INTERNATIONAL STANDARD

ISO 15689

First edition
2003-09-01

Road construction and maintenance equipment — Powder binder spreaders — Terminology and commercial specifications

Équipement pour la construction et l'entretien des routes — Épandeurs de liants pulvérulents — Terminologie et spécifications commerciales

Reference number
ISO 15689:2003(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 15689 was prepared by Technical Committee ISO/TC 195, *Building construction machinery and equipment*.

Introduction

This International Standard deals with powder binder spreaders used in road construction and maintenance processes. It specifies terminology for the machine and its components, and also the definitions of operation principles and parameters.

Dealing with commercial specifications, this International Standard establishes the parameters required for technical characteristics of the whole machine and its components, such as vehicle, powder tank, transfer unit, distributing system and control instruments. Figures are included to show the design of powder binder spreaders.

Road construction and maintenance equipment — Powder binder spreaders — Terminology and commercial specifications

1 Scope

This International Standard establishes the terminology, functions, types and characteristics of powder binder spreaders used in road construction and maintenance processes.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3911, *Wheels and rims for pneumatic tyres — Vocabulary, designation and marking*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
powder binder spreader
mobile machine intended for stabilization, treatment or retreating of pavement materials and soils in earthworks, subgrade or road foundations

NOTE The spreaders are designed so that the output is controlled by travel speed and proportioning devices.

3.2
spreader with proportioning by volume
machine whose binder output is proportioned by volume using, for example, a rotary vane feeder or delivery conveyor

NOTE 1 The spreader with proportioning by volume may be also equipped with a control device able to indicate at any given time the mass of the spread binder and the corresponding area covered.

NOTE 2 See Figure A.3 and Figure A.4.

3.3
spreader with proportioning by mass
machine equipped with a proportioning system that constantly controls the mass of binder delivered by the proportioner

4 Types and designs of powder binder spreaders

4.1 General

The design of powder binder spreaders is determined by using the following criteria:

— propulsion type;

— transfer method of binder from tank to ground;

— proportioner type.

4.2 Propulsion type

The spreaders are classified according to the propulsion type, as follows:

a) by transport machine: transported spreader (Figures A.1 and A.2);

b) by the spreader itself: self-propelled spreader (Figures A.5, A.6 and A.7);

c) by tractor: towed spreader (Figure A.3).

4.3 Transfer method of binder from tank to ground

The following methods of binder transfer from tank to ground exist:

a) by gravity

   — with fluidification of powder in the air (Figures A.1 and A.5),

   — without fluidification;

b) by a mechanical process

   — by metal or rubber delivery conveyor (Figure A.3),

   — by a screw feeder (Figure A.2) or spreading device (Figure A.7);

c) by pneumatic transfer;

d) by a combination of the preceding processes

   — with or without a distribution system upstream of the proportioner,

   — with or without conditioning hopper upstream of proportioner.

4.4 Proportioner type

The following binder proportioning units are used:

a) rotary vane feeder (Figures A.1 and A.4);

b) delivery conveyor by volume (Figure A.3);

c) proportioner by mass, with or without a distribution system downstream of the proportioner;

d) other.

5 Commercial specifications

5.1 Main assemblies of powder binder spreader

See Figures A.1, A.2, A.3, A.4, A.6 and A.7.

A power binder spreader consists of

— engine and power transmission,

— chassis,

— free axle,

— driven axle,

— powder tank,

— conditioning hopper,

— delivery conveyor,

— calibration flap,

— screw feeder,

— spreading device,

— compressor and pneumatic transfer duct,

— rotary vane feeder (rotor and stator),

— skirts, and

— operator's station.

5.2 Main measuring and control equipment

The main equipment is the following:

— output control device in cab;

— tank full indicator;

— tank empty indicator;

— tank level indicator;

— device to measure quantity of powder spread

  — by mass,

  — by volume;

— device to measure surface area covered;

— calculator of average proportion applied (associated with previous two devices);

— spread adjustment automatic controller (associated with previous calculator);

— system to record spreading parameters;

— display system with or without ticket printed;

— alarm system.

5.3 Additional special devices

The following special devices are optional:

— anti-dust device for pneumatic loading

  — to combat dust during loading,

  — to combat dust produced during fluidification of powder in the air;

— water spraying accompanying dispersion of powder to reduce dust (with water store);

— device for particular spreading width;

— warning beacon headlights.

