

THERMAL SYSTEMS

# Alteco – Vertical drying system

Maximum performance in minimum space with equipment from Rehm



Alteco  
Drying | Hardening



# Drying | Hardening

High quality and reliable  
function of electronics

## Hardening of coated printed circuit boards vertically with minimal space required

**Air bags in cars can save lives, headlights ensure a safe trip day and night, the on-board computer and the sensor system in a plane determine reliable measurement figures for flight guidance even at an altitude of 10,000 metres and a simple traffic light switching system regulates traffic in all weathers. Behind each of these functions lie highly complex electronic sub-assemblies and connections.**

In order to ensure the reliability of these sensitive electronic sub-assemblies even in difficult environmental conditions, a coat of paint is applied to the printed circuit board and then dried in a special drying system. The coating protects the electronics from damage due to corrosion or other environmental influences such as moisture, chemicals and dust. It increases the lifetime and quality of the product many times over. Alternatively, complete sub-assemblies are cast and encapsulated.

For this area of application, Rehm Thermal Systems provides innovative drying and hardening procedures that meet every requirement. The latest development is a vertical drying system which offers maximum performance with minimal space required. All industries which implement painting processes and process sensitive sub-assemblies with a protective paint coating can benefit from this system.

# Uncompromising modern process with the new Alteco from Rehm

The Rehm Vertical Drying System Alteco not only offers ideal drying and hardening processes, it is also extremely compact and space-saving thanks to its design. As a result of the vertical transport, the Alteco replaces, with a system length of only around 4 m, a comparable 40 m long horizontal furnace. With the innovative system design, you can save valuable space in your production hall.

Two transport variants are available for the vertical dryer:

1. fixed transport width, where the circulating goods carriers are set to a fixed measurement
2. flexible transport width, where the transport by means of circulating goods carriers is automatically set to the respective circuit board size

Several painting lines can thus feed different products with different circuit board transport widths in the mix to the Alteco. With the Alteco, printed circuit boards with a maximum height of 50 mm can be dried.



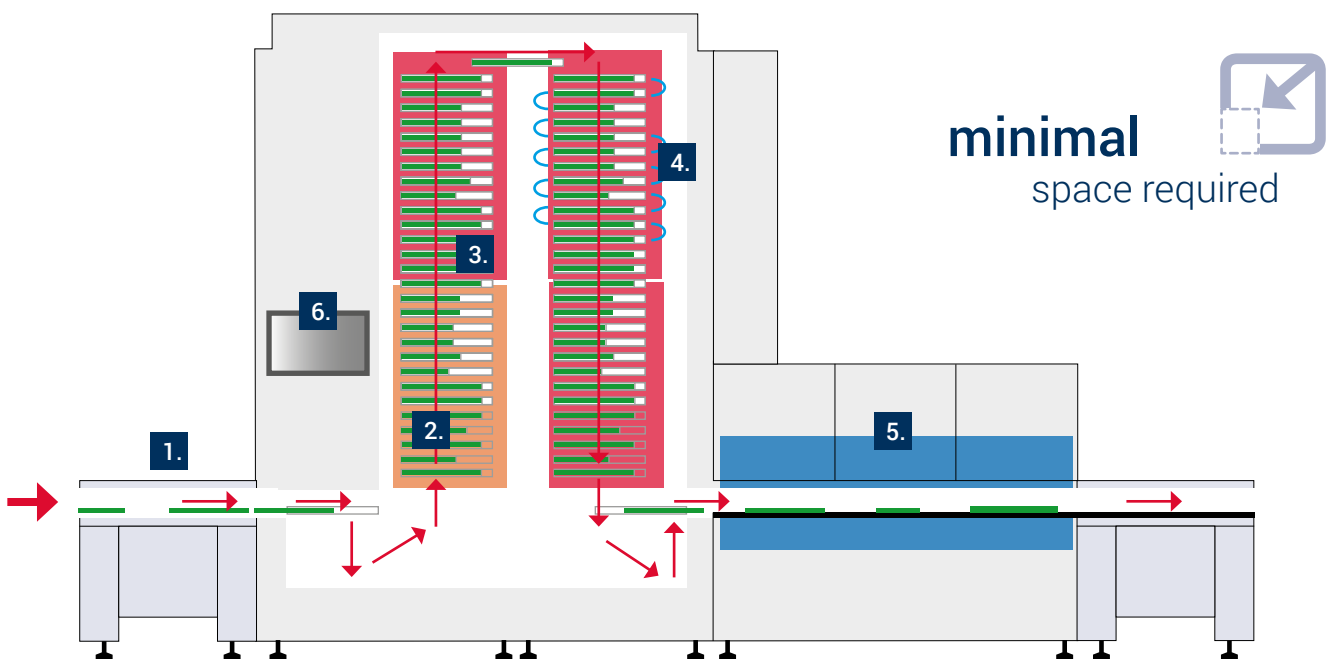
- › Saves space through vertical transport principle
- › Targeted air feed in the heating zones for reproducible temperature profiles
- › Pre-heated supply air; the volume flow can be set for each heating zone
- › Minimal heat emission due to outstanding insulation
- › The waste air volume can be adjusted depending on the heating zone
- › Downstream, segmented cooling tract
- › No thermal stress on the system mechanics due to external drive technology
- › Optimum accessibility of the system technology and easy maintenance

