

MELT recommendation on admission to the  
Danish Environmental Protection Agency's Technology List



Applicant	AgriFarm A/S
Date of application	2019-02-05
Name of Technology	AGRI Airclean air cleaner
Dialogue with applicant	This recommendation deals with full recording on the Technology List based on the previous indicative opinion. The technology has been tested in agreement with the applicant according to the VERA Protocol and verified against the Technology List Level
Description of technology	<p>AGRI AirClean is a two-step vertical chemical air purifier. The air cleaner is cylindrical, has a height of 11 m and a cross section of 2.8 m. The air is supplied from the bottom of the air cleaner, where a fan is placed. The various steps of the air cleaner are placed on top of each other and are isolated from each other, however, so that the air can freely pass through the cleaner.</p> <p>The air cleaner has a maximum capacity of 3450 m<sup>3</sup> air m<sup>-2</sup> surface area hour<sup>-1</sup>.</p> <p>The first step consists of an acid scrubber primarily for the cleaning of ammonia. The filter material is 3.7 m<sup>3</sup> (0.6 m high). The filter material is irrigated by fluid nozzles. A pump recirculates liquid from the bottom of the cleaning step. The acid addition is controlled by an acid dosing pump, with a PID control ensures that the pH is kept at the desired level (pH = 2.2) by a pH sensor. The acid (96% conc. Sulfuric acid) is sucked from a tank next to the air cleaner. The liquid is renewed regularly so that the saturation level is kept down. This takes place by draining liquid to a separate tank, followed by the addition of clean water replacement of evaporated and stripped liquid. Drainage is controlled by the liquid conductivity. A level sensor ensures that the liquid level is always kept within a predetermined interval.</p> <p>The second step consists of a base scrubber, primarily for cleaning odorants (H<sub>2</sub>S with more). The step works in the same way as the first step, with a filter material there irrigated with recycled liquid. In the base step, the filter material constitutes 9.2 m<sup>3</sup> (1.5 m high). Here, there is placed in a closed tank in the basement during the cleaner. The base addition to the tank is regulated by a pump which, with a PID control, ensures that the pH is maintained at the desired level (pH = 9-10) via a pH sensor. Bases (27%. Concentrated sodium hydroxide) is sucked from a tank next to the air cleaner. The liquid in the tank is renewed in the same way as the first step.</p> <p>There is a drop trap between the two steps and after step 2, which limits mixing of acid / base and yield of NaOH out of the air cleaner.</p>
MELT recommendation	<p>MELT recommends that Agri AirClean be included in the Danish Environmental Protection Agency's Technology List following cleaning efficiency in pig houses.</p> <ul style="list-style-type: none"> <li>• Ammonia: 91%</li> <li>• Odor: 83%</li> <li>• Dust: Not quantified</li> </ul>
Reason for recommendation	The AGRI AirClean air cleaner is a chemical air cleaner that can be implemented in pig houses to reduce ammonia and odor emissions. The air cleaner is tested on

	<p>point extraction air, but is considered to have the same effect in full or in part air cleaning of ordinary house air, subject to corresponding dimensioning.</p> <p>Verification of the AGRI AirClean air cleaner made in accordance with the applicable VERA protocol at the start of the test (Test Protocol for Air Cleaning Technologies, Version 1, 2010-09-17) has demonstrated the above-mentioned effect when used in pig housing.</p> <p>The verification of the AGRI AirClean air cleaner's effect on odor is based on chemical measurements of odorants (Hansen, MJ &amp; Feilberg, A 2019, A protocol for chemical measurement of odor in relation to abatement technologies for animal production. Aarhus University, 11 s).</p> <p>The AGRI AirClean air cleaner has proven satisfactory operating stability.</p>
Recommended text for technology List	<p>The AGRI AirClean air cleaner has the following cleaning efficiency in pig houses:</p> <ul style="list-style-type: none"> <li>• Ammonia: 91%</li> <li>• Odor: 83%</li> </ul> <p>The AGRI AirClean air cleaner has proven satisfactory operating stability.</p>
MELT experts	Information on MELT experts can be provided by contacting the Danish Environmental Protection Agency.
Recommendation sent to The Danish Environmental Protection Agency (date)	2019-05-06
Environmental Protection Agency decision (to be completed by Environmental Protection Agency)	On 22 May 2019, the Danish Environmental Protection Agency joined the recommendation from MELT