

Knovel®

CHEMICAL MANUFACTURING

## Solution Story: Specialty Chemical Company

### Turning an Unprofitable Product into a Profitable Product



#### Summary

A process engineer was tasked with enhancing the manufacturing process and reducing the production costs of an unprofitable product. The engineer determined that modifying the stripping process would be the best solution. Using Knovel, the engineer found key substance property data all in one location and equations to solve for overall facility energy needs. The result made the product profitable and reduced cycle time by 32 percent.

**“We were able not only to produce more of the solvent, but to add new products to our unit’s production line as well.”**

—Jorge Martin\*, Process Engineer



## Turning an Unprofitable Product into a Profitable Product

### Challenge

#### Optimizing the Stripping Process

A process engineer at a company that makes a solvent for the Agriculture and Herbicide markets wanted to lower the product’s costs. His goal was to improve the chemical process to reduce both manufacturing cycle time and plant energy costs.

“When I arrived at the company, the unit was operating inefficiently. Making the product was taking too long and required too much energy, resulting in high manufacturing costs,” process engineer Jorge Martin\* explains. “The product had a negative margin, and we were losing money on every kilogram of product manufactured. Our conversion costs were out of control, causing our profit margin to disappear.”

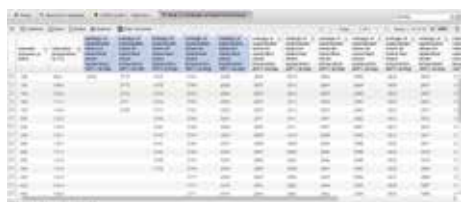
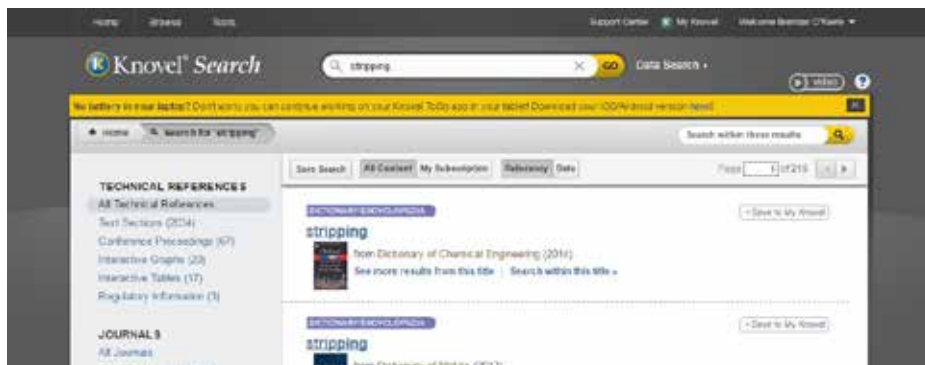
Martin identified the stripping process as the key step to reduce energy costs. Stripping is a physical separation process where one or more components are removed from a liquid stream by a vapor stream. In industrial applications, the

liquid and vapor streams can have co-current or countercurrent flows. Stripping is usually carried out in either a packed or trayed column within a chemical manufacturing plant.

To optimize the stripping process he knew he would have to calculate the enthalpy of the pure and mix components in the solvent, as well as the plant’s heat capacity. These calculations would offer him critical insight into how to produce steam more efficiently and how to reduce waste steam energy costs.

The company’s product had also been losing market share to competing products, and its negative margin had attracted the attention of management. If Martin could not find a way to optimize the manufacturing process and reduce production costs, the company would likely stop making the product. This was Martin’s opportunity to identify a strategy to turn an unprofitable product into a profitable product.

\*Names have been changed to protect rights to innovation



**Solution**

**Technical Reference Information, Data and Solutions All in One Place**

Martin used Knovel to find data on the key substances used in his unit’s stripping process.

“Using Knovel’s search feature, I quickly found many references to the information I was seeking,” Martin said. “It was much easier to locate the enthalpy data for ethanol, isobutanol and water than by searching through Perry’s Chemical Engineers’ Handbook or another book. Knovel provided the data, and the interactive equations allowed me to make the feasibility calculations quickly.”

In addition, Martin explained that “the workflow continuation of Knovel allowed me to search for the enthalpy properties, define the best options for my plant and calculate the overall energy needs of the facility within one continuous action.”

**Business Impact**

**Reducing Cycle Time, Lowering Costs and Generating Profits**

Knovel enabled the process engineer to identify the best methods for reducing the solvent’s cycle time and optimizing the plant’s total energy costs. By modifying the stripping process, Martin succeeded in reducing cycle time by 32 percent (from 103 to 69.9 hours).

This significant reduction in cycle time enabled Martin to reduce conversion costs, thereby improving the overall manufacturing process and reducing the product’s standard cost by 23 percent. The lower standard cost gave the company’s sales team more flexibility in negotiating prices with customers. Sales increased, and the company maintained its competitive footprint in its space.

The solvent started to generate profits, so the company did not discontinue the product. “But the improved cycle time also increased the plant’s overall productivity,” Martin said. “We were able not only to produce more of the solvent, but to add new products to our unit’s production line as well.” As a result, the plant’s asset utilization improved from the high-30 percents to the low-70 percents.

