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**Road construction and maintenance  
equipment — Bituminous binder  
spreaders/sprayers — Terminology and  
commercial specifications**

*Équipement pour la construction et l'entretien des routes —  
Épandeurs/pulvérisatrices de liants bitumineux — Terminologie et  
spécifications commerciales*



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## 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 3.

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 International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 15643 was prepared by Technical Committee ISO/TC 195, *Building construction machinery and equipment*.

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# Road construction and maintenance equipment — Bituminous binder spreaders/sprayers — Terminology and commercial specifications

## 1 Scope

This International Standard establishes the terminology for soil stabilizers used in road construction and pavement works. It provides the terminology for the machine and its components, also the definitions of operation principles and parameters.

This International Standard also establishes the parameters required for the technical characteristics of the whole machine and its components, such as the transport vehicle and mixing device, for commercial specifications.

## 2 Terms and definitions

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

### 2.1

#### **bituminous binder spreader**

machine used to apply a film of binder on a pavement at a predetermined application rate

NOTE The particular spreader types may be defined by associating the operating principle, the shape of the components, the type of binder, and by specifying the spreading performances.

### 2.2

#### **displacement pump spreader**

machine in which binder transfer from the storage tank to the spray bar is provided by a pump

NOTE The pump's output is proportional to its rotating speed which may be controlled by the vehicle movement speed.

### 2.3

#### **constant pressure spreader**

machine in which binder transfer from the storage tank to the spray bar is provided by pressurizing the binder

NOTE The binder may be pressurized directly by compressed air above the binder, or by a pump and regulating valve maintaining a constant binder pressure in the spray bar feeder circuit.

### 2.4

#### **fixed assembly spreader**

machine in which the tank and its attachments are fixed to the transport vehicle

### 2.5

#### **removable assembly spreader**

machine in which the tank and its attachments are fixed to a removable chassis

### 2.6

#### **heat-insulated spreader**

machine in which the tank is equipped with thermal insulation to avoid heat loss

**2.7**

**directly heated spreader**

machine with heating provided by circulation of hot gases in a tube or by an electrical resistor in contact with the binder

**2.8**

**indirectly heated spreader**

machine with heating provided by circulation of a hot liquid supplied by a generator outside or inside the spreader

**2.9**

**hot binder spreader**

machine which enables application of binder at a temperature greater than 80 °C

**2.10**

**cold binder spreader**

machine which spreads binders at a temperature lower than 80 °C

**2.11**

**high-viscosity-binder spreader**

machine which enables application of a binder with a viscosity greater than 300 cSt at the application temperature

**2.12**

**high-binder-pressure spreader**

machine in which the binder pressure in the spray bar during spreading is greater than 0,2 MPa

**2.13**

**medium-binder-pressure spreader**

machine in which the binder pressure in the spray bar during spreading is between 0,02 MPa and 0,2 MPa

**2.14**

**low-binder-pressure spreader**

machine in which the binder pressure in the spray bar during spreading is less than 0,02 MPa

**2.15**

**tank volume**

internal volume of the tank

NOTE It is expressed in cubic metres.

**2.16**

**rated capacity**

volume of binder which can be carried

NOTE It is expressed in cubic metres.

**2.17**

**nominal loading of tank**

loading using the available capacity of the binder with the highest density

NOTE It is expressed in kilograms.

**2.18**

**spray bar width**

distance between end flow points

NOTE It is expressed in metres.

**2.19****maximum output of pumping unit**

largest capacity for a binder with a viscosity of 100 cSt

NOTE It is expressed in cubic metres per hour.

**2.20****nominal application rate**

application rate at maximum output of a pumping unit moving at a speed of 4 km/h with a binder of a density of 1 g/cm<sup>3</sup> and a viscosity of 100 cSt and with maximum spray bar width

NOTE It is expressed in kilograms per square metre.

**2.21****binder carrying capacity**

difference between the laden and kerb mass of a spreader

**2.22****spreading height**

height measured between the average plane of the pavement and the orifice of the nozzles

NOTE 1 It is expressed in metres.

NOTE 2 See  $h_2$  in Figure 7.

