Case study

Air cleaning devices create a first-rate foundation for hygienic processes

Customer

Hamilton Medical AG

Location

Bonaduz (CH)

Sector

Medical technology

Dust reduction

Up to 73 %

At a glance

“By installing the air cleaning devices, we were able to avoid an expensive investment in a clean room infrastructure. The air cleaning systems are vital for us to maintain the high hygiene standards we set for ourselves.”

Dr Hans von Pfuhlstein, Head of Respiratory Care Supplies

Challenges

There are particularly high standards that apply to air purification in the medical technology sector. The products have to be produced and packaged according to a uniform hygienic process so that the material-related risk of infection remains close to zero. However, the packaging area of Hamilton Medical was experiencing particularly intensive carton abrasion and high dust levels. A clean room infrastructure for this area would have put an enormous strain on the budget. The managers were looking for an effective, economical, and convincing alternative.

Benefits

As a result of the air cleaning devices from Zehnder Clean Air Solutions, the particle concentration has been reduced by 59% and the germ count concentration by 73%. This has helped Hamilton Medical create the ideal conditions for ensuring the best possible hygiene standards. In addition, the medical technology company was able to benefit from enormous cost savings. Thanks to the Zehnder solution in the packaging area, there was no need to invest in a far more expensive clean room. Another added bonus is that, thanks to the clean air, the absentee rate also fell by 27%.

About Hamilton Medical AG

Hamilton Medical AG is one of the most internationally renowned manufacturers of medical ventilators and consumables for intensive care units, emergency rooms and patient transport.

Hamilton Medical is currently the fastest growing company in the global ‘medical ventilators’ business area and is presently ranked third in the world market. Hamilton Medical has around 350 employees at its headquarters in Bonaduz (Switzerland) and at its distribution site in Reno, Nevada (USA), and sells its products to hospitals across the globe.

Zehnder Clean Air Solutions replaces expensive investment in a clean room infrastructure

For the past year, Hamilton Medical AG, one of the most internationally renowned manufacturers of medical ventilators and consumables for intensive care units, A&E departments and patient transport, has been relying on state-of-the-art air cleaning technology for its sensitive production process. With its top hygiene standards – clean room quality for manufacturing and packaging – the company underpins its strong position in the international competitive environment.

Patient hygiene is the top priority

Hamilton Medical products such as medical ventilation hoses and flow sensors must be produced and packaged in a consistently hygienic process according to the 93/42/EEC European Directive and GMP (Good Manufacturing Practice), so that the material-related risk of infection for the patient is virtually non-existent. Furthermore, the medical technology company always ensures that its products are manufactured in accordance with ISO clean room class 9 as a minimum. According to the Hamilton Medical Head of Respiratory Care Supplies, Dr Hans von Pfuhlstein, the Swiss production location was therefore searching for effective solutions to improve the infrastructure for a hygienically optimised production process. **According to the Hamilton Medical Head of Respiratory Care Supplies, Dr Hans von Pfuhlstein, the Swiss production location was therefore searching for effective solutions to improve the infrastructure for a hygienically optimised production process.** The system had to have a flexible design in order to meet the hygiene standards, in particular with regard to the separated production areas. At the same time, the solution had to reduce the amount of cleaning required and the associated costs as much as possible.

Hamilton Medical’s main goal was **to enhance the clean room conditions throughout the production area in an affordable and flexible way and consequently reduce the amount of particles, germs, bacteria and viruses in the air to a minimum.** However, none of the previously evaluated clean room suppliers in the healthcare industry met the specific requirements of the medical technology company. Then, in 2015, at the Empack trade fair in Switzerland, Hamilton Medical heard about the leading indoor climate specialist Zehnder and its air cleaning systems, Zehnder Clean Air Solutions. Hamilton was excited about not only the technology, but also the enormous potential for cost savings.

In the run-up to the decision, Hamilton Medical defined a specification listing its main requirements for modern and efficient air cleaning. **Clean Air Solutions not only fulfilled all of the specifications but actually exceeded them, against all expectations.** The project was managed and implemented by Stefanie Schmidt, who was an undergraduate student at the time.

The specification:

- Ensure a consistent, very high hygiene standard in accordance with ISO clean room class 9 / GMP D throughout the production area.
- The equipment should be highly flexible and easy to remove and reposition.
- The equipment should be specifically aligned with particular dust sources. The packaging area in particular is subject to large volumes of dust due to carton abrasion. The equipment must ‘capture’ this dust immediately before it can spread through the rest of the hall area.
- High pressure needs to be generated, especially in the particularly sensitive production areas for medical ventilation hoses and sensors.
- Low energy and operating costs.
- Ensure a complete service package for upcoming filter replacement and maintenance, without affecting the production flow.
- No investment costs or long-term contract commitment. Hamilton Medical adopts the air cleaning systems as a service model and thus conserves its liquid funds.

Before the Hamilton Medical premises were equipped with Clean Air Solutions, numerous measurements were performed to determine the concentration of germs and particles in the room air.