Knovel saved Martin time and effort in finding the data he needed to improve the plant’s efficiency. His successful modifications to the stripping process enabled his company to save a product at risk of being rationalized and allowed the plant to produce additional products for the company’s portfolio.

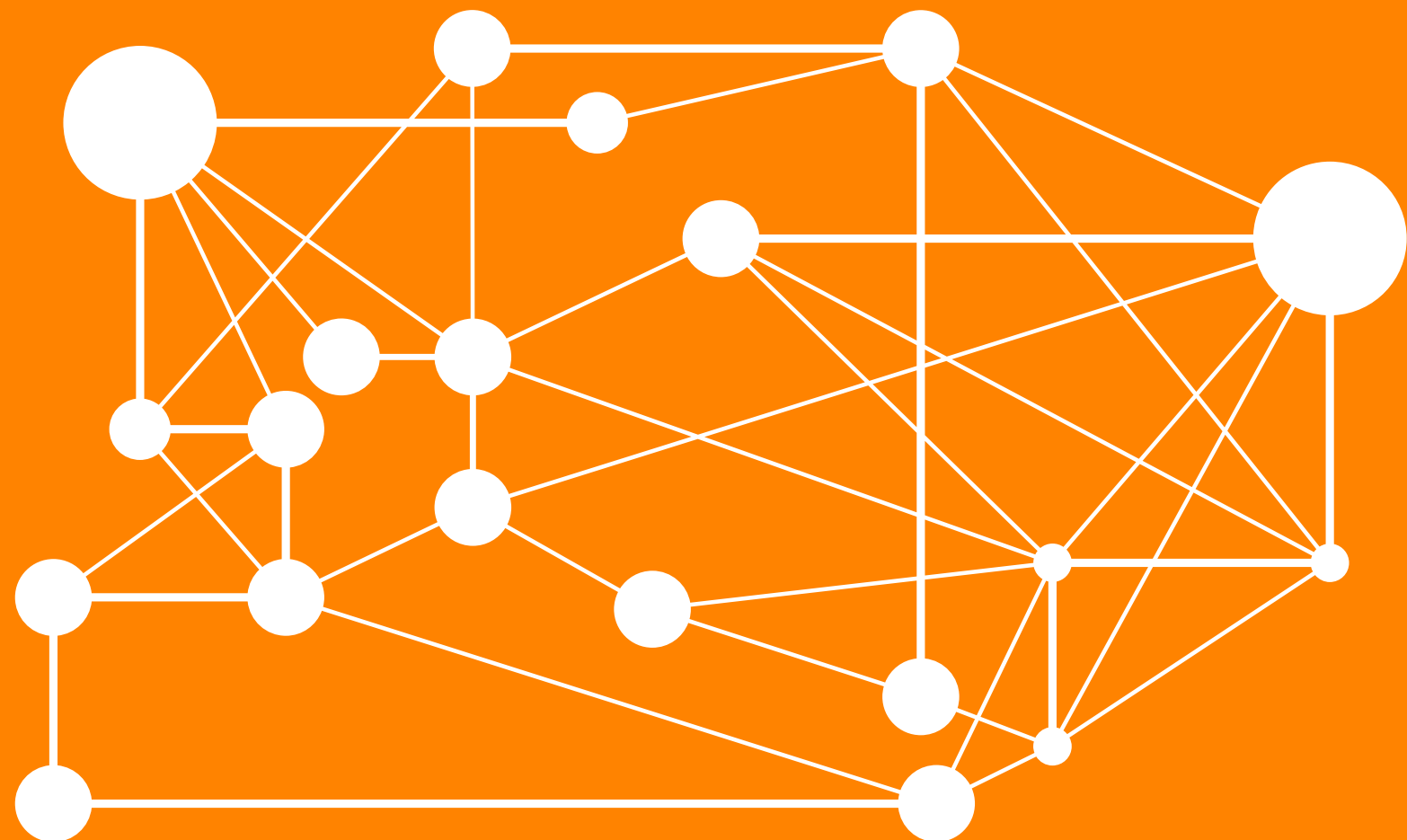
Finally, Martin stated that “using Knovel allowed me to vastly improve test scenarios, save time and reduce cost, while producing the much needed answer to get production back on track both in terms of time, but in terms of making the product a viable option for our company.”

Knovel gave Martin instant access to properties for more than 35,000 organic substances and more than 5,000 inorganic substances and elements. And it provided him with all this information in one location, without requiring him to look through multiple charts and tables in Perry’s or other books.

Armed with the enthalpy data from Knovel, Martin was able to calculate the optimal amount of steam to produce in the stripping process and the best possible solvent ratios and quantities within his formulation.

Knovel also supplied the data Martin needed to calculate an optimized level for the plant’s total heat capacity. “This gave us the flexibility we needed to increase or decrease production based on the data regarding available energy in the plant,” he said.

After these calculations were complete, Martin and his team developed a new model for the stripping process. “We observed the model working in a real case and were able to design an action plan to reduce the cycle time,” he said.



# Knovel

Knovel is an engineering decision support solution that helps the chemical industry tackle development and production challenges. Knovel provides visibility on substance suitability for specific applications and best practice data relevant to piping, chemical engineering and processing, and EHS compliance.

## LEARN MORE

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