

# SIEMENS

*Ingenuity for life*

Energy and utilities equipment (HVAC)

## Daikin McQuay

Time to produce manufacturing documentation cut by 87.5 percent

### Product

Rulestream

### Business challenges

Implement ETO process across more product lines

Reduce ETO system support costs and time to implement new products and features

Reduce order engineering lead time and effort for quicker speed to market

### Keys to success

Capture IP knowledge and best practices from retiring technicians

Automate processes to save time and eliminate data entry errors

Increase level of customization offered to customers

### Results

Reduced engineering effort from 8,500 person hours to 1,800 person hours for a new product

Increased competitiveness; winning the largest commercial HVAC order in company history

Implemented new rules to make engineering changes 5 times faster

Reduced ETO system support costs by 50 percent

### Daikin McQuay automates HVAC equipment design processes using Rulestream

What if you could reduce the amount of time your skilled drafters, designers and engineers spend doing nonvalue-added paperwork? What if you could automate a specific engineering process to make it more efficient, reduce errors, and reduce the time to produce manufacturing documentation by 87.5 percent?

That is precisely what engineers at Daikin McQuay are accomplishing with the aid of Rulestream™ software (see “A very cool coil design tool” on the next page). Rulestream is an engineer-to-order (ETO) product configuration technology from Siemens Digital Industries Software. Daikin McQuay is part of Daikin Industries, the largest heating, ventilation, and air conditioning (HVAC) company in the world. Head-quartered in Plymouth, Minnesota, USA, Daikin McQuay has approximately 2,500 employees in the United States.

The HVAC systems market is mature, with relatively limited differentiation from brand to brand. A key differentiator for Daikin McQuay is the flexibility it provides to customers. The engineered flexibility of

*Daikin McQuay engineers used Rulestream to help the company land the largest USA commercial HVAC order in history for the new One World Trade Center in New York City.*



"We evaluated solutions from three different suppliers, and Rulestream was the only solution that proved to us it could manage the level of customization offered on our products."

Mark Rogers  
Drafting Systems Supervisor  
Daikin McQuay

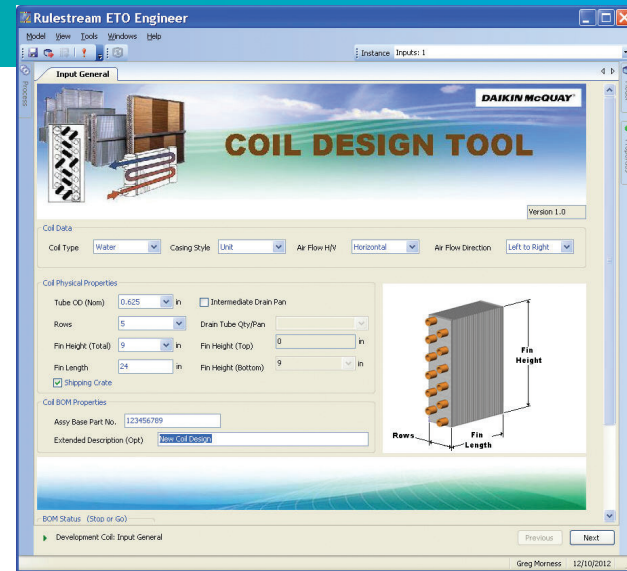
their products allows customers to fine-tune HVAC systems to meet the specific requirements of their application. This provides such benefits as low installation costs, operating and maintenance costs, high energy efficiency; quiet operation, and superior indoor air quality.

### A very cool coil design tool

The huge savings in man-hours noted above was achieved with the coil design tool Daikin McQuay created using Rulestream. "We wanted a tool that reduces the time to produce the outputs needed to manufacture a coil. When we design a new HVAC unit for the market, we need to design coils for them as well," says Mark Rogers, drafting system supervisor for Daikin McQuay. "And usually the time to produce all the information for coils becomes a project itself, mostly because of all the coil options."

He explains, "To fulfill the requirements of the product, these options start to compound on themselves. Options include galvanized or stainless steel castings, left-hand and right-hand coils, high- and low-pressure coils, standards and cleanable, and so on. Then, there are the circuiting requirements, not to mention the many different sizes of coils."

