Government
of Flanders

Ministerial decree amending the Ministerial Decree of 19 March 2004 establishing the list of low-ammonia-emission barn systems, implementing Articles 1.1.2 and 5.9.2.1bis of the Decree of the Government of Flanders of 1 June 1995 laying down general and sectoral provisions on environmental hygiene

Legal bases

This Decree is based on:
-the Decree of 5 April 1995 laying down general provisions on environmental policy, Article 5.4.1, inserted by the Decree of 25 April 2014;
- the Decree of the Government of Flanders of 1 June 1995 laying down general and sectoral provisions on environmental hygiene, Article 1.1.2, last amended by the Decree of the Government of Flanders of 21 June 2024, and Article 5.9.2.1bis, inserted by the Decree of the Government of Flanders of 19 September 2003 and last amended by the Decree of the Government of Flanders of 7 July 2023.

Procedural requirements

The following procedural requirements are fulfilled:
- The Inspectorate of Finance issued its opinion on ... (date).
- The Council of State issued its opinion on ... (date).
- This draft was communicated to the European Commission on (date), in accordance with Article 5 van Directive (EU) 2015/1535 of the European Parliament and of the Council of 9 September 2015 laying down a procedure for the provision of information in the field of technical regulations and of rules on Information Society services.

THE FLEMISH MINISTER OF THE ENVIRONMENT AND AGRICULTURE DECREES:

Article1 In Annex I to the Ministerial Decree of 19 March 2004 establishing the list of low-ammonia-emission barn systems, implementing Articles 1.1.2 and 5.9.2.1bis of the Decree of the Government of Flanders of 1 June 1995 laying down general and sectoral provisions on environmental hygiene, last amended by the Ministerial Decree of 14 March 2023, in point 1.1, the phrase ‘in pig and poultry barns.’ is replaced by the phrase ‘in pig, poultry and cattle barns. Low-ammonia-emission stable systems for cattle barns shall be included in the R list.’.

Article 2 A new Chapter 7, consisting of Articles 7.1.1.1 to 7.1.1.4, is added to Annex I to the same Ministerial Decree, as last amended by the Ministerial Decree of 14 March 2023, and shall read as follows:

‘Chapter 7:R List of low-ammonia-emission barn systems for cattle.

Section 1 Low-ammonia-emission barn systems for mature dairy cattle over two years of age

7.1.1. System R-1.1. Lely Sphere – Naturally ventilated cubicle barns with a slatted floor equipped with dividers featuring urine drainage holes in the slats, frequent humidification and cleaning of the floor by a manure collection robot, and mechanical cellar-air extraction using a chemical air-scrubbing system

7.1.1.1

Animal category:
R-1 Mature dairy cattle over two years of age

Code:
AEA – R-1.1

Name of the system:
Lely Sphere – Naturally ventilated cubicle barns with a slatted floor equipped with dividers featuring urine drainage holes in the slats, frequent humidification and cleaning of the floor by a manure collection robot, and mechanical cellar-air extraction using a chemical air-scrubbing system

Emission factor:
Ammonia emissions are 3 kg NH_3 per animal place per year.

7.1.1.2. Operating principle

The ammonia-emission reduction is based on the manure being regularly removed from the slatted floor, the pit being largely sealed, and ventilation air drawn from the pit being treated in a chemical air-scrubbing system.

The slats shall be fitted with dividers in which urine drainage holes are installed. Most of the urine flows through these drainage holes to the pit underneath. The faeces and the remaining part of the urine lying on the floor are sucked up by a manure collection robot. This robot shall also moistens the floor by spraying water over it. The water shall be sprayed from the front of the robot to remove the faeces from the floor more effectively. Some water shall be sprayed from the back of this robot to prevent the floor from becoming slippery. This water-spraying system used by the manure collection robot shall account for most of the time during which the robot is moving. When the robot is reversing, turning, and moving over a newly cleaned floor, the spray system is usually switched off. The routes to be followed by the manure collection robot and the use of the spray system shall be set by the supplier. Cleaning the floor frequently contributes to good and rapid urine drainage.

By applying the dividers with urine drainage holes in the slats, the exchange of air between the pit and the barn is prevented, and the air from the barn can be extracted effectively (capture efficiency is increased by means of extraction points close to the emitting floor surface) and largely scrubbed of ammonia in the air-scrubbing system (high removal efficiency). The air-scrubbing system described above shall be installed using a cross-flow filter unit. The washing section shall consist of a column of filling material that is continuously kept moist with an acidified washing liquid, for example by spraying or through an overflow system.

The purified air shall leave the installation via a drip catcher. With the help of a fan behind the drip catcher, the air is sucked through the air-scrubbing system. The pit air-extraction system shall be equipped with equipment that continuously and reliably measures and records the ventilation flow rate.

