

Munters Reventa Germany
Lavamatic® chemical air scrubber for
poultry farms
Summary of performance and test results

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1 Introduction

It is well known that chemical air scrubbers can reduce ammonia and dust emissions from animal farms (R. W. Welse et al., 2009). The Lavamatic® chemical air scrubber was developed in 2015 and since then installed at many animal barns. In Germany since 2022 it is required to apply for a certification of the performance of the scrubber system (TA-Luft, 2021). Therefore, Munters Reventa Germany started the testing on a layer and a broiler farm in 2023. The measurements are done by the LUFA Nordwest, Oldenburg, a certified measuring institute and will be approved by the DLG, Frankfurt.

2 System description

The Lavamatic® is a chemical air scrubber that reduces ammonia and dust emissions by using water to wash the dust and sulfuric acid to catch the ammonia in the exhaust air of animal barns.

It is a modular system and available in different sizes depending on the air volume to be cleaned. The largest module can clean a maximum air volume of 110,000 – 120,000m³/h depending on the pressure loss of the ventilation system. This module is equipped with 4 EC-fans with a capacity of 30,000m³/h each at a pressure loss of 230Pa. See Figure 1 with the data from the fan supplier.

air performance p_{sF}

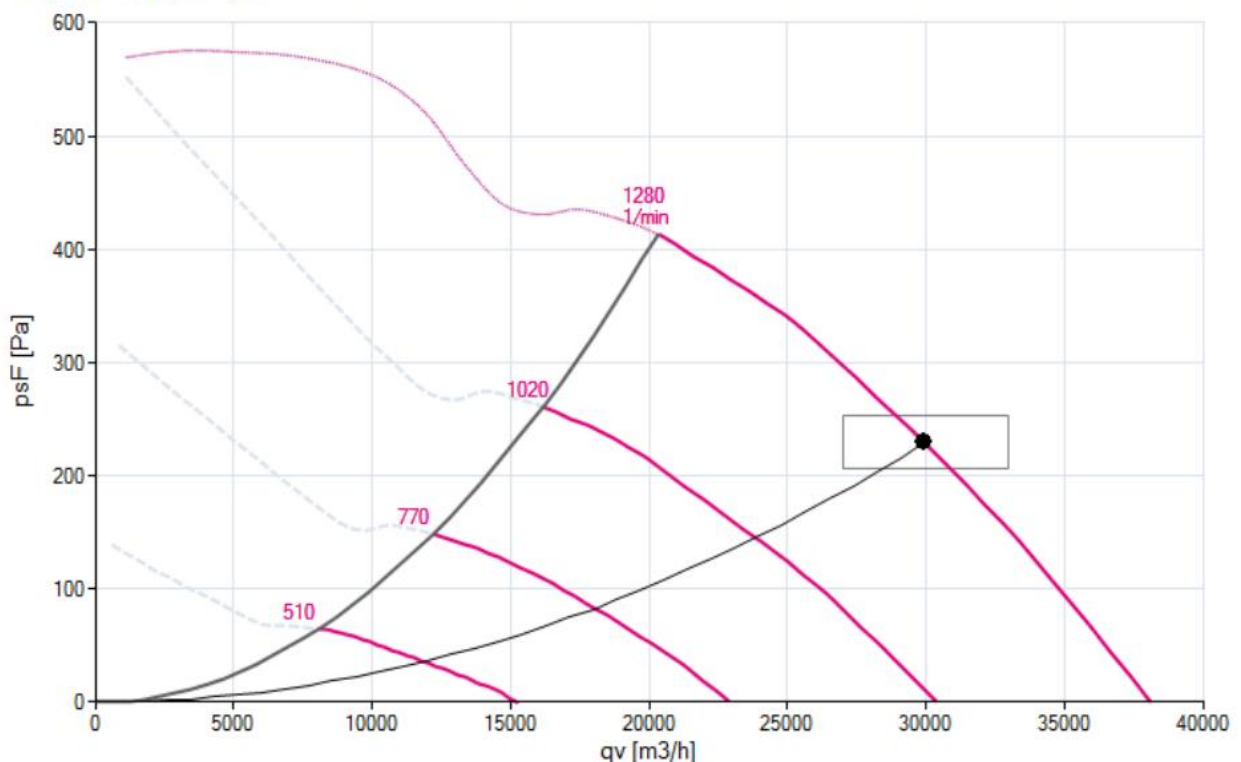


Figure 1: Air volume vs. pressure loss of the Lavamatic EC-fan (Ziehl-Abegg fan select data sheet). At a total pressure loss (Lavamatic and poultry house) of 230 Pa each fan can convey 30.000m³/h. 4 fans per Lavamatic lead to an air volume of 120.000m³/h.