5.4 Main characteristics of spreaders

5.4.1 Dimensional characteristics

The following characteristics shall be specified (see Figure A.5):

— overall dimensions in operating mode

  — length l_1 mm

  — width b_1 mm

— height h_1 mm

— wheel base l_2 mm

— rear overhang l_3 mm

— spreading width b_2 mm

— clearance between ground and feeder h_2 mm

— ground clearance h_3 mm

— height in road transfers h_4 mm

— front wheel diameter d_1 mm

— rear wheel diameter d_2 mm

— outside turning radius r_1 mm

— outside clearance radius r_2 mm

— inside turning radius r_3 mm

— inside clearance radius r_4 mm

— shipping dimensions (overall)

  — length mm

  — width mm

  — height mm

5.4.2 Mass characteristics

The following characteristics shall be specified:

— mass of an unloaded machine in operating mode kg

  This is defined as

  — basic machine including tools and standard attachments,

  — a driver of 75 kg,

  — a fuel tank filled to 50 %,

  — sprinkling or spraying facilities filled to 50 %,

  — hydraulic oil tank full.

— shipping mass kg

— mass of machine in operating mode and loaded kg

5.4.3 Load characteristics

The following characteristics shall be specified:

— load on front axle

  — no load daN

  — with load daN

— load on rear axle(s)

  — no load daN

  — with load daN

— load at coupling point

  — no load daN

  — with load daN

5.4.4 **Ground contact pressure** (for a spreader built on a crawler undercarriage)

The following characteristics shall be specified:

- ground contact pressure
  - no load kPa
  - with load kPa

5.4.5 Engine characteristics

The following characteristics shall be specified:

- manufacturer and model
- power (specify standard) kW
- cooling
- recommended power for towed spreader kW

5.4.6 Transmission characteristics

The following characteristics shall be specified:

- total number of axles
- number of driven axles
- transmission type:
  - hydrostatic
  - mechanical
  - other
- range of working speed km/h
- maximum transfer speed km/h

5.4.7 Steering characteristics

The following characteristics shall be specified:

- steering type
  - front
  - articulated chassis
- crawler skid steer
- crawler independent steer

5.4.8 Characteristics of tyres and tracks

The following characteristics shall be specified:

— at the front (marking, pressure, in accordance with ISO 3911) MPa

— at the rear (marking, pressure, in accordance with ISO 3911) MPa

— pitch of track link mm

5.4.9 Characteristics specific to the spreading function

The following characteristics shall be specified:

— powder tank capacity m^3

— spreading width b_2 (Figure A.5) mm

— output

  — maximum dm^3/m^2 or kg/m^2

  — minimum dm^3/m^2 or kg/m^2

  (for volume proportioners $dm/m^{2)}$

  (for mass proportioners kg/m)

— swept volume per revolution of the rotary vane feeder dm^3

— number of cells

— height of fall of powder to the ground, h_2 (Figure A.5) mm

— maximum longitudinal gradient in percentage which can be followed without loss of stability and impairing accuracy of the powder proportioning