# Technical details

## An overview of the Alteco

The vertical drying system Alteco allows flexible, high-performance drying and hardening processes of all protective paints and casting compounds that can be hardened with convection heat. The system consists of two process towers, which are each divided into four heating zones, and a downstream,

segmented cooling tract. The circuit boards are loaded into goods carriers at the furnace infeed. These run through the drying process in the system in a vertical direction and are stacked on top of each other during the hardening process.



### 1. Infeed/loading

In the infeed area, the painted sub-assembly is handed over to the transport system via the supply belt. Sensors record the width for each circuit board. A grabber pushes the circuit board onto the goods carrier, which is previously adjusted to the width of the printed circuit board to be loaded and measured. During the loading process, each goods carrier is precisely fixed, positioned and centred. A multiple loading of the goods carrier is possible.

### 4. Air feed

The heating system in the process towers works according to the convection principle in circulating air operation. The temperature can be separately regulated in all eight heating zones. A specially developed air feed guarantees even warming of all construction elements. The supply air can be pre-heated and pre-set individually in the volume flow depending on the heating zone. The waste air volume is also separately regulated per zone. The system can thus be ideally coordinated to the volume of paint and the solvent throughput.

### 2. Circulating transport system

The sub-assembly in the goods carrier is transported through the system on a circulating goods carrier mechanism. The cycle time is adjustable. Via a cross-beam, the goods carriers are moved under the ascending tower, where they are taken over by a stroke mechanism. After running through the towers, the goods carriers are transported to the unloading station by means of a second cross-beam. The empty goods carriers are clocked into the loading station again.

### 5. Cooling tract

The downstream cooling tract consists of three transport segments that adapt automatically to the respective transport width. Cooled air is blown from above and below onto the sub-assembly per segment. Via a heat exchanger, the waste air is handed over from the internal to the external water cycle and thus transported away from the production room in an energy-efficient manner.

### 3. Clever stacking principle

The mechanics during the drying process in the process towers work according to a vertical stacking principle. The stroke mechanism stacks the goods carriers over one another. They are equipped with spacer pins so that they are securely positioned. No running chains, oils or lubricants are necessary for the entire transport. A transfer transport mechanism hands over the goods carriers at the highest point into the descending tower. The de-stacking is done in reverse order. All drives and mechanical guideways are in the cold process area, for reliable and long-lasting transport.