The pit air-extraction system with integrated air-scrubbing system shall be made up of modules that are placed outside the barn and connected to the manure pit (e.g. to the mixing pits). When the stable air passes through the air-scrubbing system, most of the ammonia is captured in the washing fluid, after which the purified air leaves the system. By adding sulphuric acid to the washing fluid, the ammonia is bound as ammonium sulphate, after which this substance is dissolved and disposed of in the waste water. This shall be done in accordance with Article 5.4.1.1.

7.1.1.3. Design of the measure

A. Design requirements

1. *Walking floor*

For the whole of the slatted floor, the slats shall be fitted with dividers featuring urine drainage holes.

The dividers shall cover the entire surface of the slats. The measuring tolerance of the divider in relation to the length of the slat shall be a maximum of 10 mm per slat. This 10 mm is the sum of the margin of the two short sides of the slat. The dividers shall be made of a smooth and non-permeable material. The top of the divider shall measure at least 1 mm, with a maximum depth of 4 mm in relation to the top of the slat bar. The urine drainage holes shall be distributed across the surface of the slats. Each square metre of slatted floor shall contain 30 to 40 drainage holes with a diameter of 8 mm. At the level of the drainage hole, the divider shall be no more than 2 mm thick.

The floor area smeared with manure shall not exceed 5.5 m^2 per animal place. This surface includes the walkways, the passages and the holding area. It shall include neither the floor area of the milking stall nor the feeding step (if present).

A maximum of 5% of the floor area smeared with manure shall be exempt from the requirements for floor design. This section need not be fitted with the system described above, but must be constructed as a dense floor.

2. *Manure pit and manure drainage*

A manure pit in with an open-air connection to the air-extraction points shall be present below the entire surface of the slatted floor. The manure pit must not be have an open air connection to another manure pit that is not provided with a closed cover.

The manure pit under the slatted floor shall never be fully filled with manure. There shall always be sufficient free air space under the floor for an unhindered, forced air flow in the direction of the air-scrubbing system. There shall be at least 0.3 metres of free space between the underside of the floor and the top surface of the manure.

At least one discharge area shall be provided for the manure collection robot to dump the extracted manure. The discharge area shall be fitted with an airtight closure that prevents emissions from the manure pit. This may take the form of a letterbox-style closure, rubber flaps that return to their original position, or other methods that prevent emissions from the manure pit to the greatest extent possible.

An implementation plan, as referred to in point 5.2.2.2, shall be drawn up with an accompanying floor plan of the section(s) of the barn(s) whose air-scrubbing system shall treat the part of the barn air. This floor plan shall indicate the outer boundaries of the manure pit(s), the manure pit(s) whose air is sucked in and treated by the air-scrubbing system, and the discharge point(s) for the manure collection robot.

3. *Manure collection robot*

The manure collection robot shall remove manure from the floor.

The manure collection robot shall be equipped with a suction nozzle and a manure scraper. The manure scraper shall centre the manure to the front of the suction nozzle while moving, which shall suck up the manure to the tank of the manure collection robot.

The surface of the running floor must be properly cleaned by the manure collection robot. For this purpose, the manure collection robot shall be equipped with a scraper blade, a manure collection system and a water-spraying system. The water-spraying system shall be installed at both the front and the rear. The capacity of the combined water-spraying system shall be approximately three litres of water per minute.

The manure collection robot shall be equipped with equipment to programme routes and driving times, and shall start automatically. Recording equipment shall be installed to keep track of the start times and routing of the manure collection robot, to ensure that cleaning occurs frequently. A calibrated digital water meter shall record the water consumption of the water-spraying system.

The scraping frequency of the manure collection robot shall be at least 12 cleanings per day.

There shall be a declaration of job completion, on which the charging points (for both electricity and water) of the manure collection robot shall be indicated on a floor plan. The routes shall be set in such a way that manure is removed from the floor every two hours on average. The manure collection robot shall be equipped with a time-recording system, with a data-retrieval option going back at least 12 months, showing for how many hours per it is in operation per day and which routes it has taken. The manure collection robot may be stationary for a maximum of four consecutive hours at night to fully charge its battery.

4. *Partial barn-air extraction with air-scrubbing system*

The chemical air-scrubbing systems that treat the ventilation air drawn from the pit and form part of the barn system shall comply with the requirements and conditions set out in Chapter 5, Section 2 and Section 4(1).

B. Usage requirements:

1. *Manure collection robot*

General

The manure shall be removed from the floor every two hours on average.

The manure on the part of the walkway directly behind the feed barrier where the cows eat shall be removed at least every eight hours. This applies only to the first part behind the feed barrier, more specifically the first 2.2 to 2.4 metres behind the feed barrier.

The manure collection robot shall clean at least 95% of the manure-stained surface of the barn. The remaining surface area (not cleaned by the manure collection robot) shall be manually cleaned twice a day, whereby the manure present shall be removed and any blocked urine drainage holes shall be unblocked.

Where the duration of use of the holding area is limited to fixed milking times, it shall be sufficient to clean the floor of the holding area after each use.

