kilns. The conditioning zone is equipped with fans, heat coils, pressure frames, spraying/steaming equipment and its own ventilation. A door is installed between the conditioning zone and zone 2. Consequently, the conditioning zone's climate can be regulated separately from that in the rest of the stainless steel kiln. Normally, the zone has two stations. Depending on loading intervals, this gives a conditioning time of 4 – 8 hours (see Technical solutions, pages 14 – 15).

**Timber types and capacity.** As both FB and OTC models can be equipped with a conditioning zone, capacity can be up to 100,000 m<sup>3</sup> (43 MMBF). All dimensions can suitably be handled and target moisture content can be down to around 8 – 18%.

#### PRINCIPLE

After standard drying, the timber arrives at a conditioning zone. Here, the climate is set to reduce the stresses in the timber. Via heat coils, axial fans blow circulation air through the timber. To achieve the best equalisation of moisture content, the air direction is reversed.



Valutec has a long list of high-class references.  
Click to see more.

You can also visit [www.valutec.ca](http://www.valutec.ca).



# A sustainable choice. From design to operation.

One of the best ways of supporting sustainable development is to use more wood. Valutec enables the increased use of wood, as its lumber kilns and control system fully exploit the raw material's value. The design of the system is planned to achieve the smart, sustainable use of resources.

## **Energy efficiency**

Energy efficient lumber drying solutions are under constant development at Valutec. This includes e.g. well-insulated kilns, heat recovery and many energy-saving functions in the company's Valmatics 4.0 control system.

## **Sustainable materials and components**

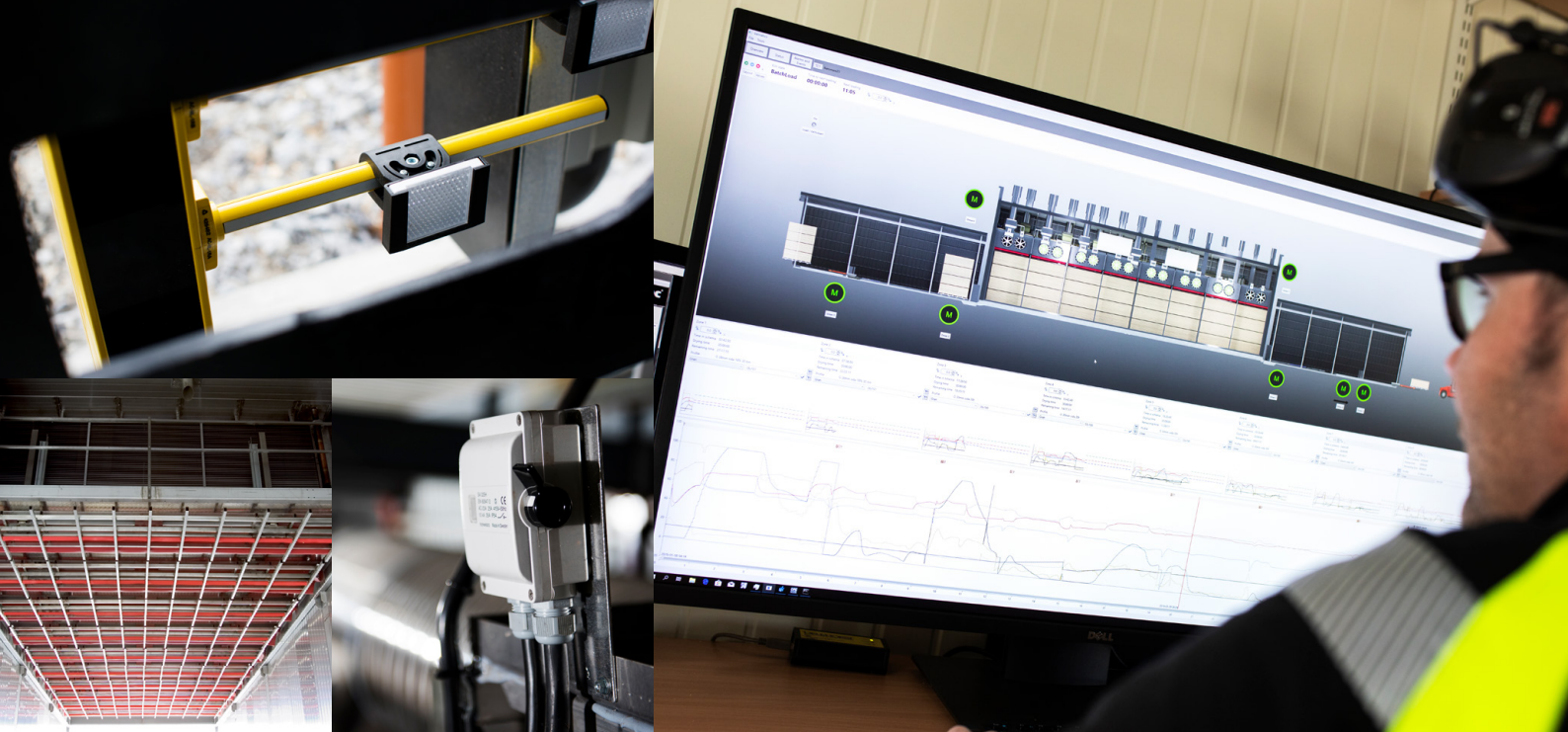
Valutec kilns are built in stainless steel to maximize lifetime and minimize CO<sub>2</sub> emissions. Thanks to our well-designed kilns, heat recovery and smart control systems, Valutec offers a more sustainable drying process with minimal energy consumption and maximum value yields.