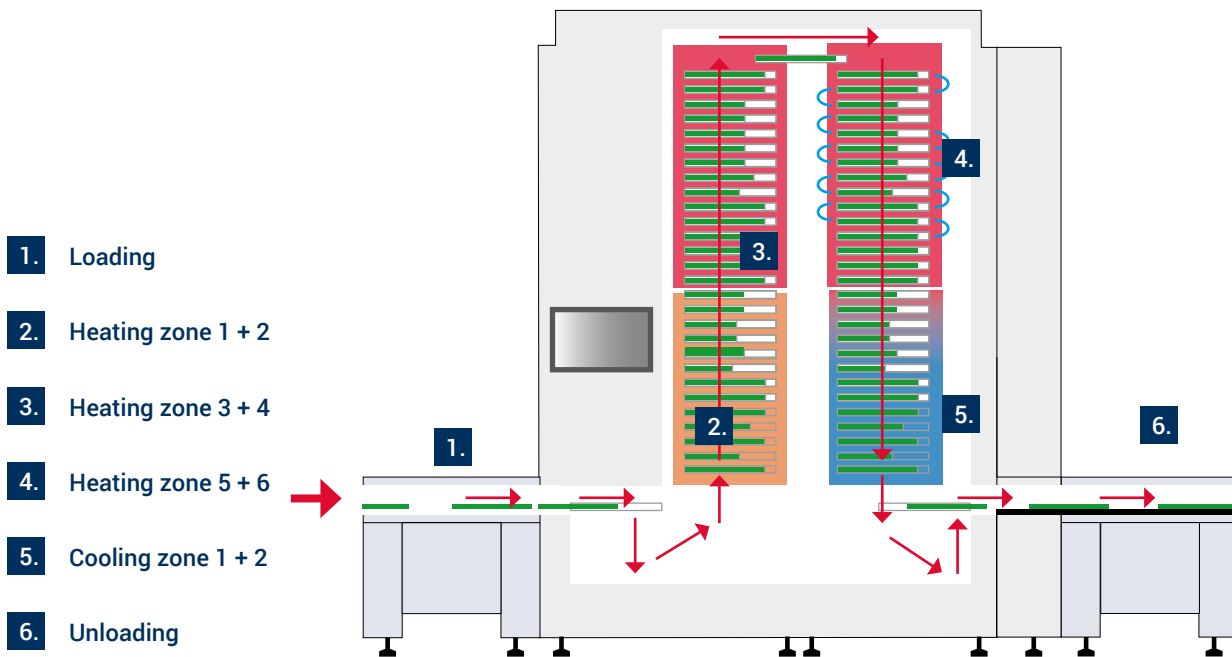
### 6. Software

The system is controlled by software via a touch interface. All relevant process parameters are documented. The width setting and the precise positioning of the goods carriers thus run fully automatically. In addition, the loading status of the goods carriers and the internal temperature of the heating zones (among other things) can be monitored. SMEMA interfaces ensure the integration of the system in each production line.

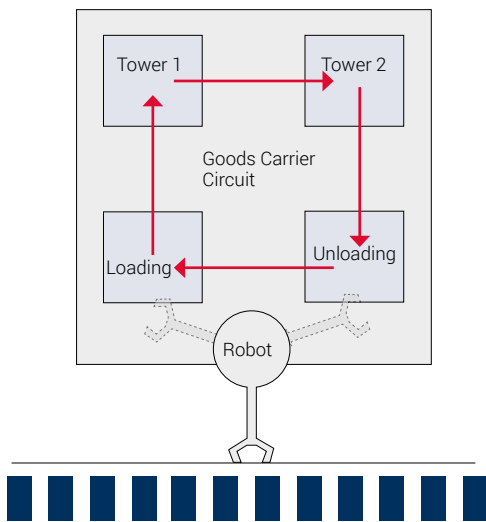
## Alteco with integrated cooling zone

The basic structure of Alteco with integrated cooling section corresponds to that of Alteco with external cooling section. Zoning within the heating towers is different, though. The first tower houses heating zones 1 to 4. The second tower houses heating zones 5 and 6 and the cooling section. This principle