If the holding area is in continuous use for an automatic milking system, the cleaning requirements shall apply, with the manure being removed from the floor every two hours on average.

At least three litres of water per square metre of cleaned floor shall be sprayed every 24 hours. This shall be done by means of nozzles with a wide spray pattern at the front and rear of the manure collection robot, whereby the average amount of water is evenly distributed between the front and rear.

Maintenance

There shall be a daily visual check of the state of blockage of the urine drainage holes in the dividers and of the operation of the manure collection robot. Where necessary, maintenance shall be carried out to ensure the proper functioning of the system.

The manure collection robot as a whole, the dividers with the urine drainage holes, and the sealing devices of the discharge area for the manure collection robot, shall be checked for proper functioning and for damage at every two months.

Repairs or replacements shall be carried out if necessary, after both the daily and the two-monthly checks.

To this end, it is recommended that a maintenance contract be concluded with the supplier of the products or with another expert party.

The manure collection robot's driving times shall recorded digitally, with past data in this regard being available for consultation for three months.

The operator shall keep a logbook recording when and by whom the manure collection robot with water-spraying system, the inlays with the urine discharge holes in slats, and the sealing devices in the discharge site, were checked and maintained.

Checks

The manure collection robot shall also be equipped with a time-recording system. The data shall be kept available for inspection for at least 12 months. The time-recording system shall record how many hours per day the manure collection robot is in operation and which routes were driven. The manure collection robot may remain stationary at night no more than four consecutive hours for the purpose of fully charging its battery. The water consumption of the spraying system shall be recorded digitally at least once a day.

The following conditions shall be met in the course of checks:

a) The urine drainage holes in the dividers are open.
b) Manure is sufficiently removed from the floor following the passage of the manure scraper.
c) The floor is visually clean and free of caked old manure.
d) With the help of invoices, it is possible to demonstrate maintenance, which is carried out at least once a year. Invoices for the last five years must be made available for inspection by the monitoring authority.
e) The sealing devices in the discharge areas seal properly.

2. Partial barn-air extraction with air-scrubbing system

All air from the manure pit shall leave the barn through the pit's extraction unit. This part of the barn air shall be treated in the air-scrubbing system. To this end, each air-scrubbing system shall have a flow rate of at least 30 m^3 of air per hour per square metre of manure-covered floor area. For this purpose, the air-scrubber system shall operate independently of the natural ventilation system with transverse and/or ridge ventilation above the floor in the barn.

In order to ensure the homogeneous suction of the part of the barn air from the manure pit, the pit's extraction unit shall be connected in an airtight manner to the manure pit. The manure pit shall have a pressure of at least 25 Pa. To check this, the pressure shall be measured in at least two locations, via continuous measurement and logging of the measurement data. The pressure is measured at least at the washing system itself and under the floor of the stable at the point furthest away from the pit extraction unit. The recorded data shall be kept for inspection for at least five years. This shall also be included in the implementation plan, and the pressure-measuring points shall be indicated in the floor plan.

The cleaning water shall have a specific weight of no more than 1.25 g/cm^3. This specific weight may not increase or decrease by more than 0.1 g/cm^3 per hour.

The air-scrubbing system shall be continuously electronically monitored, in an adequate and automated manner, for the following parameters relevant to its proper functioning:

a) the acidity of the cleaning water, expressed in pH;
b) the conductivity of the cleaning water, expressed in mS/cm;
c) the spraying-water production, expressed in m^3;

d) the pressure drop over the air scrubber, expressed in Pa;
e) the electricity consumption of the cleaning-water pump(s), expressed in kWh;
f) the cleaning-water flow rate, expressed in m^3 per hour.

The acidity of the cleaning water in the chemical scrubber shall not exceed a pH of 2.5. The conductivity of the cleaning water in the chemical scrubber shall not exceed 280 mS/cm. In addition, the conductivity shall not deviate (either downwards or upwards) by more than 40 mS/cm from the calculated conductivity value based on the specific weight.

In order to monitor these parameters, effective measuring devices shall be installed with each air-scrubbing system. The recorded values shall be recorded at least once an hour and provided automatically to the government in the form of a .csv table, either online or by means of an email to the Manure Bank. The recorded values shall be available to the operator, the Manure Bank or a supervisory authority. The recorded values shall be kept for at least five years. The electronic monitoring system shall be equipped with an alarm. If the limit values of the relevant parameters are exceeded, this alarm shall sound, upon which action must be taken by the operator and/or manufacturer of the air-scrubbing system. The limit values of the relevant parameters are provided in point 5.4.1.6.

7.1.1.4. Emission factor:

The ammonia emission factor shall amount to 3 kg NH_3 per animal place per year.'.

Article 3 This Decree shall enter into force on the day of its publication in the Belgian Official Gazette.

Brussels, (date).

The Flemish Minister for the Environment and Agriculture,

Jo BROUNS