

YORK International Corporation,
Refrigeration Systems Division of
North America
 Autodesk Manufacturing Solutions
 Customer Success Story

Autodesk® Inventor®
 Autodesk® Inventor® Professional
 AutoCAD® Electrical
 Autodesk® Vault
 Autodesk® Productstream™
 Autodesk® DWF™
 Autodesk® Consulting

3D and Process Automation from Autodesk Speed Designs Ten-Fold while Improving Quality

YORK Refrigeration Systems is accomplishing more with less by using an Autodesk solution to create, manage, and share designs of complex industrial refrigeration equipment

We can now complete what was taking 40 hours in about 4 hours using our 3D tools from Autodesk, and the information we provide to manufacturing is more complete than ever. We've increased design output between 20 and 30 percent for the last three years with about the same engineering resources.

— **Steve Brown**

Manager of Pressure Vessel Engineering Refrigeration Division of North America, YORK International

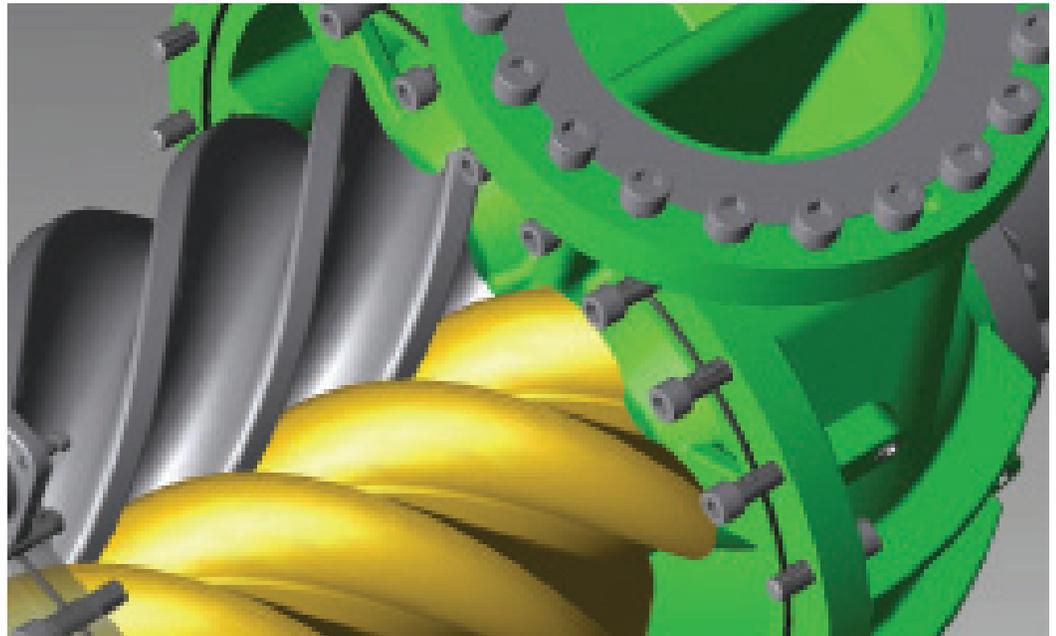


Image courtesy of YORK International.

Project Summary

YORK Refrigeration Systems uses a complete solution from Autodesk to capitalize on opportunities to re-use designs, automate manual processes, and improve collaboration among all groups involved in product development and manufacturing. The key to these achievements, YORK finds, is the tight integration of all the tools that make up the Autodesk solution for manufacturing. By using the industry-leading 2D and 3D design tools from one source—Autodesk—YORK's cross-functional teams can employ one common model. Engineers manage 2D and 3D designs in the Autodesk® Vault application to ensure that everyone works from current versions and that they can easily re-use data in new designs. Because Autodesk Vault and Autodesk® Productstream™ software automatically produce and publish DWF™ files, YORK's medium for design information sharing, they can automate management of engineering changes, creation and management of bills of materials, and release of engineering

data to manufacturing. With help from Autodesk Consulting, YORK's deployment timeframe was shortened. Engineering is completing custom order designs that used to take up to forty hours in just four, and manufacturing receives more detail than previously provided on 2D drawings, thus speeding quality products to market.

The Challenge: Produce More While Cutting Costs and Cycle Times

YORK International is America's largest independent supplier of heating, ventilation, air conditioning, and refrigeration equipment. YORK's Refrigeration Division, which produces a broad range of industrial refrigeration equipment, values its image as the industry's premier supplier of cutting-edge products over the last 150 years.

To remain robust in the competitive environment the company faces, YORK management has charged its divisions with expanding market share, increasing sales volume, and decreasing lead times to be best-in-class in their markets—all while maintaining fixed costs. “Our strategy for meeting that challenge is to employ tools and processes that improve our designers’ efficiency,” says Steve Brown, Manager of Pressure Vessel Engineering for the Refrigeration Division of North America. “Design re-use, increased automation, and collaborative engineering top the list of process improvements that are helping us meet our goals, and our complete Autodesk solution is the tool foundation that helps make those improvements possible.”