  — uphill %

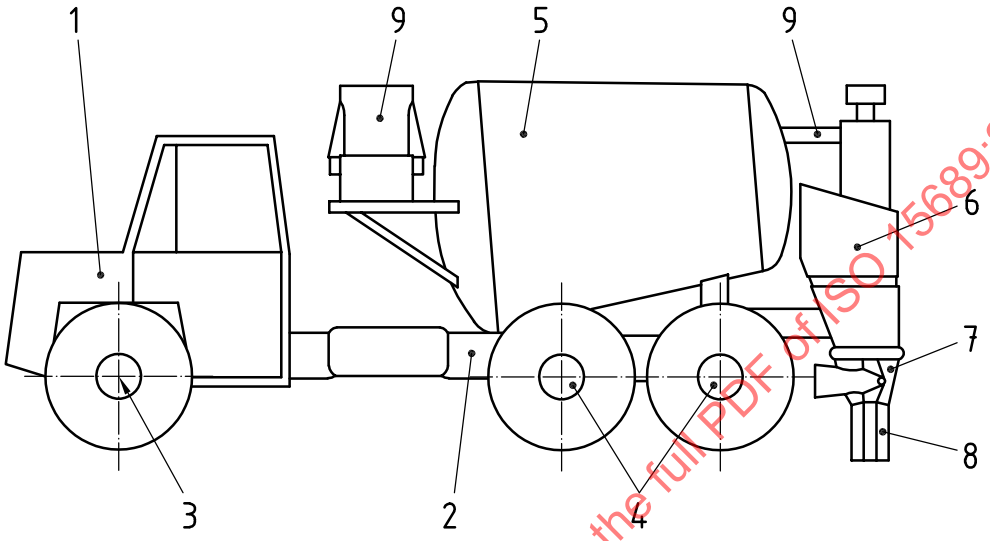
  — downhill %

— maximum transverse limiting gradient which can be crossed without loss of stability and without impairing the accuracy of the powder proportioning over the whole spreading width %

— height of centre of gravity with load during spreading phase/movement phase mm

Annex A
(informative)

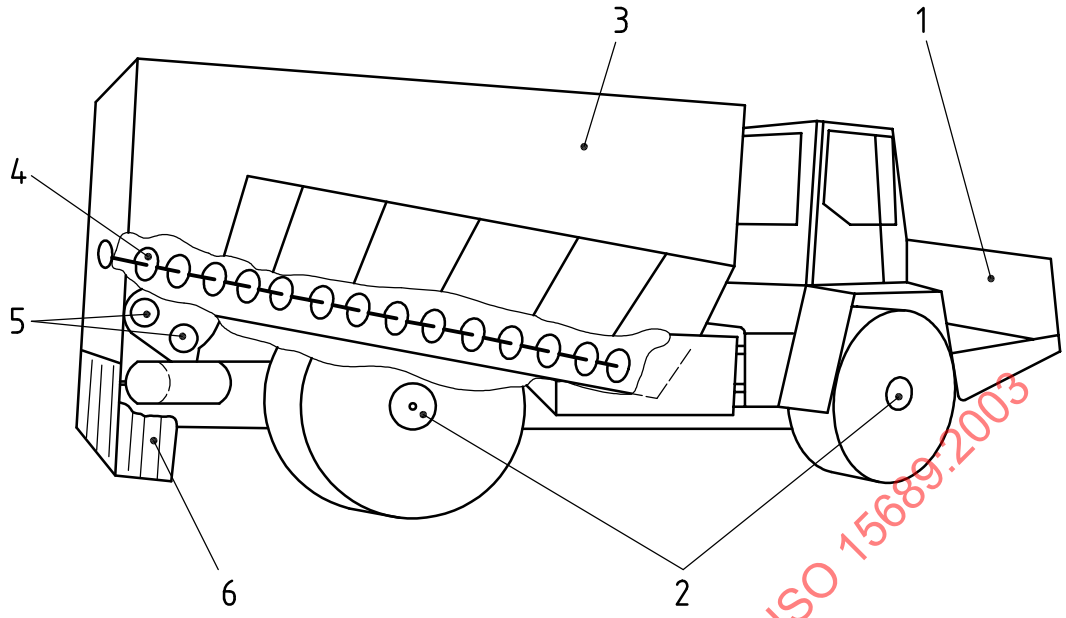
Examples of structures and dimensional characteristics of binder powder spreaders



Key

1 engine and power transmission
2 chassis
3 free axle (sometimes also a driven axle)
4 driven axle
5 powder tank
6 conditioning hopper
7 rotary vane feeder
8 skirts
9 compressor and pneumatic transfer duct

