Customer Story

Innovation on the surface – and at the core

Atotech is a world leader in coatings and electroplating. But its innovations are more than just skin deep.

You’d think a company that, among other things, makes coatings for car door handles and traces its origins back more than 165 years could be pretty conventional. But Atotech is about as dynamic as it gets. And it needs to be, operating in a market that’s highly competitive – and constantly changing. Atotech is a global leader in complex plating chemicals and coatings used in semiconductors, circuit boards and a broad range of functional and decorative surface finishing. Emerging in its current form in 1993, the company’s roots extend to a Berlin apothecary founded in 1851.

Still headquartered in Berlin, Atotech and its 4,000 employees serve 8,000 customers in 40 countries, generating revenue of $1.2 billion in 2017. The multinational’s significant annual investment in research and development has netted nearly 2,100 active patents. Best-in-class products include solutions for plating semiconductors; corrosion protection; electroplated surfaces for photovoltaics; and coatings for automotive parts. To maintain its market leadership, Atotech can’t be casual about innovation. It needs to make sure a commitment to developing, testing and producing new solutions is baked into the company’s DNA.

Continuous improvement

Competing in the coatings and plating market requires continual improvement. If Atotech isn’t constantly moving, it risks quickly falling behind. The company’s primary challenges fall into three categories:

• **Rapid response.** Especially in industries like consumer electronics, solar and wind power, the technology changes rapidly. Atotech’s solutions for semiconductors and circuit boards need to keep pace. For example, “there’s an ongoing miniaturization, with everything getting smaller,” says Petra Schreier, an engineer in Atotech’s development department.

• **Market demands.** Around the world, consumers are increasingly concerned about the effects of technology products on the environment. “For example, certain components that once contained lead or were processed using cyanide, today no longer are,” Schreier explains. That calls for new chemicals, new processes – and new testing.

• **Solution performance.** Solution testing is central to Atotech’s innovations, because the slightest changes in chemistry or process can affect performance. “On the final finish, all the soldering and bonding have to pass all possible tests,” Schreier notes. “When we adjust our chemistry, we have to do a whole bunch of tests to see if performance is increasing or decreasing.”

To improve on those characteristics, Atotech has to test new chemical processes for cleaning, etching and plating the circuits. Once it develops a better solution with regards to corrosion protection, it then also needs to test how the solution will perform under a variety of user conditions – for example, how the circuits are affected when the device is dropped.

“There’s always something new to test, and we have to figure out why there’s a failure sometimes but not other times,” Schreier says. “We’re always moving.”

Using the full range of JMP® capabilities

For Atotech, the solution to these complex challenges is design of experiments (DOE) using JMP. DOE allows the company to test multiple inputs simultaneously and understand how those factors jointly affect the output. That covers hard-to-change factors such as temperature, which often requires time to stabilize. “In the past we didn’t do design of experiments,” Schreier recalls. “We just did linear points and one
As you work with JMP, you learn to trust the software. You can test multiple factors at the same time and reduce the number of test runs.

Petra Schreier, Engineer

direction, with a maximum of three factors." Some engineers initially resisted DOE. "They preferred easy designs so they could check the results in their heads," Schreier says. "But as you work with JMP, you learn to trust the software. You can test multiple factors at the same time and reduce the number of test runs."

Schreier’s team involves about 20 people, grouped by area of focus. When designers develop new plating solutions, they experiment with both chemical composition and process. The team then tests the results. "If we want to make an improvement, we create a plan and then perform the tests and the relevant analytics," Schreier says. "So we're monitoring the tests, but we're also monitoring the process."

After the team collects the relevant data, it uses JMP to streamline analysis and build models to identify the pattern of response, home in on active factors and optimize outputs. Atotech takes advantage of five key capabilities in JMP:

• Prediction Profiler. For modeling and optimization, the Prediction Profiler allows Atotech to see how prediction models change as individual factors change. Users can gauge a model's sensitivity to changes in factors, where sensitivity is based on the predictive model.

• Custom Design. Atotech relies heavily on support for custom DOE designs in JMP to tailor experiments to answer application-specific questions. "Custom design or a different screening design is important, because it gives you more choices to adjust for specific needs," Schreier points out.

• JMP Scripting Language (JSL). JSL lets Atotech automate processes, regenerate analysis reports, integrate capabilities from other applications and even create new custom applications. "We do scripting because we have many sources of data, and we need to import them before we start the evaluation," Schreier explains. "Scripting allowed us to automate this process."

• Dashboard Builder. Finally, Dashboard Builder lets Schreier’s team create customized workflows that combine multiple graphs into a single file that tells the full story. "The great thing about JMP is the visualization," Schreier says. "It's easy to use, and you can play around and see the results from different views."

Using data to convince customers - and compete at the speed of the market

Schreier points to numerous benefits of using JMP to help drive innovation. First is clear data visualization. The results of Atotech’s testing are included in reports and presentations for customers. Data visualization is invaluable in communicating key findings and demonstrating how Atotech is meeting customer needs. "The data visualization in JMP is a key benefit," Schreier says. "You look at the graph first and get an idea, and then look into the details. But in most cases, the picture is what's most useful."

Another key advantage is the ability to share data. When the company creates new innovations or improves existing designs, “we often work in close cooperation with our customers," Schreier notes. "In that case, we need to exchange data with them." For example, sometimes the company needs to convince a customer that the best solution requires a particular chemistry. "Without JMP, it would be difficult to do that," Schreier says. "The data and analysis we can achieve with JMP gives them something tangible."

Schreier says the No. 1 benefit of JMP to Atotech has been speed. "The big benefit is time savings," Schreier concludes. "You have to be responsive in the electronics and semiconductor industry, which is quite fast-paced and competitive. JMP lets us do that." Robust data, clear analysis and speed: just what Atotech needs to make sure innovation remains at the core of the company - and the company remains at the forefront of its market.