

Methods of test for

Equipment for distributing granulated pesticides or herbicides

Committees responsible for this British Standard

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- AFRC Institute of Engineering Research
- Agricultural and Allied Workers' National Trade Group
- Agricultural Engineers' Association
- British Fluid Power Association
- Department of Transport
- Fertiliser Manufacturers' Association Ltd.
- Health and Safety Executive
- Local Authority Organizations
- Ministry of Agriculture, Fisheries and Food
- National Farmers' Union
- Silsoe College
- Ukf Fertilizers

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National foreword

This British Standard has been prepared under the direction of the Agricultural Machinery and Implements Standards Policy Committee and implements agreements of the International Organization for Standardization (ISO). It is identical with ISO 8524:1986 “*Equipment for distributing granulated pesticides or herbicides — Test method*”.

Cross-reference

International Standard	Corresponding British Standard
ISO 3534:1977	BS 5532 <i>Statistical terminology</i> Part 1:1978 <i>Glossary of terms relating to probability and general terms relating to statistics</i> (Identical)

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 16, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

0 Introduction

The aim of this International Standard is to harmonize testing of equipment for distributing granulated pesticides or herbicides, by means of standardized tests which are reproducible, allowing comparable results in figures and graph form to be obtained.

The tests assess the effects of the type of granulated pesticides or herbicides, the level of granules in the hopper, the application rate setting and the forward speed, on flow rate, evenness of flow rate and evenness of distribution.

Optional tests (see Annex B) can complete the assessment.

NOTE These tests may be combined with tests on the basic machine to which the distributor is linked. In such cases, the test refers to this combination.

1 Scope and field of application

This International Standard specifies a laboratory test method for granulated pesticide or herbicide distributors, including distributors for attachment to a basic machine.

2 Reference

ISO 3534, *Statistics — Vocabulary and symbols*.

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1

granule pesticides or herbicides (granules)

plant protection product in granule form, for example made up of an active and a carrying material, with particle size of between 0,15 and 2,00 mm

3.2

granule distributors

equipment for distributing the granulated product defined under 3.1, over a wide area, in rows, bands or at individual spots

3.3

basic machine

implement (e.g. single seed drill) to which additional accessories (e.g. granule distributor) are fitted

3.4

feed mechanism (of granules)

mechanism which takes the granules from a hopper to transfer them at a constant predetermined flow rate onto the ground (e.g. broadcast or in a band) or into the soil (e.g. into a drill via a feed pipe)

3.5

flow rate (of granules)

quantity of granules distributed, expressed in mass or volume, per unit of time

3.6

application rate (of granules)

quantity of granules distributed, expressed in mass or volume, per unit of length or surface, or per spot

3.7

hopper capacity

total of granules which the hopper is designed to contain

the top surface of the material shall be horizontal. If there is no full mark or statement in the manufacturer's instructions, the hopper shall be filled to a level 2 cm below the lowest top edge

4 General test conditions

4.1 Granule distributor

4.1.1 Selection

The distributor to undergo testing may be selected by the representative of the test office in agreement with the manufacturer. It shall be either a complete multi-row unit or three individual units with all accessories.

The distributor shall conform strictly in all respects to the specifications which the manufacturer is required to send to the test offices in writing.

The test report (see Annex C) shall specify how the distributor for testing was chosen. Should the test on the distributor be combined with a basic machine, the distributor chosen will be that attached to the basic machine.

The manufacturer or his representative shall be entitled to be present at the tests.

4.1.2 *Manufacturer's instructions*¹⁾

The distributor shall be used in accordance with the manufacturer's instructions which shall include, among other things:

- a) range of working speeds, in kilometres per hour;
- b) type of feed mechanism and types of granules (if the device includes several interchangeable mechanisms) which can be distributed by each model;
- c) types of granules which the distributor can distribute;
- d) accessories required for distributing certain types of granules;
- e) minimum and maximum flow rates of the emptying device of each feed mechanism for each granule;
- f) if the basic machine is fitted with pneumatic tyres, the inflation pressure, in bars.²⁾

4.1.3 *Checking of specifications*

The relevant technical characteristics supplied by the manufacturer shall be checked and noted in the test report. When comparing laboratory test results with application rate and flow rate data supplied by the manufacturer, it should be noted that manufacturer's data may have been adjusted for wheel slippage.