**3 Description of spreader components****3.1 Transport vehicle**

This vehicle, in the form of a truck, trailer or semi-trailer, carries all the components and provides movement of the spreader during spreading and during road transfers.

**3.2 Tank**

The tank is used to store the binder during work and transport.

It may have a facility to heat the binder and may have a system to protect against loss of heat.

**3.3 Binder transfer device**

This device provides transfer of the binder from the tank to the spray bar in order to apply a specific quantity to the pavement.

**3.4 Spray bar**

The spray bar distributes the binder uniformly across the pavement.

**3.5 Control station**

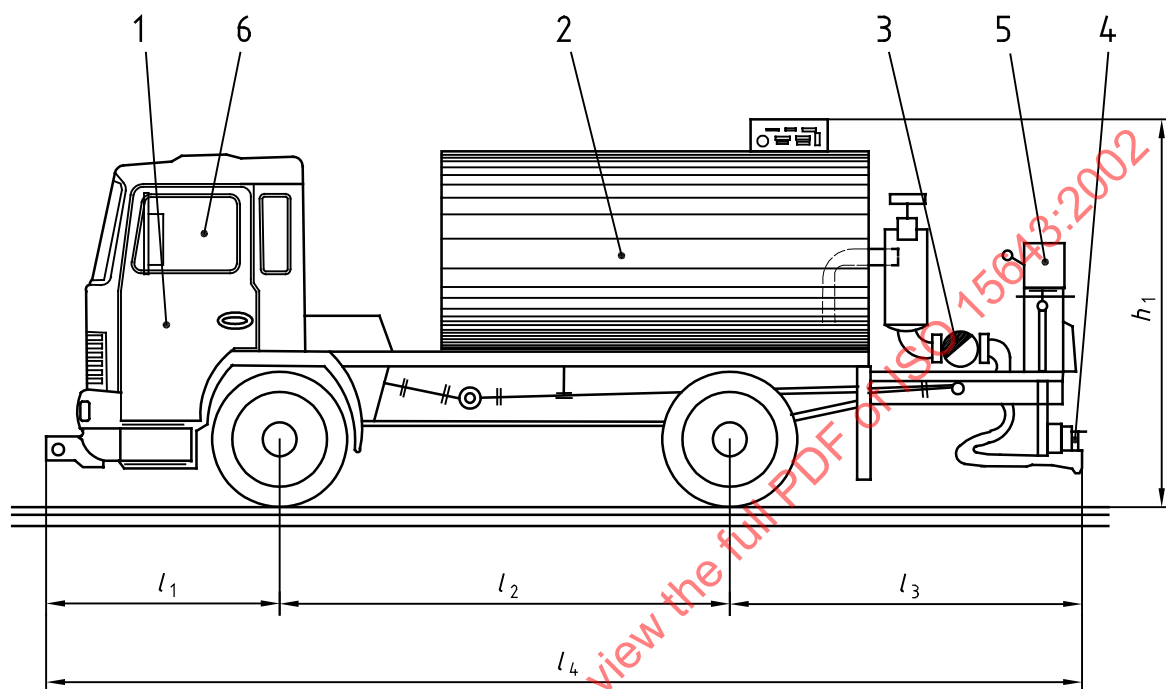
The control station contains all the control, adjustment, measuring and automatic control equipment. There are two types, as follows.

- a) Manual control: the operator adjusts all the operating parameters to obtain the required application rate.
- b) Automatic control: using predetermined operating parameters, automation ensures accuracy of the application rate.

## 4 Commercial specifications

### 4.1 Spreader components list

The components of the binder spreader/sprayer and their dimensions shall be specified. An example is shown in Figure 1.



#### Key

- |                        |                                                                                                  |
|------------------------|--------------------------------------------------------------------------------------------------|
| 1 Vehicle              | 4 Spray bar                                                                                      |
| 2 Tank                 | 5 and 6 Measuring instruments placed in driver's cab or on the rear part of the vehicle platform |
| 3 Binder transfer unit |                                                                                                  |

Figure 1 — Overall view of binder spreader/sprayer

### 4.2 Vehicle characteristics

The following characteristics shall be specified:

