

## Scientific underpinning for a maximum temperature for applying slurry with a trailing shoe.

The air temperature partly determines the temperature of the manure and thus the course of the chemical and biological processes. A higher temperature generally results in more emissions. Générmont & Cellier (1997) found that an increase in air temperature by 2°C or 4°C resulted in an increase in emissions by approximately 10% and 20%.

An increase in the average air temperature from 10°C to 20°C, depending on the manure application technique, increased emissions by 55 to 85% on arable land in an extensive Dutch study by Huijsmans et al. (2003).

**Application timing management systems (ATMS).** Ammonia emissions are highest under warm, dry, windy conditions (i.e., when evapotranspiration rates are high). Emissions can be reduced by optimizing the timing of application, i.e., cool, humid conditions, in the evenings, before or during light rain and by avoiding spreading during warm weather conditions, particularly during periods when solar elevation, and hence solar radiation input, is most intense (June/July).

The data from reported by the Royal Netherlands Meteorological Institute shows that the daily average temperature over the last 100 years remains normally below 20 °C, while the daily maximum temperature can normally exceed 20 °C % from June to end of August. Also highest daily minimum temperature almost always stayed below 20 °C., see : <https://www.knmi.nl/nederland-nu/klimatologie/grafieken/jaar>

*Economic Commission for Europe, Guidance document on preventing and abating ammonia emissions from agricultural sources (2014), page 53, paragraph 162.*

[https://www.unece.org/fileadmin/DAM/env/documents/2012/EB/ECE\\_EB.AIR\\_120\\_ENG.pdf](https://www.unece.org/fileadmin/DAM/env/documents/2012/EB/ECE_EB.AIR_120_ENG.pdf)

*Générmont S., Cellier P. (1997) A mechanistic model for estimating ammonia volatilization from slurry applied to bare soil. Agricultural and Forest Meteorology 88, 145-167.*

*Huijsmans J.F.M., Hol J.M.G., Vermeulen G.D. (2003) Effect of application method, manure characteristics, weather and field conditions on ammonia volatilization from manure applied to arable land. Atmospheric Environment 37, 3669-3680.*