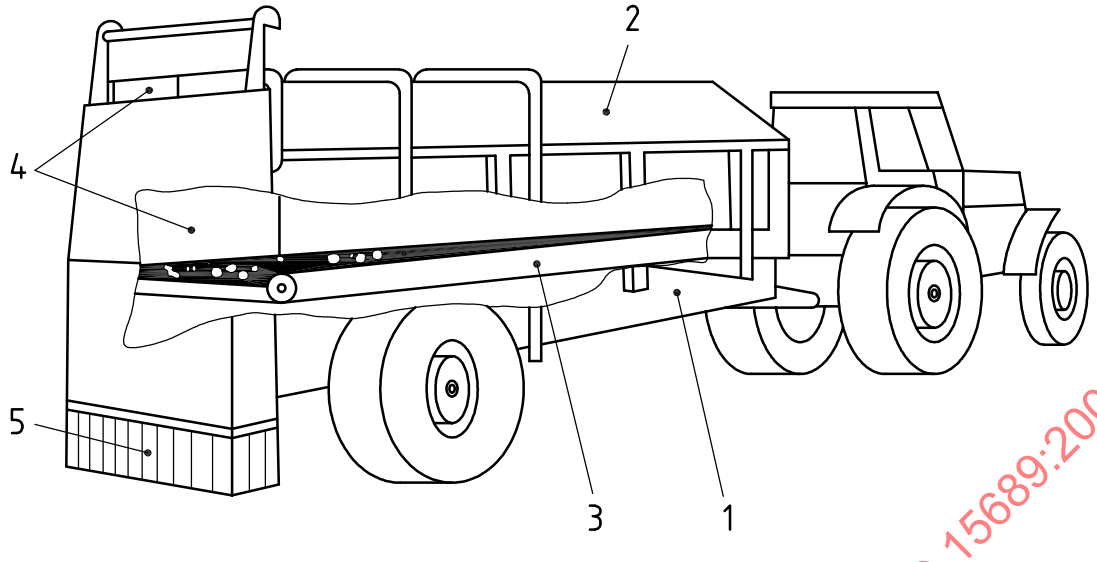
Figure A.1 — Transported powder binder spreader with pneumatic power transfer and rotary vane feeder



Key

1 engine and power transmission
2 driven axles
3 powder tank
4 screw feeder
5 spreading device
6 skirts

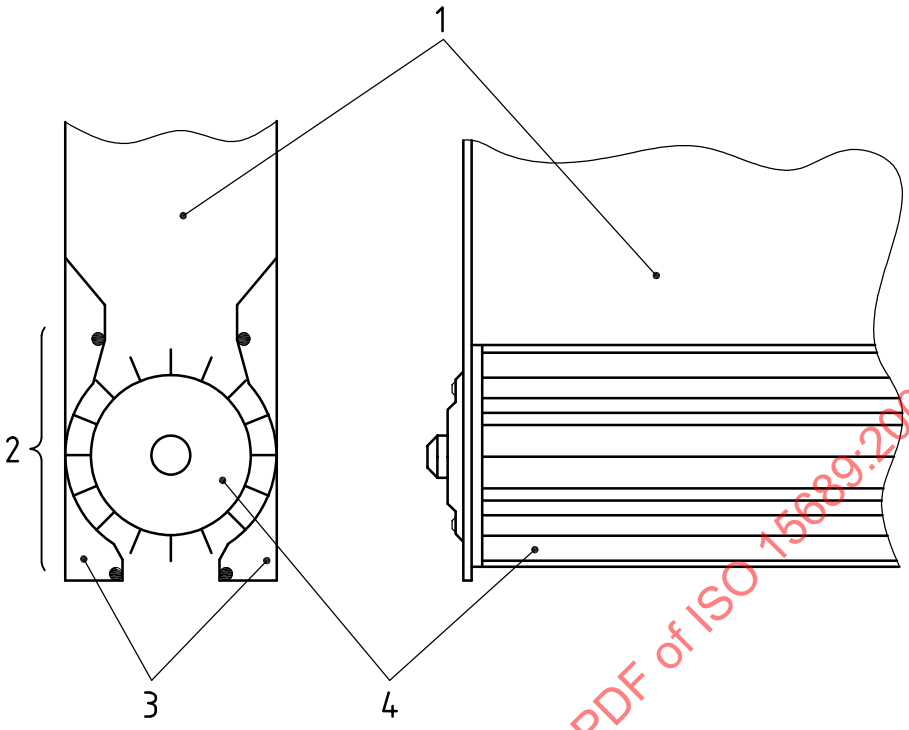
Figure A.2 — Transported powder binder spreader with powder transfer by screw feeder and rotary vane feeder



Key

1 chassis
2 powder tank
3 delivery conveyor
4 calibration flap
5 skirts

Figure A.3 — Towed powder binder spreader with powder transfer by delivery belt and proportioning of powder by adjustment of a flap position or belt speed



Key

1 powder tank (in some designs, a conditioning hopper)
2 rotary vane feeder
3 stator
4 rotor

Figure A.4 — Diagram of a rotary vane feeder