- laden mass kg
- kerb mass kg
- binder carrying capacity kg
- minimum spreading speed km/h
- overall dimensions:
  - length,  $l_4$  mm
  - width mm
  - height,  $h_1$  mm



|                           |      |
|---------------------------|------|
| — front overhang, $l_1$   | mm   |
| — wheel base, $l_2$       | mm   |
| — rear overhang, $l_3$    | mm   |
| — external turning radius | m    |
| — internal turning radius | m    |
| — maximum axle load       | daN  |
| — engine rating power     | kW   |
| — maximum travel speed    | km/h |

### 4.3 Tank: performance and characteristics

#### 4.3.1 General characteristics

The following characteristics shall be specified:

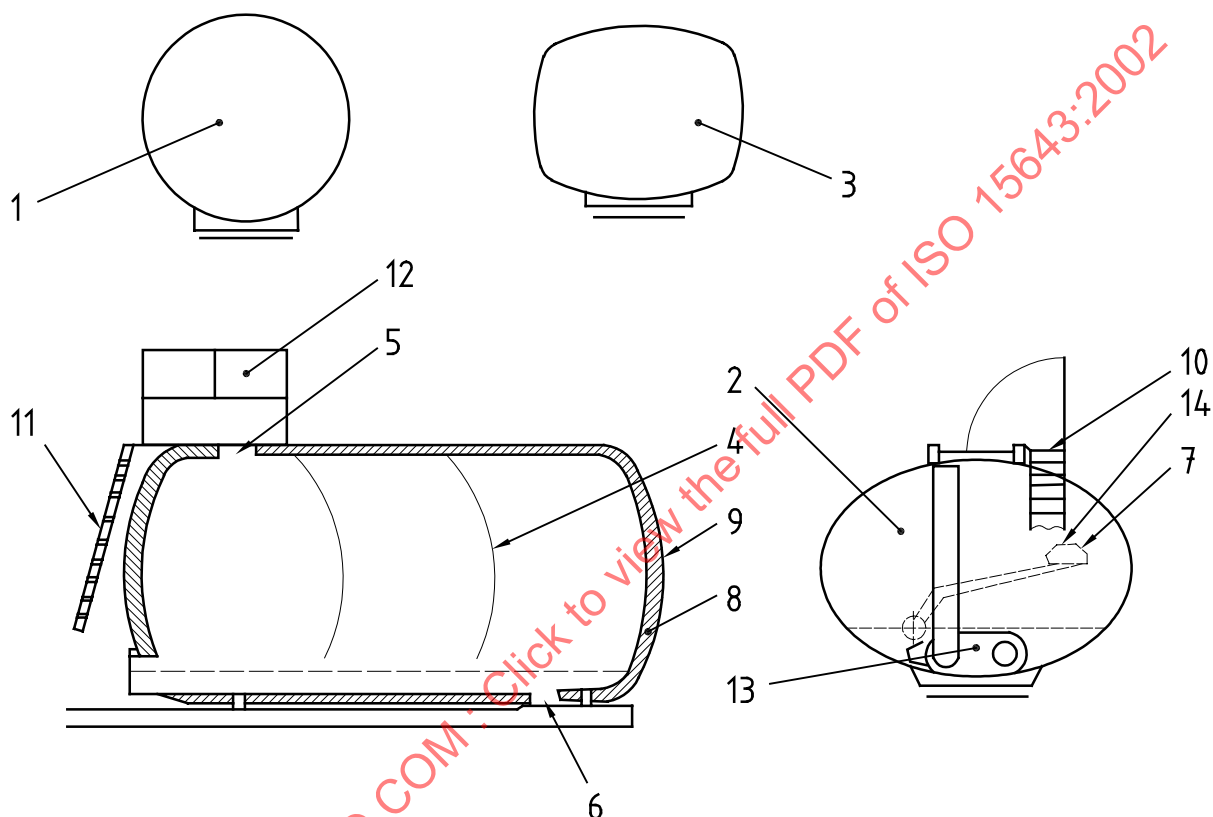
|                    |                |
|--------------------|----------------|
| — tank volume      | m <sup>3</sup> |
| — rated capacity   | m <sup>3</sup> |
| — working pressure | MPa            |

#### 4.3.2 Binder tank performance

The following units of the binder tank shall be specified (see Figures 2 and 3):