The user interface for the coil tool was configured within Rulestream, which allows you to create a user interface specific to your process without needing to do software programming. "This allowed us to customize and design the user interface with the functionality we needed," says Rogers. "The custom UI has all of the elements needed to design a coil, including interactive forms, such as input fields, pull downs, check boxes, radio buttons, tab control, dynamic image windows and more. Using this UI, we literally design each coil from scratch based on the rules loaded into Rulestream. We enter the basic input for each coil, including the size and type of the coil, the casing style, number of rows, and basic high-level inputs. Once



Daikin McQuay has developed a coil design tool using Rulestream, enabling them to more rapidly and efficiently engineer-to-order specific products.

the basics are entered, we can move onto the details such as the circuiting of the coil.

"We have just completed a product redesign for a self-contained unit, which comes in five different cabinet sizes," says Rogers. "This product is completely generated by using Rulestream. This particular product line requires 360 coils to complete the product offering. So, if you multiply three days of work times 360 coils, this equals 8,640 man hours. With our new coil tool, we can reduce that to three hours per coil. This totals to about 1,080 man hours to complete all the coils required. That's a savings of 7,560 hours. Management is happy to know we have such a tool to help deliver consistent coil designs faster for projects and orders."

Automating coil design not only frees up Rogers and his small staff of drafters for additional project work, it also virtually eliminates the possibility of data entry errors. "With the new systems that we are building using Rulestream, we have been able to cut ETO system support costs by 50 percent, and we can now respond to engineering change orders for any product at least five times faster."

### **Daikin McQuay also uses Rulestream for their air handlers**

Daikin McQuay has currently deployed Rulestream across five product lines, including their flagship product line named "Vision." Daikin McQuay's Vision air handlers can vary in size from 26 to 122 inches high by 36 to 142 inches wide, available in increments of 2 inches and can be any length. (A larger version of this product is available from 144 to 228 inches high, available in increments of 4 inches.) Daikin builds many Vision air handlers a day most of which are customized.

Prior to using Rulestream, Daikin McQuay's first generation engineer-to-order system was limited in terms of scalability and had relatively high maintenance costs. It took a lot of time to program the system and to test new rules. In addition, there were rules exercised using the software that were not directly controlled by knowledge sources.

"We wanted to move away from the legacy system we had been using for many years," says Rogers, "So we evaluated solutions from other suppliers, and Rulestream was the only solution that proved to us it could manage the level of customization offered on our products."

The goals for the new ETO system included the ability "to maintain our competitive advantage of quickly and cost effectively offering 'variable and configurable' products to our customers," says Rogers. "We also wanted to integrate the system with a new 3D solid modeling system (SolidWorks), reduce the time to implement engineering changes, and have more internal control over rules and programming."

Another benefit of the new system is helping Daikin McQuay retain core intellectual property (IP), best practices, and engineering know-how. "Executives are extremely concerned that the most important assets to their company's growth and

survival are walking out the door due to retirement and normal employee attrition," notes Rogers. "These employees take with them the knowledge that is required to remain competitive. The expertise they have acquired on the job was not captured or shareable for others to benefit from, since there was no centralized database of knowledge.

"An example of this is our 'coil guy,'" says Rogers. "Our coil guy has been with Daikin McQuay for 50 plus years. Whenever you go to him with a question about a coil, he thinks about it and then pulls a 3-ring binder from a shelf; and then he usually pulls some information from there to help locate what you actually wanted. He's got piles of stuff! It's funny, because every time I ask for something from him, he looks at me with this look on his face that says, 'You have no idea what you're getting yourself into.' There is so much information that is intertwined with each other – it's unbelievable. So we are currently in the process of capturing all of this knowledge with this coil design tool, because he will eventually retire. We know we can't capture all 50 years of his knowledge, but at least we can get as much as possible to allow us to be competitive and consistent for future projects."

