University of Michigan Ford Motor Company Robotics Lab

Ann Arbor, MI

Michigan Air Products provides a cost-effective, energy-efficient Chilled Beam solution for varied environments in a state-of-the-art robotics facility.

What do you get when you combine the University of Michigan and Ford Motor Company, two world-class institutions committed to delivering the technology to improve lives and keep people safer?

Introducing the University of Michigan's Ford Motor Company Robotics Building, a four-story, $75 million, 134,000-square-foot complex located on the campus of University of Michigan in Ann Arbor, MI. The first three floors hold custom research labs for robots that fly, walk, roll, and augment the human body, as well as classrooms, offices, and makerspaces. Through a unique agreement, the fourth-floor houses Ford's first robotics and mobility research lab on a university campus, as well as 100 Ford researchers and engineers.

The Challenge

Designed to meet three critical, overarching objectives – flexibility, collaboration, and innovation, the University of Michigan Ford Motor Company Robotics Building is home to a large variety of spaces including high bay labs, dedicated shops, classrooms, offices, and open collaboration areas. With such an expansive building housing a variety of spaces, it was critical that the HVAC systems not only meet the unique needs of each space to provide occupant comfort, but also provide energy efficiency.

MAP's Solution

Designed by Harley Ellis Devereaux, the University of Michigan Ford Motor Company Robotics Building blends striking architectural design, functional spaces, and energy efficiency.

Chilled beams are installed throughout the building to provide cooling and ventilation to various lab testing areas, offices, and collaboration spaces. Designed to work in conjunction with the lab's heating system to maintain a comfortable and consistent temperature throughout the year, the use of chilled beams in the lab was part of a larger effort to improve the facility's energy efficiency and reduce its overall environmental impact.

Traditionally, chilled beams are mounted in a ceiling grid or drywall, however, open-ceiling spaces are becoming more popular as they provide a contemporary feeling of spaciousness while simplifying coordination and allowing greater flexibility with ceiling fixtures. Chilled beams remain a great option in these cases as well, with one addition – Coanda Wings. Coanda Wings are 6-inch plates added to each side of the chilled beam to provide the surface area needed to maintain the Coanda effect, allowing the airstream to make its way across the ceiling and fall into space while keeping drafts to a minimum.

Coanda wings are recommended for any open-ceiling application, but it is also important to consider the installation height of the chilled beam. The recommended height from the beam's face to the floor is at most 15 feet, with 8–12 feet being ideal. At taller heights, the Coanda wings may need to be removed, especially if the chilled beams are used in heating mode. This is because the warm air temperatures may stratify with the Coanda wings, so a more downward angle will help direct the air toward the lower portion of the space while heating in tall areas.

The Result

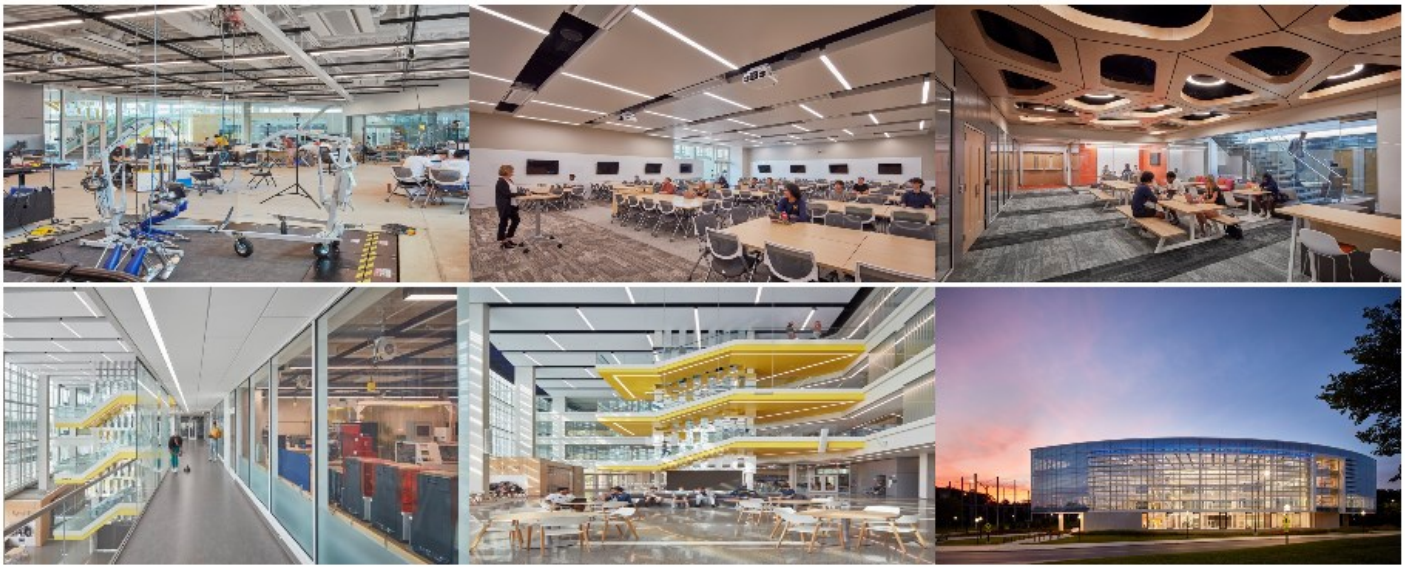
The University of Michigan's Ford Motor Company Robotics Building represents a significant investment in the field of robotics by the University of Michigan and its industry partners, and it is poised to play a major role in advancing the development of autonomous systems and robotics

Michigan and its industry partners, and it is poised to play a major role in advancing the development of autonomous systems and robotics technologies in the years to come.

With a focus on energy efficiency from the start, the completed building is now LEED Gold certified, which is only given to buildings that meet stringent sustainability requirements, positively impacting surrounding communities by reducing carbon emissions, energy, and waste. The chilled beams used in the Robotics Building contributed to this by requiring less energy to cool or heat the various spaces, compared to traditional forced-air systems, while providing more even temperature distribution throughout. The building has also been recognized as a 2022 building award recipient by the American Institute of Architects (AIA) Huron Valley.

PROJECT SUMMARY

PROJECT TYPE	Mixed-Use Educational Facility
LOCATION	Ann Arbor, MI
COMPLETION DATE	January, 2021
PROJECT SIZE	134,000 ft^2
PRODUCTS	Chilled Beams
MANUFACTURER	Price Industries
ARCHITECT / ENGINEER	Harley Ellis Deveraux (HED)



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