- tank itself, of the following geometrical shapes:
  - circular (see 1 in Figure 2),
  - elliptical (see 2 in Figure 2),
  - prismatic with rounded corners (see 3 in Figure 2);
- wash plate partition (see 4 in Figure 2);
- inspection hole (see 5 in Figure 2);
- cleaning orifice (see 6 in Figure 2);
- level indicator (see 7 in Figure 2);
- insulation: type and thickness (see 8 in Figure 2);
- insulation protective coating (see 9 in Figure 2);
- access equipment:
  - platform (see 10 in Figure 2),
  - access ladder to inspection hole (see 11 in Figure 2),
  - guard rail (see 12 in Figure 2);

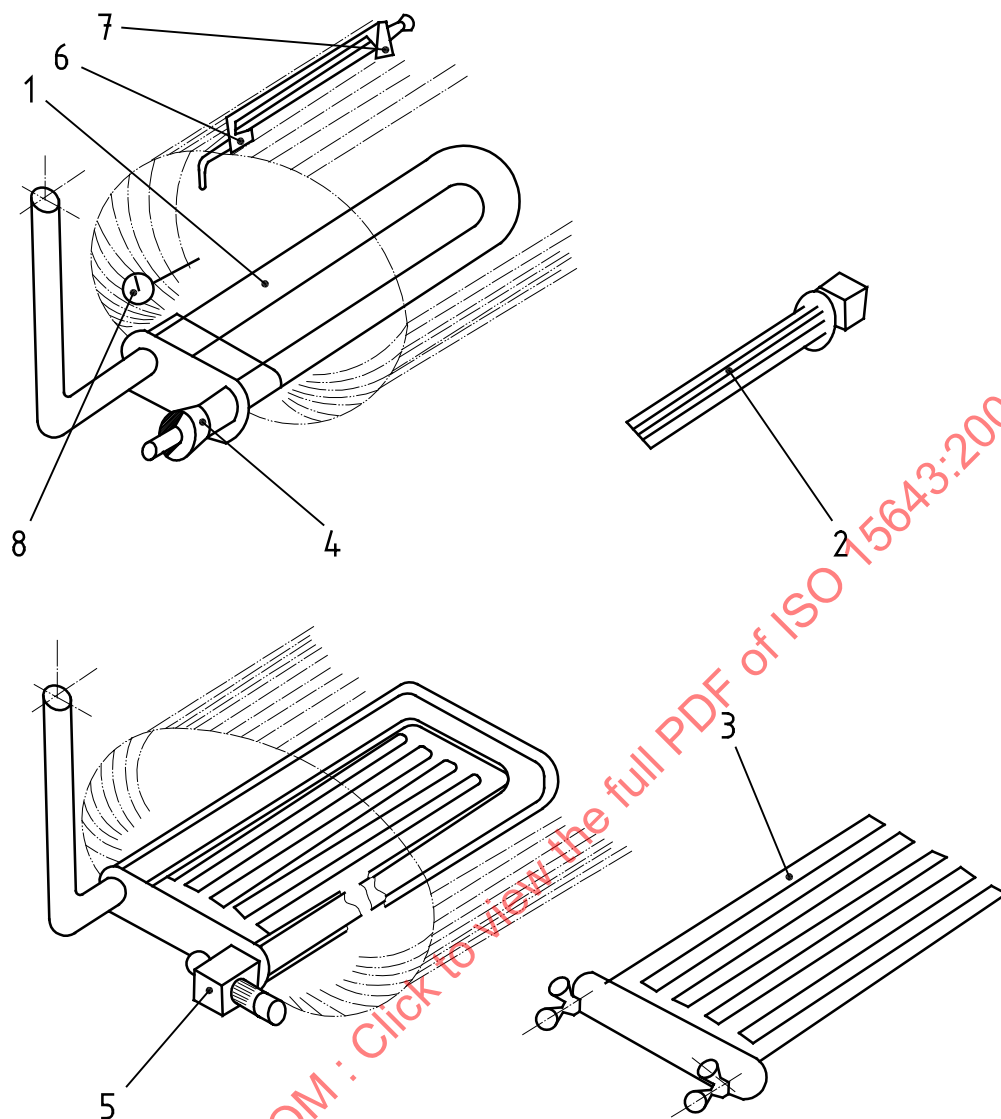
- heating device (see 13 in Figure 2);
- direct heating:
  - by open flame (see 1 in Figure 3),
  - by electricity (see 2 in Figure 3);
- indirect heating by thermal oil (see 3 in Figure 3).