3 Test results

3.1 Results from DLG test report layers (finalization in progress)

Starting in summer 2023 to the summer of 2024 the LUFA Northwest performed measurements on a layer farm in Northern Germany. The results of these measurements were sent to the DLG and in November an official approval of this system for layers was granted. The finalization of the test report (no. 7521) is still in progress.

3.1.1 Ammonia and dust reduction for layer farms

In the figures below the results of the ammonia (figure 2) and dust reduction (figure 3) are shown. All measurements were above the minimum requirement of a 70% reduction.

Prüfkriterium	Ergebnis	Bewertung*
Ergebnisse der Emissionsmessungen		
Ammoniak (jeweils mindestens sechs Wochen kontinuierlich gemessen)		
Winter, Mindestabscheidegrad [%] ^[1]	85,1	■ ■ ■ ■ □
Sommer, Mindestabscheidegrad [%] ^[1]	80,5	■ ■ ■ ■ □
N-Entfrachtung		
Winter [%]	89,1	■ ■ ■ ■ □
Sommer 1. Bilanz [%]	84,8	■ ■ ■ ■ □
Sommer 2. Bilanz [%]	83,5	■ ■ ■ ■ □

Figure 2: ammonia reduction under summer and winter conditions (preliminary DLG-report 2025).

Prüfkriterium	Ergebnis	Bewertung*
Ergebnisse der Emissionsmessungen		
Gesamtstaub (gravimetrisch)		
Winter (3 Messungen), Mindestabscheidegrad [%] ^{[1], [2]}	74,3	■ ■ ■ □ □
Sommer (4 Messungen), Mindestabscheidegrad [%] ^{[1], [2]}	80,3	■ ■ ■ ■ □
Feinstaub PM₁₀ (gravimetrisch) ^[3]		
Winter (3 Messungen), Mindestabscheidegrad [%] ^{[1], [2]}	72,5	■ ■ ■ □ □
Sommer (3 Messungen), Mindestabscheidegrad [%] ^{[1], [2]}	72,8	■ ■ ■ □ □

Figure 3: dust reduction under summer and winter conditions (preliminary DLG-report 2025).

3.2 Expert opinion from 2016 on dust and ammonia reduction for a broiler farm

In 2015/16 Munters Reventa together with experts from Uppenkamp & Partner evaluated the emission reduction of the Lavamatic system at a broiler farm in Northern Germany. The measurements were performed by the LUFA Northwest.

Remark: To achieve a DLG-certification new measurements are required due to new legislative requirements in Germany (TA-Luft 2021).

The results of the average dust reduction were 90% for the total dust and 74% for the fine dust (PM₁₀). The achieved ammonia reduction was 75%.

3.3 Results from the LUFA measurements on a broiler farm

For the DLG-certification of the Lavamatic® Munters Reventa Germany started measurements of ammonia and dust reduction together with the LUFA Nordwest on a broiler farm in Northern Germany. These measurements are done to achieve a DLG certification for the Lavamatic® for broiler farms. In the following extracts of the reported results are shown. The finalization of the measurements is still in progress.

3.3.1 Ammonia reduction

According to the DLG-guidelines at least 4 continuous ammonia measurements must be done (2 under summer conditions and 2 under winter conditions) during the fattening period of broilers.

Under summer conditions the average ammonia reduction was mostly at around 90%. The data of a complete measurement under summer conditions are shown in figure 4.