### **Winning the largest US commercial HVAC order in history**

A company's ability to rapidly design new products to customer specification can yield big wins for its sales organization, not just engineering. A great example is Daikin McQuay's ability to land the largest USA commercial HVAC order in history for the One World Trade Center built in New York City. This job called for a new HVAC unit design. With the help of Rulestream Daikin McQuay was able to design and build a test prototype unit in less than six weeks and ship it to a customer test lab well ahead of the competition. "Our use of Rulestream allowed us to quickly implement a production system to create consistent drawings, bills of materials (BOMs), flat files, and 3D models for this

"This particular product line requires 360 coils to complete the product offering. So, if you multiply three days of work times 360 coils, this equals 8640 man hours. With our new coil tool (built using Rulestream), we reduced that to three hours per coil. This totals to about 1080 man hours to complete all the coils required for this project. That's a savings of 7560 hours. Management is happy to know we have such a tool to help deliver consistent coil designs faster for projects and orders."

Mark Rogers  
Drafting Systems Supervisor  
Daikin McQuay

"When considering participation in the World Trade Center project, the aggressive schedule for delivery of the first verification test unit as well as design completion for all the required model sizes was a big concern. However, the ability to use the flexibility of the Vision cabinet design in the Rulestream environment, with its automated engineering documentation outputs, ensured that Daikin McQuay would fulfill our customer's delivery needs."

Steve Wold  
Director of Engineering  
Daikin McQuay

## Solutions/Services

Rulestream  
siemens.com/rulestream

## Customer's primary business

Daikin McQuay delivers engineered, flexible solutions for commercial, industrial and institutional HVAC requirements with reliable products, knowledgeable applications expertise and responsive support.

www.daikinmcquay.com

## Customer location

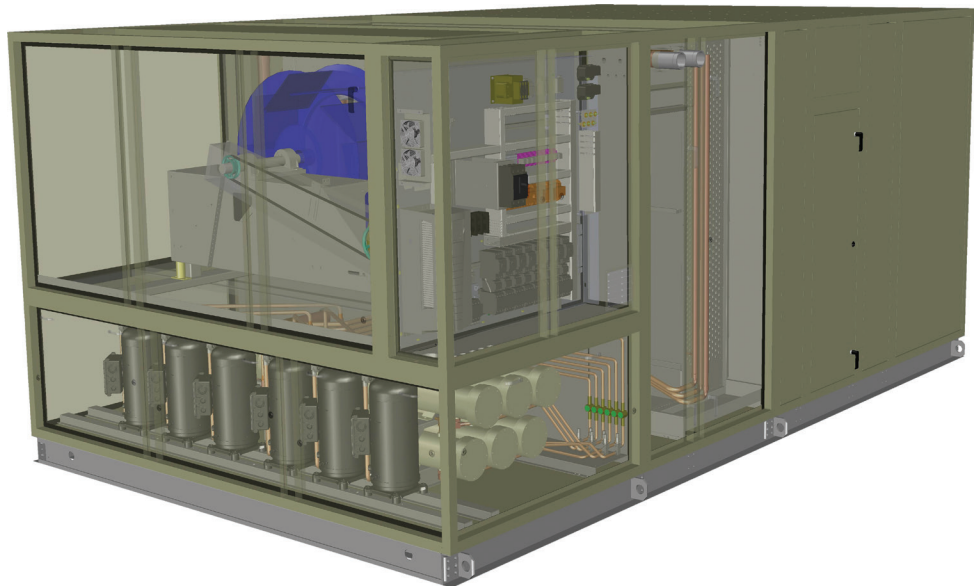
Plymouth, Minnesota  
United States

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Mark Rogers  
Drafting Systems Supervisor  
Daikin McQuay

new product. We are very honored and proud to be part of the One World Trade Center building!" says Rogers.

"When considering participation in the World Trade Center project, the aggressive schedule for delivery of the first verification test unit, as well as design completion for all the required model sizes were big concerns," says Steve Wold, director of engineering for Daikin McQuay. "However, the ability to use the flexibility of the Vision cabinet design in the Rulestream environment, with its automated engineering documentation outputs, ensured that Daikin McQuay would fulfill our customer's delivery needs."



*The use of Rulestream helped Daikin McQuay design custom HVAC units for the new One World Trade Center in New York City.*

## Siemens Digital Industries Software

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