Batch kilns

valutec®
Good for Wood


“Enabling increased use
of wood is the very reason
for our existence.”

Photo: Martinsons, Jonas Westling

Valutec is Europe's leading supplier of timber kilns. Why?

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 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. Examples of this include our timber kilns and our industry-unique control systems. They 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 batch 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, CEO Valutec

Forklift-fed
Batch kiln

STORA ENSO, GRUVÖN	
Start-up:	2020
Capacity:	Approx. 12,500 m^3/kiln 5 MMBF/kiln

Photo: Martinsons. Jonas Westling

Just as all our other batch kilns, the forklift-fed batch kiln ensures precise control of the climate throughout the entire drying process. This opens the possibility of drying that, with minimum risk of checking, takes the timber all the way to exactly the desired target moisture content.

Flexibility and quality. This type of kiln gives great flexibility as regards type of wood and dimensions. A forklift-fed batch kiln requires relatively little space and is a good choice where achieving the desired quality at the lowest investment cost is a major requirement. Combined with our market-leading control systems, our batch kilns provide the right conditions for satisfying ever stricter requirements in respect of processing quality and customisation.

Control with great choice. With drying requirement as the starting point, we offer the following choices: schedule control, model control, power control, adaptive simulator control and adaptive temperature drop control. To these can be added Valutec's leading simulator technology. This has in-built intelligence that, in a simple and user-friendly way, radically shortens the time necessary for optimising a drying process.

Based on industry-leading R & D. The drying facility is built in stainless steel and air circulation is controlled by axial fans. All sensitive equipment is located in the building's ventilated "cold attic". Leading research and development, both Nordic and international, is the basis of all our design solutions (see Technical solutions, pages 10 – 11). Kilns can advantageously be fitted with heat recovery systems.

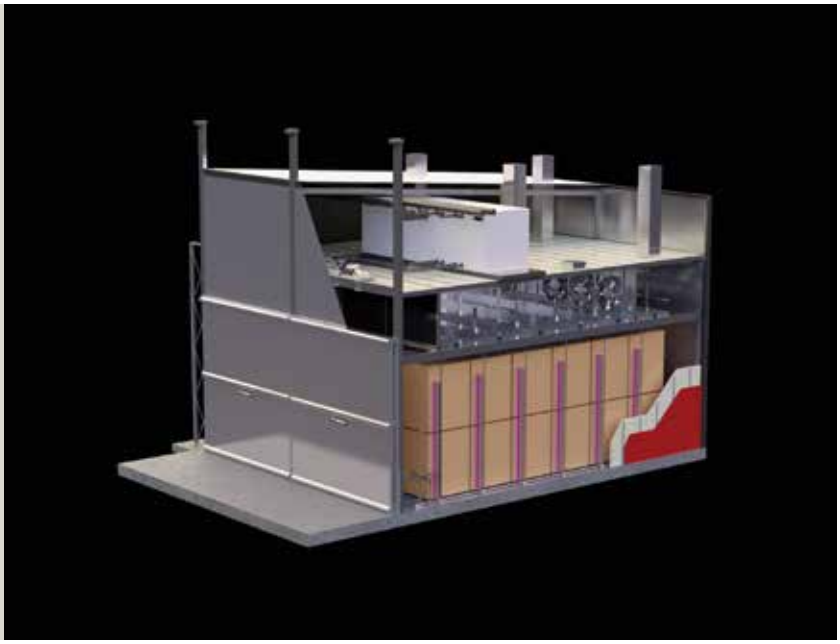
Volume and target moisture content. Valutec's forklift-fed batch kilns are particularly adapted for planks, but can also be used for boards. Batch volume can vary from 50 to 450 m^3 (21–190 MBF) and target moisture content from 5 – 20%.

PRINCIP

Forklift trucks load and unload the kiln from a single side. Axial fans located on a deck above the timber
load blow circulation air between the piles (in the timber's longitudinal direction).

Lamella-type heat coils give maximum heat transfer. After initial equalisation of moisture content,
the heating level is adapted to how the moisture content is changing.

Making use of the pressure difference, the moist air is evacuated via two ducts on either side of the load.



E-trolley fed
Batch kiln

HÅLLANDERS, DALSTORP	
Start-up:	2005
Capacity:	Approx. 10,000 –20,000 m^3/kiln 4–8 MMBF/kiln

Photo: Christina Brandin Englund, Svenskt Trä

E-trolley feeding is a good choice if large batch volume and high productivity are a major priority. Because loading and unloading are in the kiln's longitudinal direction, a large number of kilns can be placed side by side. Loading the timber outside the kiln minimises pulling time.

Flexibility and exact control. Batch kilns give great flexibility as regards type of wood and dimensions. Exact control of the climate throughout the drying process provides optimum conditions for satisfying all requirements in respect of high processing quality and customisation. This type of kiln delivers drying right down to the target moisture content and minimises the risk of checking.

Building system and fans. The drying facility is normally built in stainless steel and air circulation is controlled by axial fans. All sensitive equipment is located in the building's ventilated "cold attic". Leading research and development, both Nordic and international, is the basis of all our design solutions (see Technical solutions, pages 10 – 11). Kilns can advantageously be fitted with heat recovery systems.