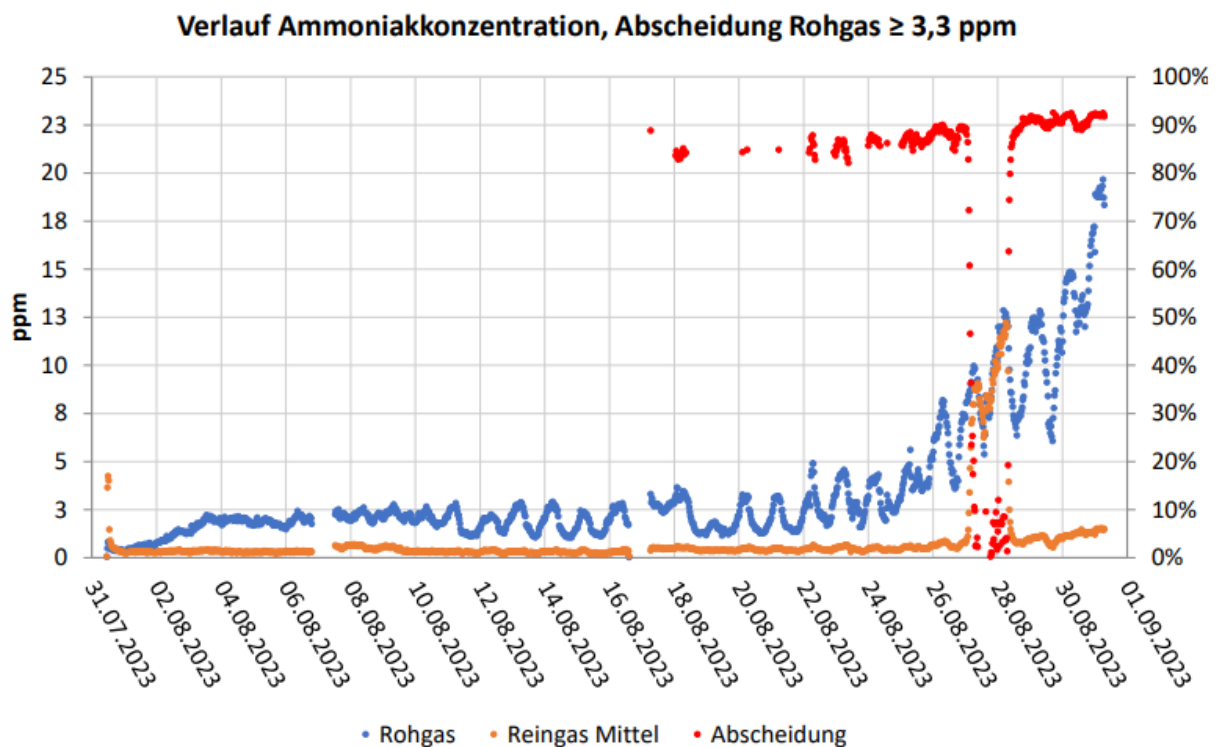


Figure 4: Ammonia reduction under summer conditions (LUFA Nordwest). Blue Line: exhaust air, orange line: clean air, red line: reduction.

Under winter conditions the average ammonia reduction was mostly at around 90%. The data of two winter measurements are shown in figures 5 and 6.