# Solutions at the cutting edge of technology. **In every detail.**

**Valmatics 4.0** is the only control system on the market that provides sawmills around the world with tools to automate and optimize drying in every type of lumber kiln. The system, which was developed for Industry 4.0, has a modern, intuitive user interface and is constantly being developed using the latest lumber drying technology. The high quality of the process is ensured by simulators programmed with data from hundreds of thousands of measurements to enable the calculation of drying processes with unbeatable accuracy from beginning to end.

Valmatics 4.0 is also the only control system on the market to combine simulator technology with adaptive control, enabling the optimization of capacity, quality and energy consumption. Simultaneously.

## **Stainless steel unit construction**

- All kilns are built using Valutec's stainless steel construction system, an FEM calculated design in 2–10 mm steel.
- Prefabricated modules with minimal welding.
- Static joints with screw joints and silicone seals.
- Resistant to heat expansion and fatigue.
- No need for assembly welding.
- Great protection against instability and fractures.

## **Efficient motors**

Synchronous reluctance motors are standard in Valutec's continuous kilns. The motors have an efficiency standard of IE5, three levels above IE2, which is the current EU standard. This ensures energy efficiency and minimizes CO<sub>2</sub> emissions. Energy savings can reach up to 25 percent, and because the bearings are permanently lubricated, they maintain a 10–20°C lower temperature, resulting in motors with service lives up to four times longer than motors with an IE2 rating.

## **Doors**

- Robust doors made of aluminum or stainless steel.
- Same elements and joints as the building system.
- Mineral wool insulation and profiled covers with good insulation against heat and noise.
- The elements are held together by an outer frame with a sealing strip.
- Bearing pins provide effective locking to the door frame's sealing surface.
- Door lift with electric vertical wire winch.

## **Fans**

- Axial fans optimized based on operating conditions for maximum efficiency.
- Adjustable or fixed blades.
- For operating temperatures above 90 °C (195 °F), we supply motors with air cooling.
- An external cooling fan provides cooling air for each motor.

## **Baffles**

- For sealing around the lumber load to prevent energy leakage and unnecessary moisture content variation.
- Fixed side and roof baffles with EPDM rubber or polyamide wire cloth.
- Adjustable side baffles with manual operation.
- Roof baffles integrated with pressure frames.

## **Lumber feed**

- Package feeder system with stable lumber trolleys and hooked bar feeder function with motor external to kiln.
- Fully automatic feeder system at the input and output buffers.

## **Pressure frames**

- For minimal deformation of top layers.
- Stable, stainless steel guided load frames allows permanently mounted cylinders and fully tiltable frames with no risk of jamming.
- Holds up to one metric ton per cylinder.
- Stainless steel piston rods with Viton seals, stainless steel pipes and connections.
- Also available in a scissors design for integration into existing kilns.

## **Security solutions**

- Light beams at input and output of buffer and loading zone.
- Safety switches at all wicket doors.
- Hatch doors, operable from inside and outside.



# A complete range of continuous kilns.

## Brief specifications.

○ passes  
● recommendation

CHARACTERISTICS	TC	2-ZONE	OTC	3-ZONE
Boards	●	●	●	●
Planks	○	●	●	●
Online dimension changes	●	○	○	○
Mixed dimensions (mm)	16–50	16–63	16–75	16–75
Low final moisture content	●	●	●	●
Minimal checking (planks)	●	●	●	●
Minimal moisture content variation	●	○	○	●

TECHNICAL DATA				
Max kiln temperature	90 °C (194 °F)			
Annual capacity (m³)	40,000–200,000	25,000–100,000	25,000–100,000	25,000–100,000
Annual capacity MMBF	17–85	10.5–42	10.5–42	10.5–42
Building Material	Stainless steel			
Heat transmit. coeff. (W/m² °C)	< 0.30			
Door system	Vertical doors			
Air seal/flaps	Fixed wall and roof flaps integrated in pressure frames			
Feeding system	Fully automatic			
Fans	2–4 axial fans/zone			
Air velocity (m/s)	2–4	3–6	3–6	3–6
Supply/exhaust air	Mechanical evacuation			
Evacuation flow (m³/h)	10,000–50,000			
Heat recovery	Air/air or air/fluid			
Control system	Valmatics 4.0			
Heating coil	Lamella heating coils, Valutec special			
Spraying/steaming system	High-pressure hot water or steam			



**SWEDEN**

Valutec AB  
Box 709  
SE-931 27 Skellefteå  
SWEDEN

Phone +46 (0)910 879 50  
Fax +46 (0)910 879 59

valutec@valutec.se  
www.valutec.se

**FINLAND**

Valutec Oy  
Tehdaskylänkatu 11 A  
FI-11710 Riihimäki  
FINLAND

Phone +358 75 756 1401  
Fax +358 (0)19 760 4440

valutec@valutec.fi  
www.valutec.fi

**NORTH AMERICA**

Valutec AB  
PO Box 447  
East Longmeadow  
MA 01028  
USA

Phone +1 413-246-2881

robert.weithofer@valutec.se  
www.valutec.ca



With nearly 100 years in the industry Valutec has developed drying equipment for the sawmill industry. Over the years we have delivered more than 4 000 wood dryers to customers all around the world. Valutec is Europe's largest supplier of wood dryers.

Valutec has established an extensive program for research and development. Close collaboration with leading researchers has resulted in continuous kiln dryers and batch kiln dryers which today are market leaders in terms of both quality and total economy. Additionally, Valutec's development of control system and simulator technology has resulted in value-adding solutions, making it possible to seize the full value of the raw material.

The Valutec Group AB includes Valutec AB, Skellefteå and Valutec Oy in Riihimäki, Finland. Collectively, the Group has a complete range of products based on Swedish and Finnish expertise in wood drying.