

## EXECUTIVE DECISION BRIEF | MANUFACTURING

# Automated ventilation hygiene in manufacturing

*For pharmaceutical and biotech, medical device, food and beverage, cosmetics, consumer goods, and automotive manufacturing facilities*

### At a glance

- **The risk:** The air handling unit and ductwork supply the production area with air, yet their internal surfaces are cleaned infrequently, usually by hand and during a shutdown. Between interventions, their condition is neither visible nor documented.
- **The solution:** The compact LaraSystems unit disinfects the air handling unit and ductwork in an automated 4–9 minute weekly cycle using a hydrogen peroxide based aerosol, while the system operates and with every cycle recorded.
- **The evidence:** At one operating installation, the measured bacterial load fell from 550 to 10 CFU/m<sup>3</sup> after one cycle; without further disinfection, it rose to 90 CFU/m<sup>3</sup> over 12 days.
- **Recommended next step:** A site survey, followed by a system specific proposal and implementation schedule.

## 1. Why this matters to management

In sensitive manufacturing, a microbiological deviation does not remain a technical issue. It can trigger an investigation, repeat sampling, exceptional cleaning, a batch hold, or, in more serious cases, lost production and questions from customers or regulators. The air handling system is a critical link: it can carry contamination and distribute it throughout the facility. In large plants, that same air also affects employee health and the quality of the working environment. Ventilation hygiene therefore concerns quality, occupational health and safety, and facility management alike.

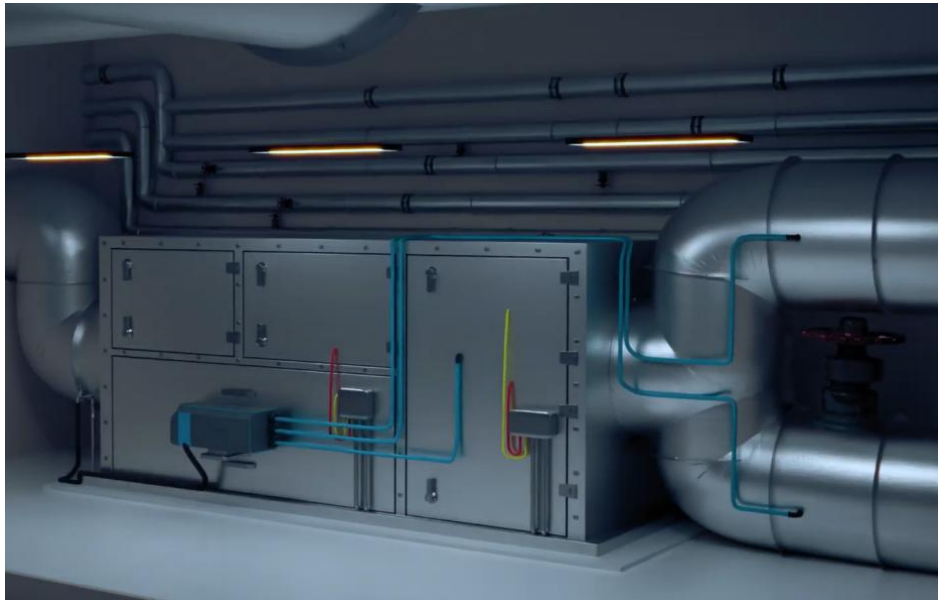
| Sector                                           | Regulatory and customer focus                                                                                                                              | Role of LaraSystems                                                                                                                  |
|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>Pharmaceuticals, biotech, medical devices</b> | EU GMP (Annex 1: contamination control strategy), deviation management and CAPA, qualified systems                                                         | A documented, repeatable measure addressing ventilation risk; IQ/OQ/PQ documentation support                                         |
| <b>Food and beverage manufacturing</b>           | HACCP, FSSC 22000 / BRCGS / IFS, environmental monitoring, especially mould in humid and chilled zones                                                     | Recorded cycles to support the HACCP plan and environmental monitoring                                                               |
| <b>Cosmetics</b>                                 | ISO 22716 (cosmetic GMP), microbiological quality of products                                                                                              | A planned hygiene process for air supplied to production areas                                                                       |
| <b>Consumer goods</b>                            | Food contact packaging (BRCGS Packaging), hygiene products, microbiological quality of household and personal care products                                | Recorded disinfection of air supplied to production areas to support hygiene and customer audits                                     |
| <b>Automotive manufacturing (OEM)</b>            | Workplace air quality in large, highly staffed facilities; ventilation hygiene as part of plant facility standards (often VDI 6022 in German owned plants) | Scheduled, recorded disinfection of air supplied to production halls and welfare areas; paint lines only after individual validation |
| <b>Automotive suppliers</b>                      | OEM customer requirements for facilities and audits, workplace air quality, IATF 16949 quality management context                                          | Documented facility hygiene for customer audits; technical cleanliness (particle) requirements remain separate                       |

**From a business perspective:** if the value of one avoided deviation, batch hold, or unplanned shutdown exceeds the system's total annual cost, the investment can be justified on that basis alone. Reduced manual intervention, better auditability, and a better working environment add further value.

## 2. How it works

The system turns air handling unit and ductwork hygiene from an occasional project into a scheduled, automated routine.

