

Conveyor System for Maersk in Chile

Flexible Container Painting System with Power & Free Conveyor

As part of its investment in a new paint shop, Maersk Container Industry, a business unit of the container shipping company Maersk, decided to install a new conveyor system. A customised, flexible power & free system ensures that the process of painting heavy containers runs smoothly.

Every 15 minutes a Maersk container ship arrives at or departs from a port somewhere in the world. Maersk transports more than four million containers between Asia and Europe alone each year. The company is a worldwide group with approximately 89,000 employees, offices in around 130 countries and a revenue of 40.3 billion US dollars. Its core businesses include container shipping, oil and gas production, offshore drilling services and terminals that provide a port and an inland infrastructure. Maersk acquires the majority of its containers from Maersk Container Industry (MCI), an independent business unit within the group, which manufactures refrigerated and dry containers as well as Star Cool refrigeration units for global shipping carriers and fruit distribution companies.

In the summer of 2013, MCI decided to install a new coating line for refrigerated containers at its new factory in Chile. This included a conveyor from Caldan Conveyor Systems. The coating facility and, in particular, the conveyor system formed part of MCI's investment of 200 million US dollars in the construction of a factory covering an area of 70,000 m². Over the next few years the plant will gradually ramp up to an annual production of 40,000 refrigerated containers and refrigeration units. These are manufactured under one roof on a 330,000 m² site near the port of San Antonio.

With the help of the new coating line, where around 1000 people work, in the third quarter of 2015 MCI was able to deliver the first 12-metre-long, ISO-standard refrigerated containers

to leading shipping companies Maersk Line and CMA CGM.

Three stations in the coating process

The surface treatment facility for the containers was designed on the basis of experience from the MCI refrigerated container factory in the Chinese city of Qingdao. The newly installed coating line consists of three different systems: one for painting doors, one for painting container frames and one for applying the top coat to the complete containers.

Caldan Conveyor A/S was the contractor responsible for the conveyors in all three systems, while other Scandinavian companies were chosen to provide the painting equipment and robots. Caldan supplied the conveyors, including the complete steel structure and all the electrical and automation systems. It was also responsible for installing and commissioning the conveyors.

In the door coating systems, the container doors are separated into left-hand and right-hand components and transported on a 210-metre-long power & free system through the cleaning, coating, flash-off and infrared drying processes. The maximum load of the 60 wagons in the system, which can be accumulated either in line or at 90 degrees, is 100 kg.

On the frame coating line, the front and end frames of the containers are coated in parallel with the doors. The primer and the top coat are applied to the frames, in the same way as to the doors, in two booths with interim flash-off zones and infrared dryers.



Painted refrigerated containers from Maersk Container Industry's new factory in Chile.



Raw material and interim buffer zones are arranged in parallel on the painting line.



Raw material buffer zone for doors before they enter the painting system.



Complete containers in the flash-off/dryer zone.

A blasting system is integrated into the coating line for pre-treating the frames and a metallisation process precedes the coating stage. Both processes are carried out by robots, as are the coating processes in the booths.

The wagons on the Caldan conveyor system have to be positioned in all the zones where one of the many robots applies the coatings (on three lines). The 135 wagons in the system are designed for loads of up to 500 kg and can be accumulated either in line or at 90 degrees. This allows for large buffer zones which save space. Because of the size and weight of the components, vertical lifting stations have been installed for loading and unloading the conveyor. The overall length of the conveyor is 1200 m.

Transporting 12-meter-long containers

However, the highlight of the surface treatment centre from a conveyor perspective is the system for transporting the finished containers when the final coating is applied. This power &

free conveyor is designed for a maximum load of 4000 kg and for a container length of up to 12,200 mm. While the door and the frame coating lines are equipped with P&F400 systems, a heavy-duty P&F420 conveyor is used on the container lines. The wagons can be accumulated, but are conveyed continuously into the robot coating zones at fixed pitches.

The process on the lines for the finished containers consists of the following stages. After loading, the containers are blasted again to clean the walls and are then metallised. An interim coat is applied to the entire container and then dried before the top coat is applied. After the final drying process, the containers are transported to manual workstations for processes such as demasking and the application of logos.

Complete assembly by one supplier

The overall project was coordinated from Caldan's headquarters in Denmark and a team was specially set up to manage the project because of its size.

The individual systems were broken down into separate groups for assembly on site. A team of up to 10 specialist assembly staff from Caldan carried out and coordinated all the installation work from the earthquake-proof steel structure through to commissioning. The company also managed the electrical installations and the entire automation system including visualisation and the SCADA system.

The project began in September 2013 and was completed in February 2015. Volume production at the plant started in June 2015. Since then it has been manufacturing refrigerated containers used for transporting fruit and meat from South America to Europe and the Middle East. With an overall cost of 4 million euros and a total conveyor length of more than 2.5 km, this is Caldan's biggest international project to date. ■

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