4.2 Granules

4.2.1 *Types*

Tests shall be carried out with up to three different granular materials indicated by the manufacturer of the distributor. If, for safety reasons, the test has to be carried out with simulated granulated products, not more than three of the following types should be used:

- a) Pumice stone (common quality):
 - poor flow qualities, rough, coarse, hard;
 - bulk density: approximately 0,4 g/cm³;
 - granule size: 1,0 to 1,6 mm for more than 85 % of the mass.
- b) Quartz:
 - good flow Qualities, round, fine grained, hard, heavy;
 - bulk density: approximately 1,4 g/cm³;
 - granule size: 0,5 to 1,0 mm for more than 85 % of the mass.

c) Calcite:

- wide distribution of granule size, heavy, soft;
- bulk density: approximately 1,4 g/cm³;
- granule size: 0,4 to 1,0 mm for more than 85 % of the mass.

d) Gypsum:

- good flow qualities, round, soft;
- bulk density: approximately 0,9 g/cm³;
- granule size: 0,4 to 0,9 mm for more than 85 % of the mass.

e) Any other granulated product which the test office and manufacturer considers of sufficient importance and the physical properties of which differ from the products indicated above.

The granulated products used shall be listed in the test report.

4.2.2 *Physical characteristics*

The following physical characteristics of the granules used in the test shall be determined: particle size distribution, bulk density, water content, slope angle. The type of simulated product, if appropriate, shall also be stated.

4.3 Ambient conditions

Atmospheric humidity and temperature at the time of the test shall be noted in the test report.

5 Mandatory tests³⁾

5.1 Nature of tests (see Annex A)

These tests shall allow determination of the evenness of the flow rate and of distribution and will include both static and mobile measurements.

5.1.1 *Static tests*

With the distributor stationary, the drive wheel, if it exists, shall rest on the drive mechanism. The drive wheel or any other power input shall be driven at a speed equal to that which it would have for actual work, i.e. at the theoretical forward speed of the distributor travelling without slipping.

5.1.2 *Mobile tests*

The distributor shall be driven at a constant speed over a hard, uniform surface.

¹⁾ These instructions shall be attached to the test report.

²⁾ 1 bar = 10⁵ Pa = 100 kPa (exactly).

³⁾ For the optional tests, see Annex B.

5.2 Distance between the feed mechanism and the surface

Care shall be taken that the outlet of the mechanism is placed at the same average distance from the surface (collecting boxes) as in actual working conditions.

5.3 Types of tests

5.3.1 Evenness of flow rate

The test shall be carried out with the machine stationary, with at least three feed mechanisms to compare their flow rates. The granules shall be collected in boxes placed under the feed mechanism or, for example, under the pipes or fishtails, where fitted.

NOTE Air-assisted distributors need not have three feed mechanisms.

5.3.2 Evenness of distribution

5.3.2.1 Test conditions

The test shall be carried out on a moving machine with at least three feed mechanisms. The granules shall be collected in boxes placed on the ground.

The collecting boxes shall have external dimensions of approximately 100 mm × 100 mm and a depth of approximately 30 mm.

The boxes shall be of anti-static material and provision shall be made to avoid loss through rebounding. Sloping walls allow the granules to empty into a weighing bowl, while preventing foreign bodies from falling into the bowl. Cardboard boxes covered in plastic have proved satisfactory.

Ensure that only the feed mechanisms under test direct their flow into the boxes, flow from the other feed mechanisms being deflected but not stopped, which could influence the discharge.

NOTE Air-assisted distributors need not have three feed mechanisms.

5.3.2.2 Arrangement of boxes

5.3.2.2.1 Arrangement of boxes for spot distribution

Thirty collecting boxes shall be placed at each spot where the granules are to be dropped in the direction of travel. The number of boxes (or arrangement of boxes) per spot shall be chosen in accordance with the area of a spot.