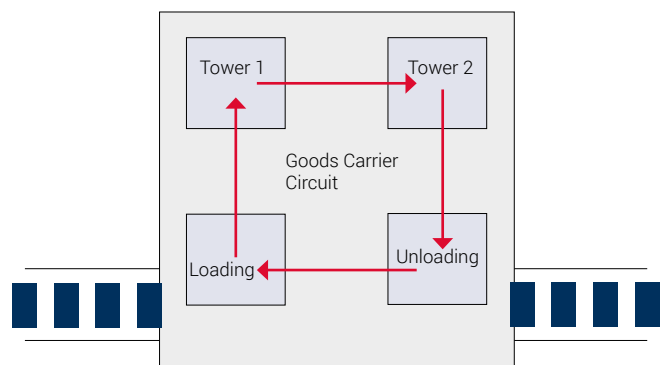
is suitable for assemblies that require shorter process throughput times due to their lower mass or are not processed directly afterwards and can therefore cool down in downstream magazines.



## Inline solutions



loading and unloading by robot



loading and unloading by transport lane, boards have to be pushed on the carrier

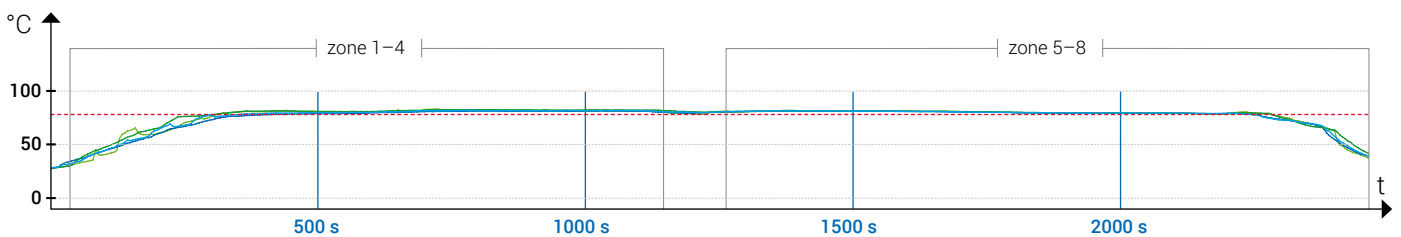


# Best profiling capability for reproducible procedures

Through the use of innovative control, blower, heating and sensor components combined with a solid machine design, Rehms supplies a high-quality system enabling you to run and log stable processes in your production operations.

Our application specialists will be pleased to help you define the optimum setting parameters for your sub-assembly production. In-house training courses and process and maintenance training courses in your production environment round off the services offered by Rehms Thermal Systems.

## Stable temperature profile



## Easy maintenance

Our Alteco is easily accessible for minimum maintenance effort. The system cladding and the doors of the process towers can be opened. The electronic switching cabinet at the back of the system with EMC-compliant, transparent design and a separate performance/control part is also freely accessible. The heat exchangers of the cooling tract can be replaced quickly and conveniently.



Freely accessible switching cabinet



Easy maintenance of the heat exchangers in the cooling tract

## Flexible loading

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Goods carrier with flexible width setting to accommodate circuit boards with different transport widths

Alteco with automatic product carrier adjustment allows simultaneous drying of two different painted boards within a single system. Different sizes, e.g. from two paint lines, can be conveyed to the oven in no particular order. The product carrier width is automatically set to the width of the product. This means that several production lines with different products can be covered by one vertical stove.

## Vertical stacking principle

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Vertical stacking principle in the process towers for receiving the goods carriers

Alteco lets goods be stacked on the product carrier form and force-locked without using chains. No lubricant is therefore needed in the transport system. The risk of steaming the assemblies with oil mist is completely eliminated.