**Key**

- |                                     |                                                 |
|-------------------------------------|-------------------------------------------------|
| 1 Circular tank                     | 8 Thickness of thermal insulation               |
| 2 Elliptical tank                   | 9 Thermal insulation                            |
| 3 Prismatic tank with round corners | 10 Access platform                              |
| 4 Wash plate partition              | 11 Ladder for access to inspection hole         |
| 5 Inspection hole                   | 12 Guard rail                                   |
| 6 Cleaning orifice                  | 13 Heating device                               |
| 7 Level indicator                   | 14 Detector for minimum/maximum level of binder |

**Figure 2 — Bituminous binder tank performance**



#### Key

- |                                                   |                                                      |
|---------------------------------------------------|------------------------------------------------------|
| 1 Direct heating by open flame                    | 5 Hot oil installation with automatic burner control |
| 2 Direct electric heating                         | 6 Venting device                                     |
| 3 Indirect heating installation by hot oil        | 7 Pressure and vacuum relief valve                   |
| 4 Hot oil installation with manual burner control | 8 Thermostat                                         |

**Figure 3 — Heating installation of bituminous binder tank**

#### 4.4 Burner

The following characteristics shall be specified:

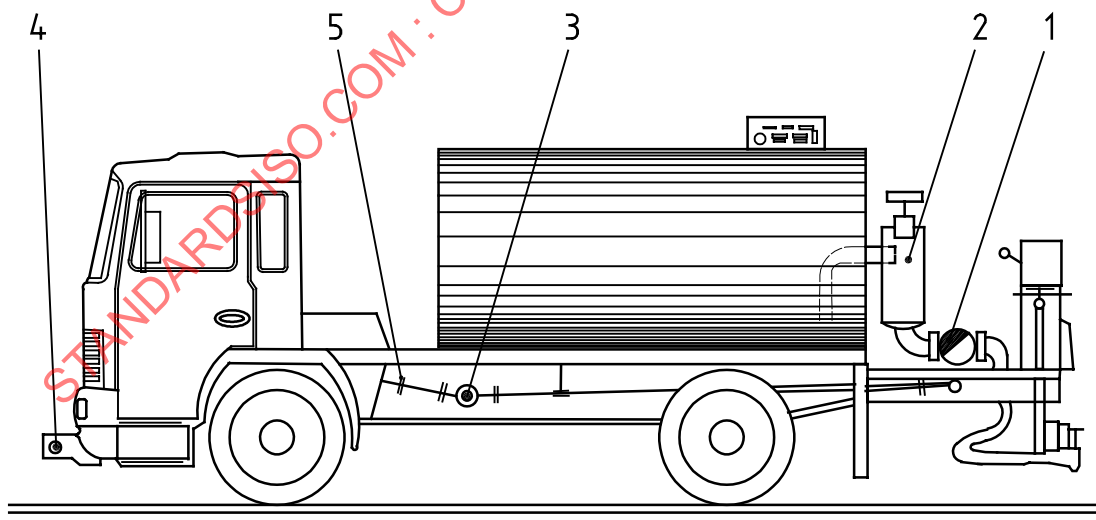
- manual burner control (see 4 in Figure 3);
- automatic burner control (see 5 in Figure 3);
- detector for minimum binder level (see 14 in Figure 2);
- detector for maximum binder level (see 14 in Figure 2);
- venting device (see 6 in Figure 3);

- pressure and vacuum relief valve (see 7 in Figure 3);
- thermometer;
- thermostat (see 8 in Figure 3).