- **Cycle:** Typically once a week, with a disinfection cycle lasting at least 4 and at most 9 minutes (first the air handling unit, then the ductwork). Airflow distributes the fine aerosol. Scheduling can be aligned with shifts, and there is no waiting period after the cycle.
- **Disinfectant:** A hydrogen peroxide based disinfectant developed by Sanosil is dosed automatically in controlled quantities within the enclosed ventilation system. The manufacturer has more than 25 years of experience in aerosol disinfection; its disinfectants are also widely used in healthcare settings.
- **Integration:** Can be installed in existing or new air handling units and connected to a building management system (BMS). Multiple units and sites can be managed through one interface.
- **Monitoring and records:** The time and parameters of every cycle, device status, and disinfectant consumption are recorded and can be retrieved.
- **Resource use:** For a two channel configuration with a four minute weekly cycle, approximately 3.5 operating hours, 104 litres of water, and 55 kWh of energy per year.



## 3. What LaraSystems enables

**Continuous control instead of occasional intervention.** Air handling unit and ductwork hygiene becomes a scheduled process maintained week after week, rather than a snapshot at one point in time.

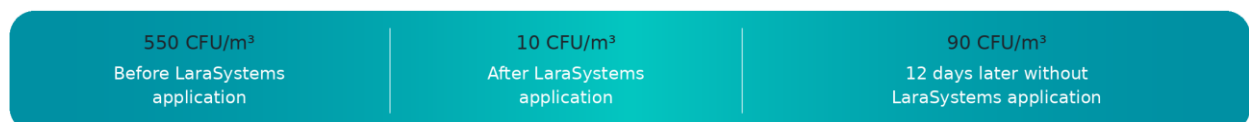
**Visibility where there was none before.** Every disinfection cycle is recorded, including its time, parameters, and disinfectant consumption. The period between two physical cleanings becomes documented and auditable.

**Hygiene without stopping production.** Cycles run during operation and can be aligned with shifts; there is no shutdown or waiting period.

**One standard across multiple sites.** Systems can be managed through a shared interface, allowing ventilation hygiene to be governed and reported consistently across the company.

## 4. Measurement at an operating installation

**Site:** Hungary's second largest shopping centre



The third value matters as much as the first two: without disinfection, the microbial load rose again substantially within 12 days. This supports regular automated cycles rather than a single intervention. These results relate to one specific site and are not a general performance or return on investment guarantee.

## 5. Compliance, safety, and scope of responsibility

- **Quality assurance:** Cycle records can support the traceability of GMP deviation management, the contamination control strategy, and HACCP control points, as well as customer and facility audits. Acceptance is determined by the local quality manager or auditor. For pharmaceutical customers, we support qualification with IQ/OQ/PQ documentation.
- **Occupational safety and sizing:** Dosing is matched to the size of the ventilation system. During the site survey, we review occupational safety and material compatibility with your specialists.
- **Regulatory status and certification:** The Sanosil disinfectant complies with the EU Biocidal Products Regulation (BPR), and LaraSystems products carry CE marking. The company is certified to ISO 9001, 14001, 45001, and 27001; the latter also helps with the IT/OT security assessment of the BMS connection.
- **Environmental and ESG impact:** Hydrogen peroxide decomposes into water and oxygen. Measured water, energy, and disinfectant consumption (E), workplace air quality (S), and records and auditability (G) can be used under the company's own ESG methodology.
- **Limitations:** The system disinfects the internal surfaces of the air handling unit and ductwork. It does not replace physical cleaning, room cleaning, local validation, or technical cleanliness (particle) requirements. Use in the air supply for automotive paint lines requires individual validation. Every installation requires a site survey and system specific sizing.

## 6. Recommended next step: survey and implementation

| Step                              | Scope                                                               |
|-----------------------------------|---------------------------------------------------------------------|
| 1. Site survey                    | Air handling units and ductwork, access, integration points         |
| 2. Sizing and proposal            | System specific design, total cost, implementation schedule         |
| 3. Installation and commissioning | Installation, BMS connection, disinfection cycle settings           |
| 4. Handover                       | Handover of the records and monitoring interface; operator training |

**What we need from you:** technical documentation for the air handling unit, one facility management and one quality contact, and access for the site survey.

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**LaraSystems – planned, measurable, documented ventilation hygiene**

*Breathe safe. Live better.*

## APPENDIX

### Internal cost estimation worksheet

Today, the cost of ventilation hygiene is typically spread across maintenance, quality, and production cost centres. The framework below supports a short internal estimate: your team enters the figures, and we help validate them during the site survey.

| Cost item                             | What it includes                                                    | Annual estimate (HUF) |
|---------------------------------------|---------------------------------------------------------------------|-----------------------|
| <b>Planned cleaning</b>               | Manual or robotic cleaning, external service provider, coordination |                       |
| <b>Downtime</b>                       | Shutdown or restricted production during the intervention           |                       |
| <b>Deviation investigations</b>       | Quality team hours, additional sampling, laboratory costs           |                       |
| <b>Product loss</b>                   | Held or rejected batches, repeat production                         |                       |
| <b>Exceptional intervention</b>       | Exceptional cleaning, requalification, callout                      |                       |
| <b>Working environment</b>            | Air quality complaints, absence, occupational health measures       |                       |
| <b>Audits and customer compliance</b> | Preparing documentation, burden of proof                            |                       |
| <b>Total</b>                          |                                                                     |                       |

**Decision rule:** if the value of one avoided deviation or batch hold exceeds the system's total annual cost (survey, installation, disinfectant, filters, maintenance, water, and energy), the investment can be justified on that basis alone. Reduced manual intervention and better auditability add further value.