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# European Standard for solid fertilizer distributors

## Environmental related requirements and test methods harmonized Europe-wide

*For the first time with the Standard EN 13739-1 and -2, a unified requirement level regarding environmental protection has been introduced. The test and assessment procedures allow its execution under reproducible comparative testing Europe-wide. This improves competition and benefits producers and applicators as well. Simple and clear adjustment instructions, and adjustment aids should motivate farmers to correctly set their machines, which will produce an economical as well as an ecologically positive effect.*

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### Keywords

Environmental protection, European standardisation, solid fertilizer distributors, evenness of distribution, border spreading

**E**co-friendly processes as well as resource conserving and sustainable forms of cultivation are of special significance right in agricultural production as land cannot be enlarged. In highly sensitive fields such as fertilisation and crop protection, the industry already has continuously improved the equipment for the spreading (dosage and distribution) over the past years so that from the technical point of view they are at a high level. At the same time, testing and assessment procedures have been developed, allowing a comparison of machinery and spreading quality. Now, for the first time – after more than ten years of often controversial discussions – Europe-wide valid standardised environmental-related requirements and test methods for solid fertiliser distributors in terms of a European standard (EN) could be achieved. In this context it is particularly positive that at the end of the consultations there was a consensus of all involved parties (industry, test institutes, authorities) and unanimous acceptance of the standard.

### European standardisation and its co-operators

Members – and consequently entitled to vote – within the European Committee for Standardisation (CEN) are the national standards institutes. The votes are weighted according to the EC Treaty (Treaty of Amsterdam). The principle of delegations applies so that countries participating in the European standardisation process are obliged to formulate one national opinion in the preliminary stages of international discussions. In Germany, the German Institute for Standardisation (DIN) is in charge of the standardisation processes which in turn has assigned the responsibility for standards relevant for mechanical engineering to the Standardisation Department (NAM) which is organisationally associated to the VDMA. The German delegation, having accompanied the standardisation work on this standard since the beginning of the discussions in June 1992, consisted on equal terms of representatives of

manufacturers, DLG (German Agricultural Society) and the VDMA. Besides this, regular reports on progress to the national technical committee in charge (NLA TA 2; Standardisation Body for Agricultural Machines, Technical Committee 2 – Machinery and Equipment for tillage, seeding and crop protection) assured the national formation of consensus.

### Environmental protection with mineral fertilisation

Differing from the operational safety (Machinery Directive) there are no (harmonised) European regulations regarding environmental protection of solid fertilisation. Therefore, the CE marking required in the field of safety engineering does not apply with regard to the aspect of environmental protection and therewith it lacks the pressure to apply appropriate EN standards. Anyhow, for the future, the European manufacturers of fertiliser distributors agreed to communicate the conformity with the new environmental standard of their machines.

Table 1: Maximum allowed deviation of the obtained flow rate from the intended flow rate

Intended flow rate kg/min	Maximum allowed deviation of the obtained flow rate from the intended flow rate %
< 25	15
25 – 150	10
> 150	7,5

Table 2: Maximum allowed deviation from the average obtained flow rate

Average obtained flow rate kg/min	Maximum allowed deviation from the average obtained flow rate %
< 25	10
25 – 150	7,5
> 150	5

