



CASE STUDY /

Ansys + AeroFarms

“Ansys CFD is helping us address food insecurity through indoor farming. It has allowed us to scale our current environmental control and airflow distribution models to our new, higher-density facility without having to build a prototype. Ansys CFD easily integrates with our mechanical software, helping us make our vertical grow farms efficient and productive.”

Justin Zabilansky

Senior Biological Systems Manager / AeroFarms

Ansys CFD Helps AeroFarms Achieve New Heights

AeroFarms, the world leader in indoor vertical farming, builds and operates environmentally responsible farms throughout the world, enabling year-round, local production of leafy greens at a commercial scale. Their facilities use up to 95% less water than field-farmed food while producing annual yields 390 times higher per square foot. To produce healthy plants from seed to harvest in less than two weeks, AeroFarms uses aeroponic technology, which feeds the plants using a targeted mist containing nutrients, water and oxygen. LEDs enable precision photosynthesis in the most energy-efficient way.

/ Challenges

AeroFarms grows millions of lbs. of leafy greens a year at its largest facility, a 70,000 sq. ft. indoor farm where 48 ft. tall towers provide 27.3 million sq. ft. of vertical growing space. The company is building a new facility twice as large and needed to verify how airflow and other environmental conditions that drive plant biology processes could be scaled to higher towers with a greater density of plants and lighting.

/ Technology Used

- Ansys CFD

/ Engineering Solution

- AeroFarms engineers began by using Ansys CFD to simulate the current air distribution and irrigation systems in their 70,000 sq. ft. facility.
- The simulation accounted for all of the variables in the growing environment, from the heat produced by LED grow lights to the humidity produced by the aeroponic mist.
- The engineers then projected the data onto a full-scale physical mock-up of the next generation of grow towers.
- By mapping and comparing the Ansys CFD and 3D physical models, engineers could test and validate multiple design iterations quickly and confidently.

/ Benefits

- Using Ansys CFD de-risked highly critical decisions regarding environmental control and airflow distribution.
- AeroFarms has a better understanding of how to deliver consistent irrigation across a higher grow tower and how to maintain temperature, humidity and airflow that are optimal to the biology of leafy greens and will produce consistent plants.
- Through simulation, AeroFarms is better equipped to scale the distribution of airflow, temperature and humidity to larger facilities with higher vertical grow towers, making the most efficient use of commercial space and providing higher density food production to meet future needs.

/ Company Description

Since 2004, AeroFarms has been leading the way for indoor vertical farming and championing transformational innovation for agriculture. On a mission to grow the best plants possible for the betterment of humanity, AeroFarms is a Certified B Corporation with global headquarters in Newark, New Jersey, United States. Named one of the World's Most Innovative Companies by Fast Company two years in a row and one of TIME's Best Inventions, AeroFarms' patented, award-winning indoor vertical farming technology provides the perfect conditions for healthy plants to thrive, taking agriculture to a new level of precision, while using up to 95% less water and no pesticides versus traditional field farming. For additional information, visit: <https://aerofarms.com/>.

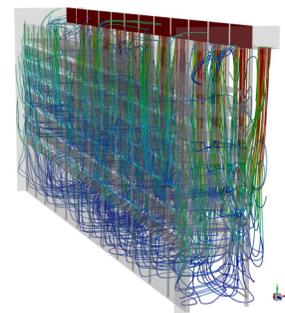


Figure 1: Airflow streamlines used to visualize flow of air through vertical racking systems.

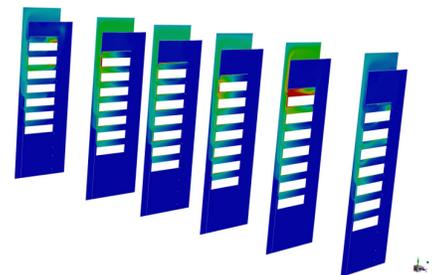


Figure 2: Vertical slices through simulation used in the analysis of environmental uniformity through racking system.



Figure 3: AeroFarms Indoor Farm tailors lighting and environmental variables to grow the best plants possible!

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