#### 4.5 Binder transfer unit: bitumen pumping and transmission characteristics

The following characteristics shall be specified:

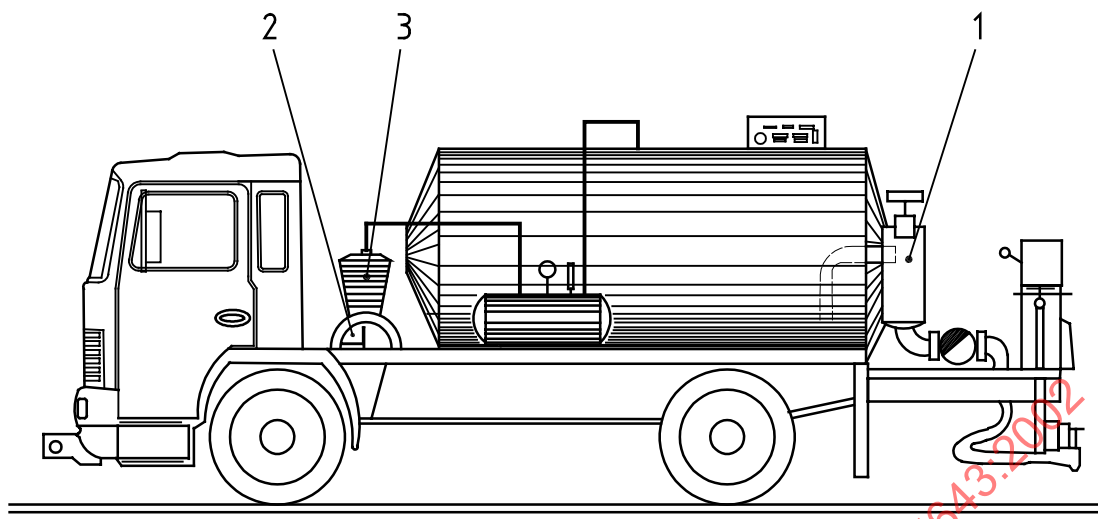
- displacement pump (see 1 in Figure 4):
  - rotation speed  $\text{min}^{-1}$ ,
  - output  $\text{dm}^3/\text{min}$ ;
- pump heating;
- filter (see 2 in Figure 4);
- transmission:
  - mechanical (see 3 in Figure 4),
  - hydrostatic (alternatively);
- power take-off on engine (see 4 in Figure 4);
- power take-off on gearbox (see 5 in Figure 4);
- auxiliary engine (see 2 in Figure 5);
- compressor (see 3 in Figure 5).



#### Key

- 1 Bitumen displacement pump
- 2 Bitumen filter
- 3 Bitumen pump drive
- 4 Power take-off on engine
- 5 Power take-off on gearbox

**Figure 4 — Spreader with displacement pump for bitumen pumping**

**Key**

- 1 Bitumen filter
- 2 Auxiliary engine for driving compressor
- 3 Air compressor

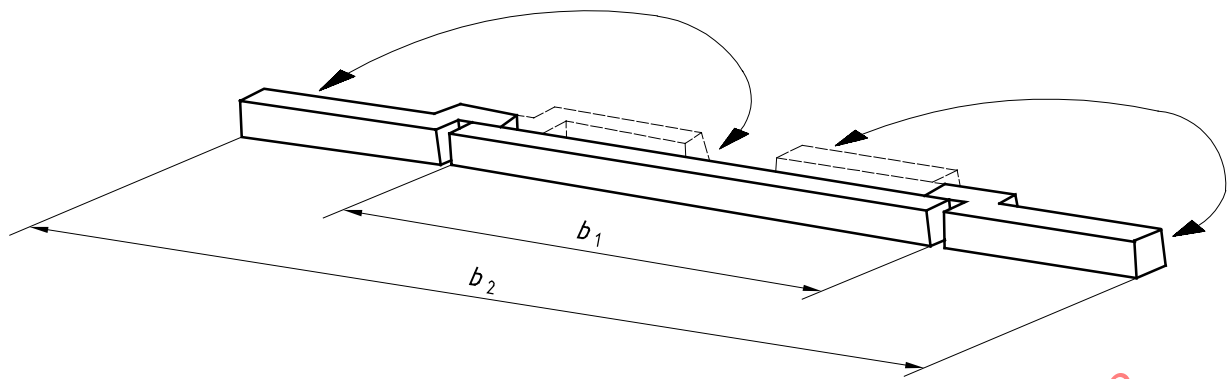
**Figure 5 — Constant pressure spreader with air compressor for bitumen feeding**

