

Ebeam Metal Coil Coating

Cleveland Steel Container Case Study

The Application

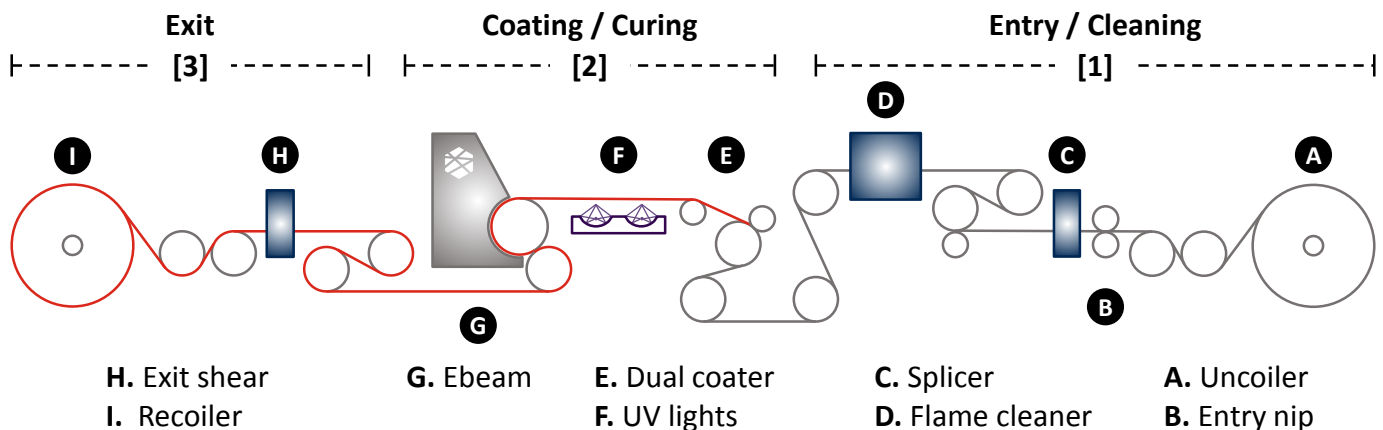
5 years ago, Cleveland Steel Container (CSC), one of the largest steel pail manufacturers in the U.S., wanted to switch from a sheet-fed coating process to a coil-fed coating process to improve efficiency. CSC used the sheet-fed coating process to coat steel that was then stamped into covers and bottoms for pails. The steel sheets needed an opaque, colored coating on the outside and a clear coating on the inside. With the sheet-fed process, speeds were limited to 18-30 m/min and only one side of the steel could be coated at a time. With a coil-fed line, faster speeds and double-sided coating would be possible. The problem? A traditional thermal-cure coil coating line would not fit in their facility.



The PCT Solution

The solution was to install one of the world's first radiation-curable coil coating lines. The compact line is just under 30 m long and has no accumulators. It features a UV station to cure the clear, inside coating and an ebeam to cure the opaque, colored coating that becomes the outside of the pail lid or bottom. The small footprint of the line is due in large part to the instantaneous curing of both ebeam and UV coatings. Additionally, ebeam is 'color blind', making it a great solution for the opaque coatings with which UV struggles.

The PCT solution for CSC was a 1370 mm wide, 150 kV beam capable of speeds up to 400 m/min. The beam operates with nitrogen inerting, a requirement for curing ebeam coatings. It features PCT's patented, integrated shield roll which simultaneously supports and cools the web, while reducing the required volume of nitrogen and providing easy access for maintenance. Specific to the needs of a metal coil line, the ebeam line can sense an incoming splice and will automatically adjust for the increased thickness. In addition to providing the ebeam, PCT supported the mechanical and electrical integration of the coil coating line.



CSC's Experience, 5 Years After Install

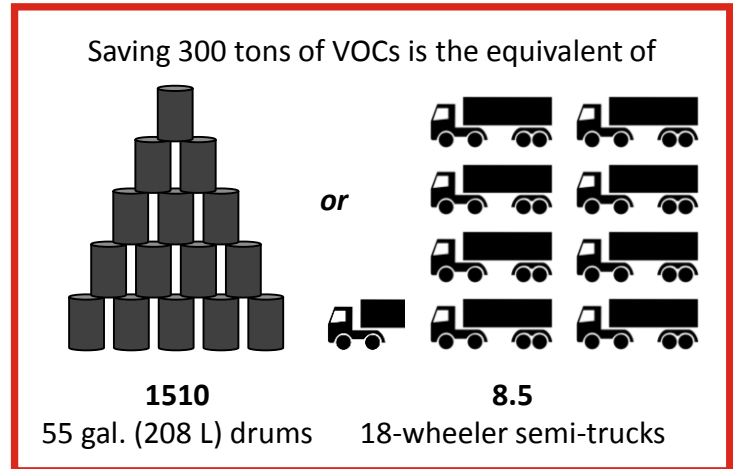
Improved Efficiency:

“The drastic improvement to internal efficiencies, *i.e.* making more product with manufacturing effort, has been calculated and is the bulk of the savings we see. The coil coating operation feeds a coil-fed press, which is much faster than the older traditional [sheet-fed] method. The new operation is estimated to be **4 to 6 times more efficient** than the traditional method. This has reduced overtime and increased production capabilities across the board as resources are easier to plan for customer needs.” – Will Parish, CSC



Improved Sustainability:

“The ebeam uses 100% solids coatings instead of the low solids (~40% solids) we use for traditional thermal cure (>350°F / 177°C) coatings. This has eliminated nearly **300 tons of VOC emissions** we would have had to destruct in our thermal oxidizers. Additionally, the energy requirements are much lower than heating a natural gas oven to >350°F to cure traditional coatings, and the line has much lower regulatory burdens with the state or federal EPA (Environmental Protection Agency). The reduction in VOCs and the resultant byproducts of combustion have improved our carbon footprint.”



Ebeam Performance:

- Usage: “The ebeam runs 3-4 days per week, as we estimated when evaluating it.”
- Nitrogen consumption: “Quite frankly, we don’t even measure it. Yes, we use it, but it is minimal in cost compared to other factors in our process.”
- Maintenance: “Maintenance is one aspect which we do struggle with. The service life of consumable items, such as foils, and filaments can be short. When these need replaced, there are several hours of downtime.”

Overall Experience:

“We would never have been able to install a coil coating line in our current facility without the ebeam. It would have required a new addition or facility. The ability to coil coat and cure our steel has driven performance and efficiencies in our process.

Our impression of ebeam before was one of skepticism. The technology was not used in the rigid packaging world. Although we were familiar with UV-cure technology, we were totally unsure of how it would work. After 5 years, we are pleased with the performance but also understand some of its limitations due to its novel chemistry and lack of widespread commercial interest of suppliers.”

Would you recommend other companies check to see if ebeam is right for their process lines?

“Yes.”



Cleveland Steel Container

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