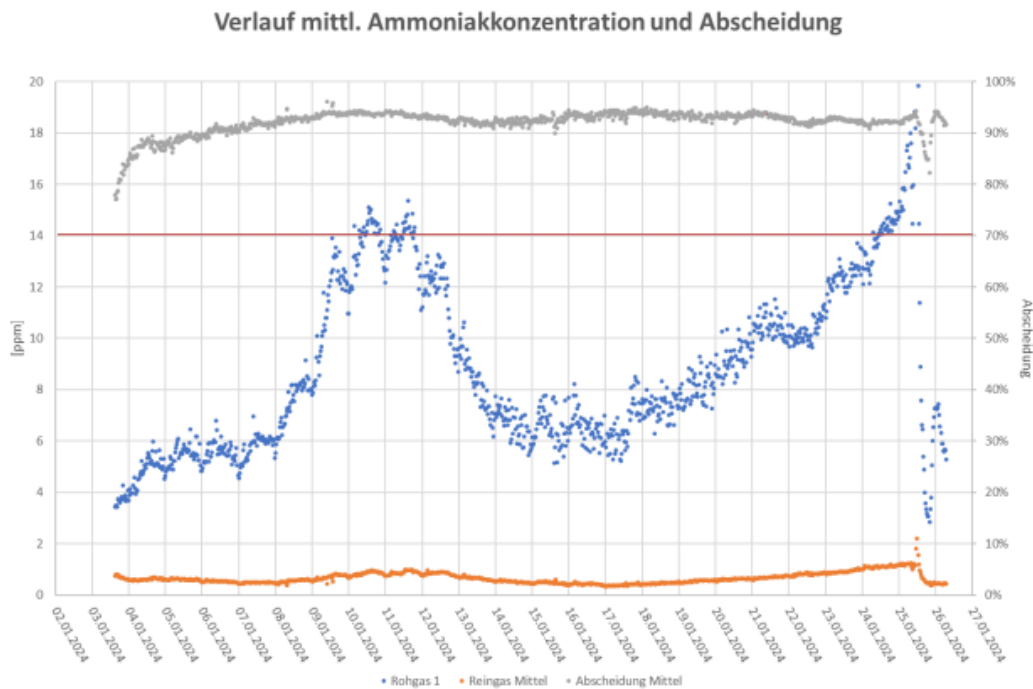


Figure 5 : Ammonia reduction under winter conditions (1st measurement LUFA Northwest).
Blue Line: exhaust air, orange line: clean air, grey line: reduction.

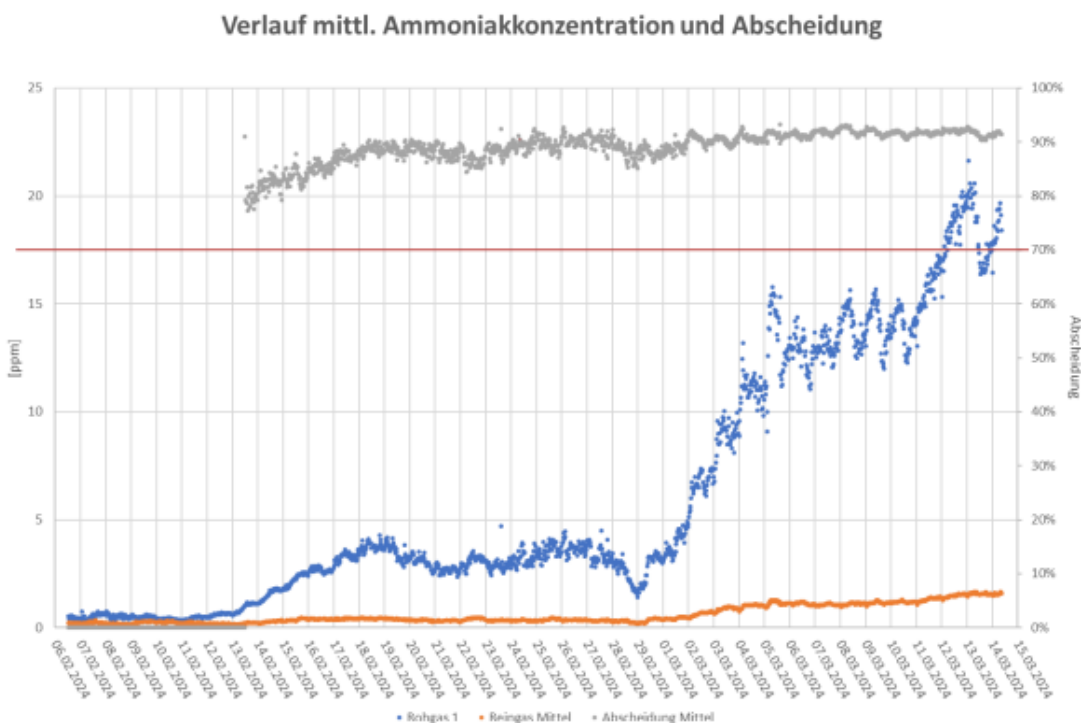


Figure 6: Ammonia reduction under winter conditions (2nd measurement LUFA Northwest).
Blue Line: exhaust air, orange line: clean air, grey line: reduction.

3.3.2 Dust reduction

For dust reduction several measurements must be done under summer and winter conditions. So far, the results in table 1 could be achieved.

Table 1: Total and fine dust reduction under summer and winter conditions on a broiler farm (LUFA Nordwest).

	Total dust	Fine dust (PM10)
Summer	-82%	-72%
Winter	ongoing	ongoing