During installation, the air cleaning units were ultimately placed next to the sensitive application areas in production and final inspection. The units run in automated permanent operation with two adjustable performance levels, which can be programmed using a timer. Hamilton Medical is therefore able to regulate the operating time in a customised and flexible manner, without causing pressure losses or drops in performance.
A further advantage of the air cleaning systems is their compact design, which enables fast mounting using steel chains directly on the ceiling. “This easy mounting process is a key part of their particular appeal, as it makes the air cleaning systems very flexible and enables them to be removed and suspended elsewhere as needed. Furthermore, the suspension height can easily be adjusted using the steel chain system in order to achieve the optimum airflow,” explains Dr von Pfuhlstein. With its usual focus on service, Zehnder installed the units outside of regular hours of operation in order to avoid disrupting Hamilton Medical’s production flow.

As well as installing Clean Air Solutions, Hamilton Medical also carried out additional accompanying measures in order to support the hygiene requirements even further. These comprised, for example, extensive hygiene training, an intensification of hygiene controls and even a tightening of clothes safety regulations (long-sleeved protective gown, face mask, hair net).

The hygiene requirements are greatly exceeded

In order to assess the efficiency in terms of the actual air quality, measurements for airborne germs and particles were carried out in twelve measurement locations after an operating time of one year with just one filter replacement. The results speak for themselves:

- Rather than ISO clean room class 9, the air conditions now correspond to clean room classes 6 – 7/GMP classes B – C in some cases. The general germ count was reduced by an average of 73%, while the particle count in the air decreased by 59%.
- As a positive side effect, the absentee rate for employees in production dropped by a whole 27% and is now significantly below the Swiss average.

These results impressively prove the high level of efficiency of Zehnder air cleaning technology, which was enhanced by the accompanying hygiene measures carried out by Hamilton Medical. The project has also been a complete success

in terms of costs: **by installing the air cleaning systems, the company was able to avoid the expense of investing in a clean room infrastructure which, by way of comparison, would have only paid itself off after more than 37 years.** This highlights once again the superiority of Zehnder Clean Air Solutions for outstanding hygienic conditions.

According to Dr Hans von Pfuhlstein, “The Zehnder air cleaning devices have now become an integral part of the production infrastructure and are therefore vital for maintaining the high hygiene standards that Hamilton Medical has set for itself.”

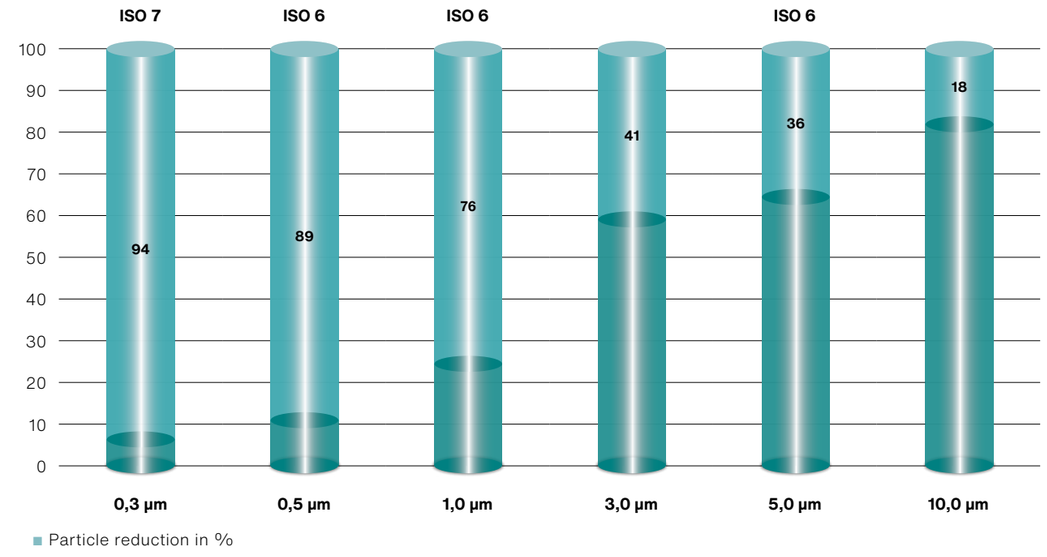
The medical technology company also sees very high potential for the future integration of the Zehnder air cleaning systems into its continuously growing infrastructure, rather than building costly clean rooms.

Clean room classes according to ISO 14644-1 and GMP

ISO class	GMP class	Number of particles per m³ at corresponding particle diameter					
		≥ 0.1 µm	≥ 0.2 µm	≥ 0.3 µm	≥ 0.5 µm	≥ 1.0 µm	≥ 5.0 µm
1		10	2				
2		100	24	10	4		
3		1,000	237	102	35	8	
4		10,000	2,370	1,020	352	83	
5	A–B	100,000	23,700	10,200	3,520	832	29
6	B	1,000,000	237,000	102,000	35,200	8,320	293
7	B–C				352,000	83,200	2,930
8	C–D				3,520,000	832,000	29,300
9					35,200,000	8,320,000	293,000

Source: Own representation based on the German Federal Ministry of Health.

Effective reduction in the number of particles at the Hamilton Medical site thanks to Zehnder Clean Air Solutions



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