YORK Refrigeration Systems began building its Autodesk solution in the early 1990s with AutoCAD® software. In the late 90s, the company began exploring 3D technology. “Considering the overall cost of ownership including maintenance, we determined that the return on investment for Autodesk Inventor was better than the competition,” explains Brown. “Furthermore, Autodesk Inventor promised to quickly boost our productivity—more help in meeting our mandate. Its user interface is intuitive and its learning curve is short. Our people who have used a number of CAD systems tell us Autodesk Inventor is the easiest to use.”

“With Autodesk Inventor Series, we can use either AutoCAD or Autodesk Inventor depending on which is best for the purpose at hand—another reason for switching,” Brown continues.

“Additionally, since the majority of the design work in the refrigeration industry is AutoCAD-based, it is very important that we be able to share data created in a 3D environment with those using the dwg format.”

“By selecting Autodesk products, we knew that the tight integration between the two products would allow us to export and import files more easily,” adds David J. Myers, Designer, Food and Beverage Packaging Group.

Empowering Collaborative Design Creation, Design Re-Use, and Automation

YORK benefits from the collaborative nature of the Autodesk Inventor® software environment in many ways. “When multiple engineers work concurrently on a design, the 3D visualization power of Autodesk Inventor provides plenty of opportunity to eliminate interferences and other errors before release to the shop floor,” says Brown. “Autodesk Inventor lets us get the designs out the door faster because multiple engineers can be working concurrently on a common model, and because we waste less time correcting errors—more ways Autodesk is helping us meet our mandate.”

The collaboration even extends to the shop floor, where engineering and manufacturing meet to review 3D models of proposed products. Manufacturing suggests ways to improve designs to make them easier to manufacture, resulting in a faster production process.

The Food and Beverage Packaging Group illustrates how Autodesk Inventor is helping with design re-use and automation. This group has created a number of standard configurations of systems for refrigerating food and beverages. When a customer requests a custom system, engineers call up the standard configuration that most closely matches the specifications and use Autodesk Inventor and AutoCAD along with automated techniques they have developed inhouse to perform the customization.

Recently YORK added AutoCAD® Electrical software for electrical controls design as well as Autodesk Inventor® Professional for designing wire harnesses, piping and finite element analysis (FEA). “Pro/Mechanica for FEA was determined to be difficult for some users,” says Brown. “Basic FEA capabilities are included at no extra cost in Autodesk Inventor Professional, and its user interface is friendlier for the casual user.”

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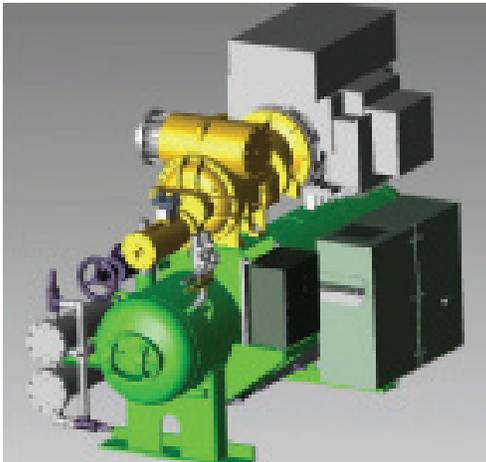


Image courtesy of YORK International.

YORK Speeds Development by Integrating Data Management with Design

YORK has long realized that a strong product data management (PDM) solution that is tightly integrated with the design environment can greatly expedite searching for and managing design data. Several years ago, before Autodesk Vault was available, YORK used SMARTEAM for PDM.

“SMARTEAM did fine with AutoCAD files, but we never could get it to manage Autodesk Inventor designs very well and we really needed a system that could handle both,” says Tom Coyle, Supervisor of the Application Support Group. “Then Autodesk introduced Autodesk Vault, and we were so impressed at its integration with Autodesk Inventor that we decided—even though we had a mountain of data to migrate—to make the change. But we waited until Autodesk Productstream became available because we needed its revision control and lifecycle management capabilities at the same time.”

Now that YORK can manage project files as well as 2D and 3D data in one central repository, new heights of process automation are possible. “Autodesk Vault lets us easily re-use models and assemblies in creating new designs,” Coyle says. “We’ve enhanced our automation and design re-use abilities a great deal now that we have such tightly integrated design and data management solutions.”

Autodesk Productstream for Sharing and Lifecycle Management—Saving Time while Assuring Accuracy

Besides improving data management processes, Autodesk Vault is performing another important function—automatically producing Autodesk DWF files of designs for use downstream with manufacturing and suppliers via Autodesk Productstream. “In the past we used PDF files for sharing,

but creating and managing them were manual processes that we had to perform over and over as we changed a design,” says Myers. “Autodesk Vault and Productstream spare us all that by automatically creating and managing DWF files for us. Besides saving a lot of time, we no longer have to worry about someone forgetting to make a PDF and leaving manufacturing with the wrong drawings.”

