

Air Flow Consulting AG



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Air Flow Simulation Helps Optimize Installation and Minimize Operation Costs of a Clean Room

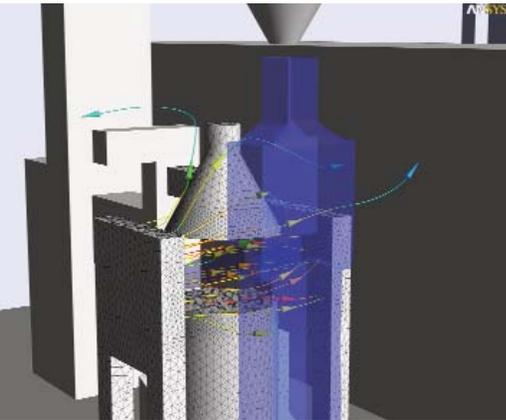
AFC provides comprehensive consulting in airflow-related engineering and computational fluid dynamics (CFD) analysis for fire safety, building climate control, contaminant control and engineering applications. AFC helps customers design proper air flow to optimize their ventilation systems, which substantially reduces installation and operating costs while maintaining high-quality conditions.

TECHNOLOGY USED

ANSYS® CFX®

CHALLENGES

More and more products require production environments with high-quality air conditions. In most cases the entire production room operates as a clean room, but installation and operating costs for such rooms are very high.



Streamlines released from air inlet that brings in clean air, fulfilling zone 2 specification. The air flows around the vessel and protects the open product from particles in the room.

In one particular pharmaceutical production plant in Switzerland a new packaging (blister) line was installed that required an air-quality criterion of zone 2, or less than 100,000 particles per cubic meter. Yet the actual air quality of the environmental room was measured as zone 3, which has no limitation to the number of particles. Typically, to solve this problem the entire blister line with the loading part is put below a laminar flow, which guarantees the required air quality but is expensive to install and operate.

AFC was hired to develop a more cost-effective ventilation solution that would help the pharmaceutical company to comply with higher air-quality requirements. ANSYS CFX software was used to assess the ventilation concept, optimize the design and operating parameters and minimize the flow rate.

ENGINEERING SOLUTION

A local ventilation device, consisting of a push and pull component with integrated filters, was developed using ANSYS CFX software to create a local region of zone 2 air around the loading sector and simulate the results. AFC was able to:

- Create a 3D model of the entire blister line and the environmental room
- Simulate several possible scenarios of air flow and vary the boundary conditions
- Demonstrate through simulations that initial efforts resulted in air quality between the defined zones of 0 to 10 percent of the particle concentration of the zone 2, which was not optimal
- Enlarge the lateral supply, with simulation showing that all particles were completely removed and contamination of air from zone 3 was prevented

BENEFITS / RESULTS ACHIEVED

Using ANSYS CFX software, AFC:

- Designed, validated and certified the supply and exhaust systems
- Reached particle concentrations in the defined zones well below the limit
- Reduced installation costs by more than 70 percent
- Reduced operating costs by more than 50 percent
- Reduced energy consumption by more than 90 percent

COMPANY INFORMATION

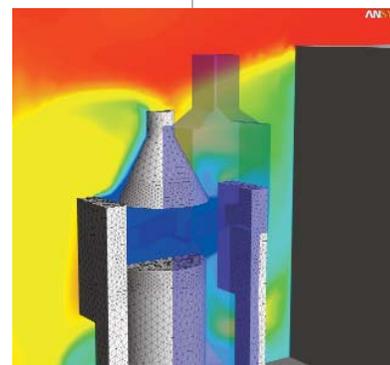
Country: Switzerland

Industry: Engineering Consulting



“ANSYS CFX engineering simulation software allowed us to optimize this installation to meet the stringent clean room specifications for a new packaging blister line in a pharmaceuticals production plant, and also to minimize the cost. ANSYS CFX software is a useful technology for this kind of design study and can lead to enormous savings.”

Dr. Daniel Gubler
AFC Air Flow Consulting AG
Contaminant Control Division



Particle concentration in the room shown in a vertical plane, with red indicating high particle concentration in the zone 3 area and blue indicating low particle concentration in the protected area.

CASE STUDY