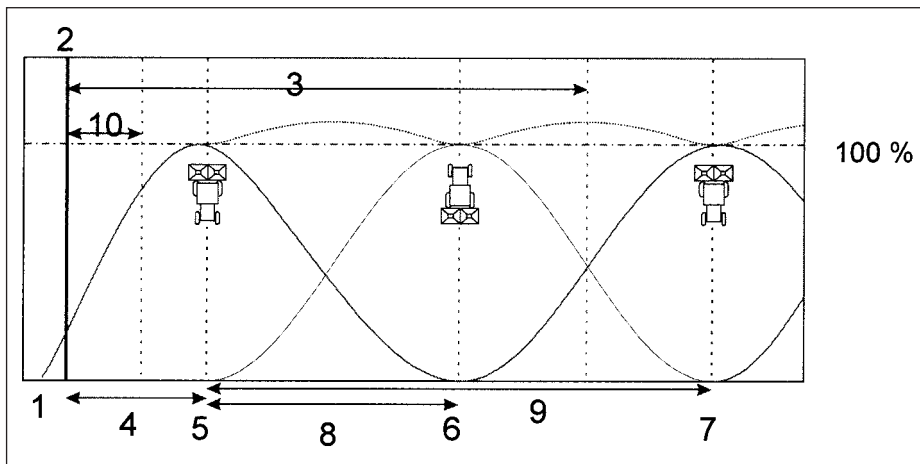


Fig. 1: Illustration of definitions related to border spreading; 1 fertilising limit, 2 border, 3 transition width, 4 border line distance, 5 edge tramline, 6 first field tramline, 7 second field tramline, 8 working width, 9 throwing width, 10 edge width

In Germany, the new standard will achieve a high significance as the German national so-called „fertiliser regulation“ which came into force on 1996-01-27 requires that with respect to the used machines these have to comply with the state of the art. Finally, this state of the art is described in the new standard.

### European Standard EN 13739-1 and -2

Essential objective of the standard which was initiated by Sweden is to formulate requirements for solid fertiliser distributors, on the one hand in order to avoid inadvertent spreading and, on the other hand assuring an evenness of fertiliser spreading for the respective spreading quantities (kg/ha). The enormous variety of physical features of the respective solid fertilisers contributes to the fact that it is not possible to determine a defined machine adjustment for a certain kind of fertiliser. The farmer rather has to calibrate the machine individually for each operation by means of preferably only few iteration steps. Therefore, particular attention in the standard was paid to the indications given in the instruction manual and the adjustment aids to be supplied by the manufacturer, if necessary.

The most important requirements of the standard refer to the evenness of the transversal distribution. In order to meet the real conditions during operation of fertiliser distributors, requirements on the field spreading as well as on border spreading are determined. The same requirements always apply for the top-dressing. For calculation of field spreading it is referred to the known coefficient of variation (CV) which shall not be explained here in detail anymore. According to EN 13739-1 this value shall not exceed 15%, calculated acc. to the overlapping of 2 spreading patterns when travelling to and fro.

A further main issue of the standard are the requirements on the adjustment and evenness of the flow rate being the most important parameter in respect of the longitudinal distribution. *Table 1* shows the maximum permissible deviations of the obtained from the intended flow rates at different intended flow rates. *Table 2* shows the requirements on the evenness of the flow rate as percentage deviation from the (measured) average obtained flow rate.

### Border spreading – requirements and assessment

The requirements and assessment methods

for border spreading described in the standard are completely new. An European group testing of fertiliser distributors in Denmark in 1999 (Research Center Bygholm) provided important impulses for the Europe-wide introduction of this method. The test reports can be found and downloaded under [www.dlg-test.de](http://www.dlg-test.de).

It is the objective to avoid that fertiliser is spread over the sides of the field. The complex conditions with border spreading however do not allow a limitation of the requirements to only one criterion, as this is possible with field spreading by means of the CV. *Figure 1* presents the definitions referring to the border spreading. For fulfilment of the standard the following criteria for border spreading have to be met:

- within the edge width (= 5 m, cp. Fig. 1, Dimension „10“) the application rate shall exceed at no point the average application rate by more than 20%;
- the coefficient for the transition width (CT) shall not exceed 25%;
- the loss Y in the field between the fertilising limit and the border shall be less than 3%.

The coefficient for the transition width (CT) is similar to the CV but here the range of the transition width is evaluated (see Fig. 1) and not the range of the working width after overlapping, as for the CV. This value becomes much lower when the edge of the border spreading pattern declines „steeply.“ As a measure for evaluation with regard to the compliance with the border, the loss Y has been introduced. Hereby the rate spread outside the border is extrapolated to 100 m of border length and it is referred to a rate spread within a field of 1 ha.

### Literature

- [1] – : EN 13739-1: 2003, Landmaschinen – Ausleger- und Wurf-Mineraldüngerstreuer – Umweltschutz, Teil 1: Anforderungen (Veröffentlichung in Vorbereitung)
- [2] – : EN 13739-2: 2003, Landmaschinen – Ausleger- und Wurf-Mineraldüngerstreuer – Umweltschutz, Teil 2: Prüfmethoden (Veröffentlichung in Vorbereitung)