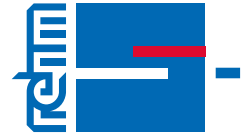
## Segmented cooling tract

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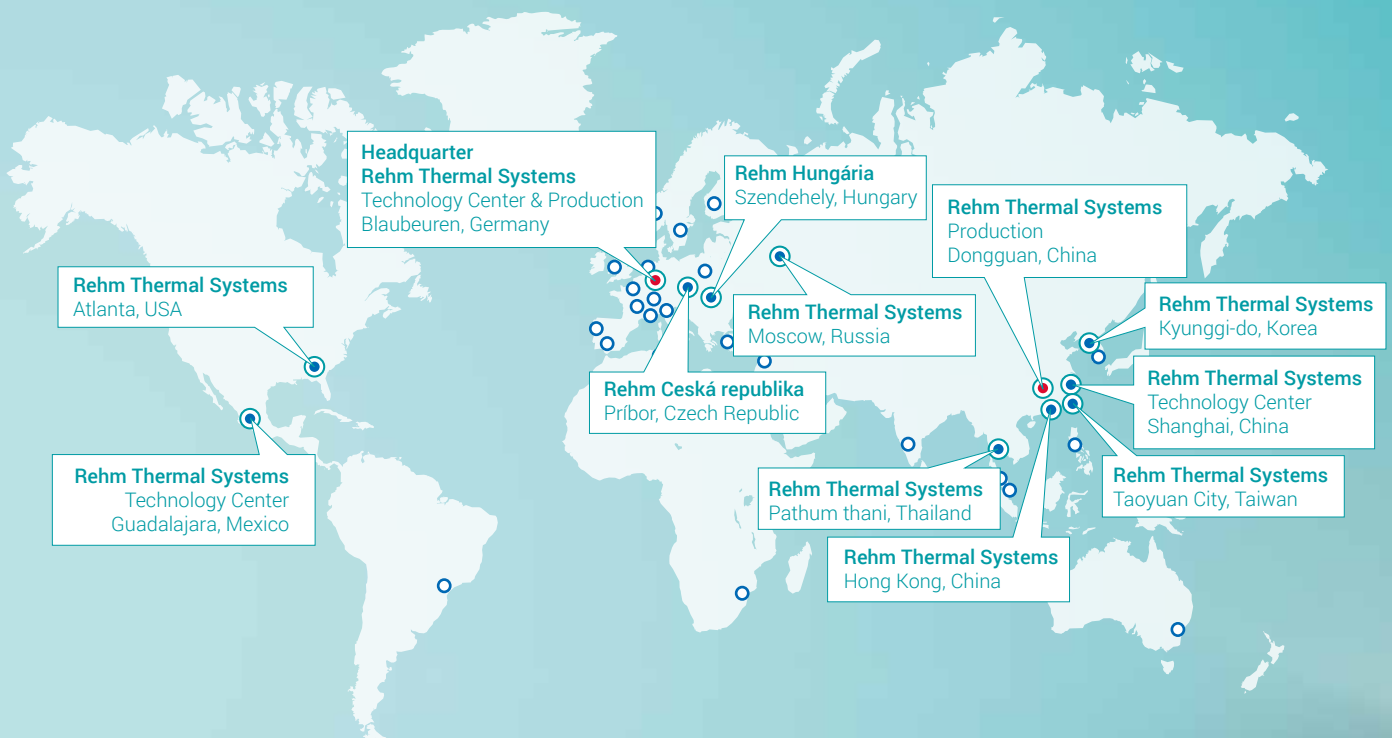


Segmented cooling tract with automatic width adjustment for each zone for the processing of different circuit board sizes

Alteco's downstream cooling section ensures the best assembly cooling. This is a cascaded, 3-part cooling section. Depending on the product range, the transport units are prepared including the downstream cooling section. This enables seamless product change. The vertical dryer or cooling section does not need emptying.



**THERMAL SYSTEMS**



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## Rehm Worldwide

As a leading manufacturer of innovative thermal system solutions we have customers on every continent. With our own locations in Europe, America and Asia as well as 27 agencies in 24 countries we are able to serve the international markets quickly and to offer outstanding on-site service – worldwide and round the clock!

- Location
- Production facility
- Representation



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