The addition of Autodesk Productstream allows YORK to automate the management of engineering changes, the creation and management of bills of material, and the management of the process for releasing engineering data to manufacturing. Because the solution is based on the .NET platform, future customization and integration with other business systems such as Enterprise Resource Planning will be very straightforward.

Autodesk Consulting Saves YORK Months of Work Converting Files; Exceeds Expectations for Results

Having performed a similar but smaller file migration in the past using internal resources, YORK Refrigeration Systems realized the magnitude of the task it faced to get all the existing data into Autodesk Vault. There were 130,000 AutoCAD documents alone totaling 35GB worth of data, and Autodesk Inventor added another 100GB. “We knew how big the file conversion job was, and that we’d have problems forever if it wasn’t done right,” says Myers. “That’s why we asked Autodesk Consulting to conduct the project.”

Autodesk Consulting installed and set up Autodesk Vault and Productstream, migrated the data from SMARTEAM, and trained users on both new products. “Autodesk Consulting saved us at least two months of work,” says Coyle. “Out of the 75,000 item histories they migrated, we had about a 1% error rate. That is a lot better than we expected because the SMARTEAM data was not that clean. Furthermore, I was able to write routines to fix the erroneous histories using the utility programming capabilities and open API of Autodesk Vault and Autodesk Productstream. It’s an excellent .NET programming environment with all the latest technologies that cut development time greatly.”

Now that we have Autodesk Vault and Productstream, we’re able to automate more of our document management and design reviews for both 2D and 3D that we weren’t able to do with our previous PDM system.

— **Tom Coyle,**
Supervisor of the Application Support Group, Refrigeration Division of North America, YORK International

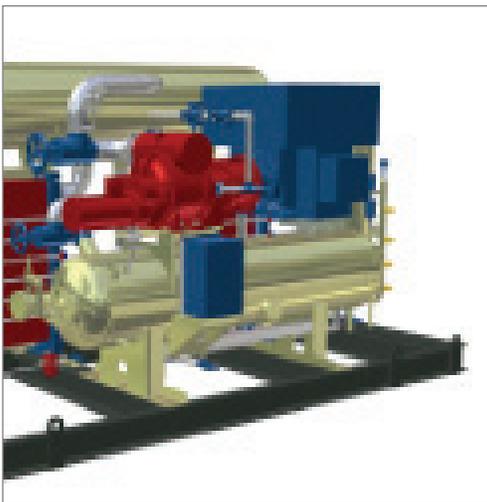


Image courtesy of YORK International.

The Results Are in—YORK Increases Design Output by 20 Percent and More

Management asked YORK Refrigeration Systems to accomplish more with no additional resources, and with their Autodesk solution the division has responded in full—as exemplified by a product line called recirculators that two engineering groups were able to collaboratively model for the first time using Autodesk Inventor software. Because of YORK's ability to re-use models, and because the 3D environment of Autodesk Inventor is so much more productive, the time to fill a typical recirculator order is now down from 40 hours to just four hours.

"That's just part of it," says Brown. "We're also delivering more to manufacturing than ever—not just 2D views, but additional information such as 3D isometric views, assembly weight based on the actual model, and additional exploded views to clarify design intent."

More examples of Autodesk's benefits abound. Vessel Engineering's output is up twenty to thirty percent with no increase in head count. The Food and Beverage Group produces all the drawings and bills of materials to satisfy a customer order in four hours versus the twenty-four it took with the old system.

Dramatic as these results are, YORK feels that the benefits that Autodesk receives in return are equally powerful. Every time YORK people have an opportunity to use a new product or feature, they make sure to provide feedback that will help Autodesk introduce improvements. "Whenever that happens we watch for the next release, and sure enough our enhancement is there," says Coyle.

"We are very pleased with our relationship with Autodesk," says Brown in conclusion. "There's only one word for it—it's a partnership."



Image courtesy of YORK International.

For More Information

To learn more about how Autodesk applications are helping companies save time and money, visit us on the web at www.autodesk.com/manufacturing.

YORK Refrigeration Systems singles out support for special mention. All the Autodesk people with whom the company interacts, from account management to Autodesk Consulting to actual developers who answer the really tough questions, consistently provide responsive and high-quality support.

All of YORK Refrigeration Systems' Autodesk product licenses are covered by the Autodesk Subscription service. YORK appreciates the benefits of this service, especially the ability to easily stay current despite the rapid introduction of product enhancements.

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— **David J. Myers**

Designer, Food and Beverage Packaging Group, Refrigeration Division of North America, YORK International