Airedale chose the **6SigmaDCX** software suite to help them optimize the design of their state-of-the-art ACUs and chillers. The **Virtual Facility** (VF) addresses the demand for more effective cooling systems by using **Computational Fluid Dynamics** (CFD) to simulate airflow. The VF has improved Airedale’s performance in design stages and enabled them to build a precise replica of their test facility. For Airedale, this has resulted in **better offerings to customers** as well as enhanced research and development.

### The Virtual Facility

![Figure 1. An example of the Virtual Facility (VF)](image)

Airedale are market leaders in the manufacture of precision air conditioning units (ACUs) and chillers. They have always customized their designs to meet the specific requirements of individual users, through intelligent design processes and innovative manufacturing.

![App Note: The Virtual Facility for a Hardware Vendor](image)

Future Facilities have for 12 years been developing the Virtual Facility (VF) - a sophisticated 3D modeling tool. Using the VF with 6SigmaDCX, Airedale have worked to optimize the design of their ACUs and chillers. The use of Computational Fluid Dynamics (CFD) was key in designing Airedale’s new and improved product range. CFD helped Airedale to verify both the internal designs and the performance of their products in a virtual model of their test facility.

### Optimization

Airedale have built detailed virtual models of their cooling units by importing their existing CAD designs into the 6SigmaDCX suite. 6SigmaDCX enabled Airedale to conduct a highly accurate analysis of airflow and heat transfer in the models, eliminating problems with inefficient prototypes at the design stage, and improving performance all-round.

One product designed and tested for validity by Airedale was the Deltachill Free Cool chiller. Airedale used DCX to optimize their designs before the prototyping stage. CFD analysis was performed to find the optimum V-angle for the V-block arrangement inside the chiller (see Figures 2&3). After designing, the product prototype was manufactured and the V-block was tested. The physical testing results gave Airedale confidence that the CFD simulation closely matched the actual performance of their product.

![Figure 2. Velocity Result Planes for testing V-angles](image)
As a leading manufacturer of air conditioning, we create solutions which optimise performance and set the benchmark for efficiency. CFD allows us to verify design and performance of our units, and their applications. It forms a key part of our development process. Our use of 6SigmaDCX is reflective of their position as leaders in their field.

Patrick Cotton, Customer Services Manager, Airedale

The 6SigmaDCX software suite has proved to be an invaluable asset to the optimization of our product designs prior to prototyping. This has reduced the time to market and consequently provided a better quality product.

Rinku Patel, CFD Design Engineer, Airedale

5-Star Library Items

Future Facilities and Airedale have also worked together to develop the first full range of 5*-rated library items in 6SigmaDCX. These highly rated library items incorporate advanced levels of data, so that the ACU models can be used in any VF environment to get the most realistic representation of a facility.

6SigmaDCX comes with 5* models of the entire range of Airedale’s Smartcool ACUs (see Figure 4), in addition to models of their Easicool and Alphacool ACUs. These library items enabled Airedale to build a detailed model that accurately represented their real facility.

Airedale have created an exact replica of the test facility in the VF (see Figure 5). The VF representation allowed Airedale to analyze their product design and performance in the test facility, enabling their product performance to be verified and improved.

The primary focus of an owner-operator is the performance of the ACU in their facility, including the complex interaction between the performance of the unit and the facility’s control systems. The 6SigmaDCX software suite allowed Airedale to use their calibrated ACU libraries within a VF that models the actual facilities of their customers. In this way, Airedale were able to make sure all of their customers’ requirements were fulfilled.

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