In order to save energy, renew and optimize, DTU Nanolab changes 291 fan filter units (FFU) in cleanroom

CASE STUDY - NANOLABORATORY

Customer and Project Profile

End User: DTU Nanolab Denmark – National Centre for Nano Fabrication and Characterization

Industry: Semiconductor

DTU Nanolab is the National Centre for Nano Fabrication and Characterization in Denmark and is owned by and located at the Technical University of Denmark (DTU) in Lyngby, North of Copenhagen. DTU Nanolab operates and maintains advanced processing equipment within 1.350 m2, class 10-100, ISO 9001-certified, open access, pay-per-use cleanroom facilities.

As a research infrastructure the DTU supports research and development within state of the art characterization and fabrication technologies. To ensure world class expertise the institute conducts research in fabrication and characterization technologies at DTU Nanolab. Their faculty of around 15 professors and researchers covers a wide range of technologies and methods. The primary goal of their research is to push the state of the art within selected technologies in order to enable novel applications and devices.
For more information **https://www.nanolab.dtu.dk/english**

Initial Situation

As almost all facilities of this kind the DTU Nanolab is suffering from high energy costs for the operation of their cleanrooms. The fan filter unit infrastructure, the HEPA filters used within the units, as well as the controls for the complete system have been identified as an important corner stone to achieve energy savings.
The fan filter units currently in use are partly 15 years in service and in terms of energy efficiency, system integrity and noise level not state-of-the-art.
Based on AAF's strong image within the semiconductor industry and long track record including thousands of installations of FFUs and low-energy consuming ePTFE HEPA filters, AAF suggested a convincing solution - with sustainable success.

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Bringing clean air to life.®

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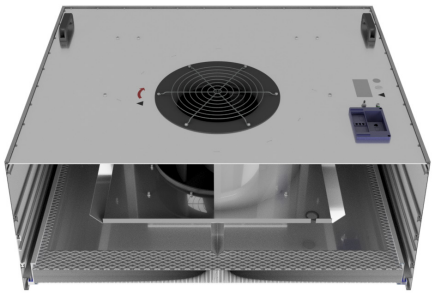
AAF Products of choice

The AstroFan FFU module comprises of an aluminium housing containing a high performance encapsulated AAF Optimized direct driven backward curved EC fan/motor combination and a replaceable AAF HEPA or ULPA filter. The entire housing is easy to decontaminate and resistant to disinfectants. The housing seals and rests on the anodized aluminium extrusions of the AAF HEPA or ULPA filter.



Highest-Performing ULPA Filter Technology for Microelectronics

In microelectronics manufacturing, the purity of air and product is essential for proper doping of semiconductors. Like particles, certain elements can affect the electrical properties of integrated circuits negatively, effecting yield. Traditional borosilicate glass media is a potential source of boron contamination, even with “low-boron” glass media. Phosphorus can be found in flame retardants of certain polyurethane sealants used to seal the media pack to the filter frame. That is why the MEGAcel II ePTFE is built and tested boron- and phosphorus-free. For over 20 years, MEGAcel II ePTFE has been the gold standard for minienvironment housings for semiconductor tool filtration systems.

High Efficiency HEPA/ULPA FFU with modular design

- Available in 7 standard sizes
- Lightweight aluminium housing
- Low sound level
- Suitable for all ISO cleanroom classes
- Suitable for turbulent and laminar flow
- Suitable for a wide range of AAF HEPA and ULPA filters
- Available with EC RS-485, 0-10 Volt and MODBUS RTU control interface

Fully integrated Control Systems down to the single FFU

In addition to air filters and non-powered supply housings, certain applications also require unit specific control of the speed and consistency of airflow into large-scale production spaces. Fan Filter Units, especially when paired with robust electronic control systems, help to ensure the integrity of production processes within these applications and serve to maximize overall system economy.

MEGAcel® II ePTFE membrane filters

- Provides ultra-high efficiency with the lowest pressure drop
- High resistance to corrosive environments (acids, alkalis, and organic substances)
- Lowest offgassing properties available
- High tensile strength media, more resistant to rough handling in transportation and installation
- Meets I300I specifications and is UL 900 and ULC S111 classified

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Implemented Solution

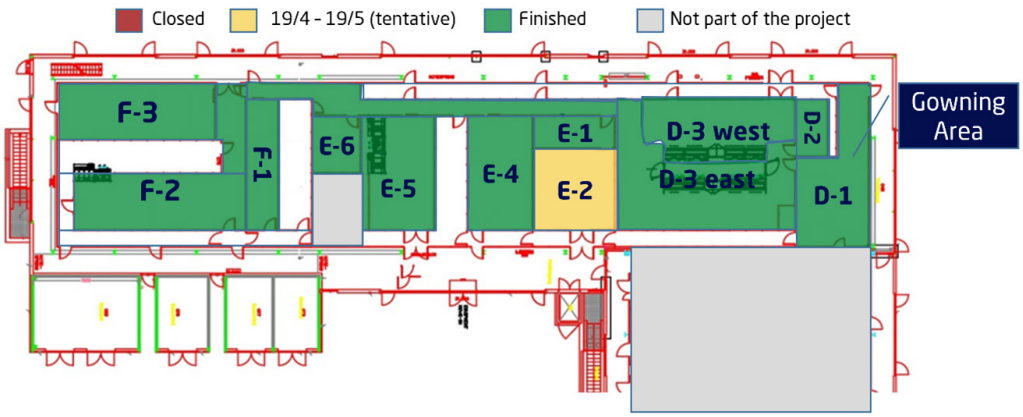
291 Fan filter Units (FFUs) are about to be changed in the cleanroom with an estimated completion date in May 2022. The new FFUs are quieter than the existing FFUs and will save 122.000 kWh/year, corresponding to ca. 268.000 kr./year.

Technician installing a FFU in a DTU cleanroom.

Test Set up

Facility Manager testing the airflow (blue funnel) and the noise.

The project is almost complete already. To follow the project click here **https://sites.dtu.dk/ffunanolab**



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