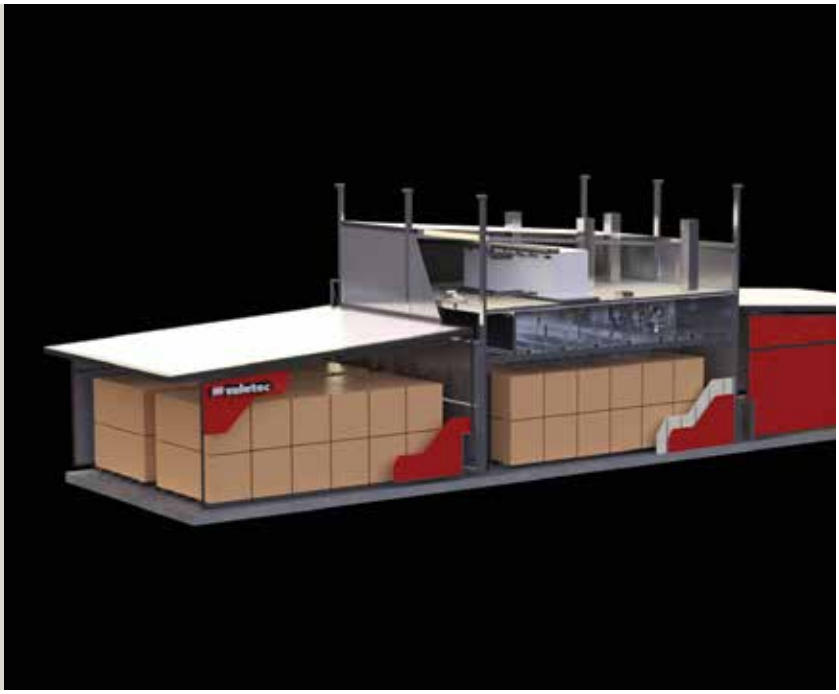
Volume and target moisture content. Valutec's e-trolley fed batch kilns are particularly adapted for planks, but can also be used for boards. Batch volume can vary from 50 to 450 m^3 (21 – 190 MBF) and target moisture content from 5 – 20%.

PRINCIP

E-trolleys are brought into the kiln by feeders. The kiln is also available with equipment for automatic loading. Axial fans located on a deck above the timber load blow circulation air between the piles (in the timber's longitudinal direction).

Lamella-type heat coils give maximum heat transfer. After initial equalisation of moisture content, the heating level is adapted to how the moisture content is changing.

Making use of the pressure difference, the moist air is evacuated via two ducts on either side of the load.



High-temperature kiln

IMPREGNA	
Start-up:	2001
Capacity:	Approx. 15,000 m³/kiln 6 MMBF/kiln

Photo: Martinsons, Jonas Westling

When requirements in respect of moisture content variation and the final quality of the timber permit, an alternative drying method that offers extremely high productivity can also be chosen. Drying in a high-temperature kiln is considerably faster than in other timber kilns. To give just one example, the drying time for 50 mm timber is around 24 hours. With drying temperatures up to 140°C (285°F), water is vaporised through boiling and thus dissipates more quickly than in ordinary drying.

Building system and fans. To withstand the high temperatures, steam pressure and evaporation rate, the drying facility is built in well-insulated steamtight stainless steel. All sensitive equipment is located in the building's ventilated "cold attic". The sturdily housed fan motors are air-cooled. Furthermore, the kiln has a loading/unloading solution for streamlined pulling – timber is loaded onto trolleys that are fed in via a rail-based system.

Control of drying. Drying is primarily controlled by regulating the heat input and selecting a drying temperature. This means that evaporation can be controlled to achieve the desired final results. In the final phase of drying, the process can also be controlled via hygrometric differences.

Moisture equalisation through conditioning. After drying in a high-temperature kiln, timber has a relatively large moisture gradient. The surfaces are dry and the centre relatively moist. There is compression stress at the surface and tensile stress in the centre. When drying has finished, these differences are equalised through conditioning. Because of the short drying time, the air-blow depth in a high-temperature kiln should not be more than 4 metres. This allows two normal-size timber packages to be dried side by side.

Volume and target moisture content. Valutec's high-temperature kilns are particularly adapted for planks and poles, but can also be used for boards.

PRINCIP

The timber is dried through water vaporisation induced by boiling in an environment with temperatures of 100°C (212°F) and above.

The timber is loaded onto trolleys that are then either pushed or pulled on rails into the kiln. Via fans, air is blown through the timber in the direction that is opposite to that of transport. Spraying with saturated steam ensures rapid heating.

The moisture gradient (dry surfaces and a relatively moist centre) is equalised by conditioning.

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_2 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 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_2 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.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ways of supporting
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Batch kilns.
Brief specifications.

○ Possibly
● Yes

	BATCH KILNS		HIGH-TEMP KILNS
PROPERTIES	Forklift-fed	E-trolley fed	Trolley fed
Boards	●	●	○
Planks	●	●	●
Minimal space	●		
Large batch volume	●	●	○
High availability/short pulling time		●	●
Minimal checking	●	●	○
Minimum moisture content variation	●	●	○

TECHNICAL DATA		
Max. kiln temperature (°C)	90 or 120°C, 194 or 248°F	140°C, 284°F
Batch volume (m^3) Batch volume (MBF)	50–450 21–190	<400 <169
Target moisture content (%)	5–20	
Construction material	Stainless steel	
Heat transmit. coeff. (W/m^2 °C)	<0,30	
Door system	Vertical doors	
Air sealing/flaps	Wire cloth	
Superimposed loading	Pneumatic pressure frames	
Fans, number	2–4	2–15
Air speed (m/s)	4–6	
Spraying/steaming system	High pressure hot water or steam	
Control system	Valmatics 4.0	
Heating media	Hot water or steam	

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valutec®
Good for Wood

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.