#### 4.6 Spray bar: performance and characteristics

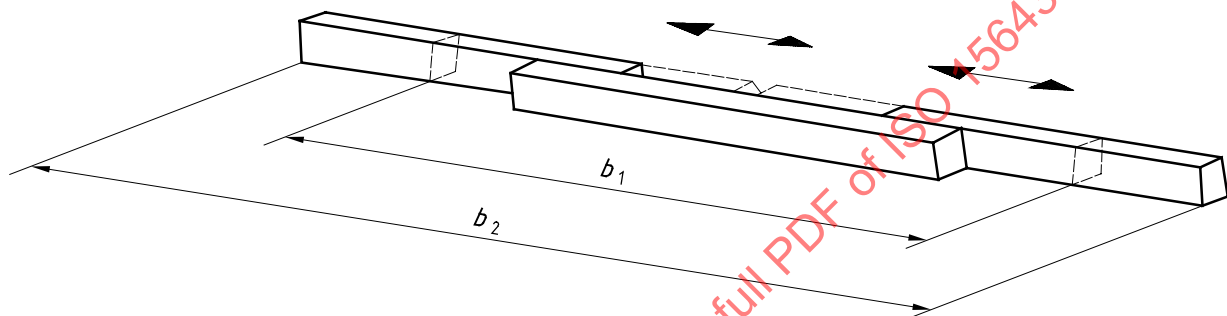
The following characteristics shall be specified:

- bar raising method:
  - mechanical,
  - pneumatic,
  - hydraulic;
- spreading height (see Figure 7),  $h_2$  mm;
- height of spray bar in transport mm;
- minimum width of bar in transport position,  $b_1$  mm;
- maximum width of bar in working position,  $b_2$  mm;
- bar width (see Figure 7),  $b_3$  mm;
- automatic correction of spray bar height during spreading, or without correction;
- pressure in the bar during operation Mpa;
- bar heated by:
  - circulation of binder,
  - hot oil,
  - electric resistor;

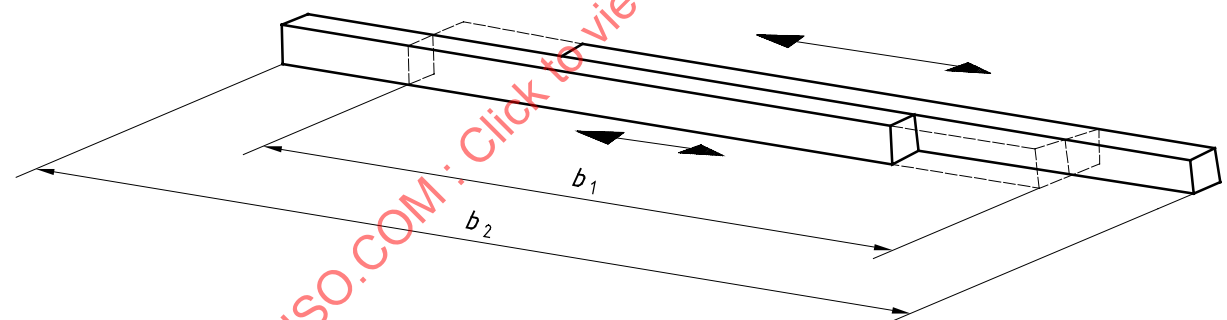
- spreading width:
  - full portion width (see Figure 7),  $b_4$  mm,
  - medium width (see Figure 7),  $b_5$  mm,
  - covered width (see Figure 7),  $b_6$  mm;
- nozzles (see 4 in Figure 7):
  - number of nozzles,
  - nozzles control,
  - individual diffuser (see 5 in Figure 7),
  - collective diffuser for two nozzles or more,
  - mechanical,
  - pneumatic,
  - hydraulic,
  - spacing of nozzles (Figure 7),  $b_7$  mm,
  - binder jet shape: coniform or flat (see 3 in Figure 7),
  - end flow correcting nozzle (see 4 in Figure 7);
- position of nozzles:
  - embedded in the spray bar,
  - outside the spray bar;
- orientation of nozzles (Figure 7),  $\alpha$  1°.



a) Spray bar with central unit and two folding extensions



b) Spray bar with central unit and two pull-out extensions

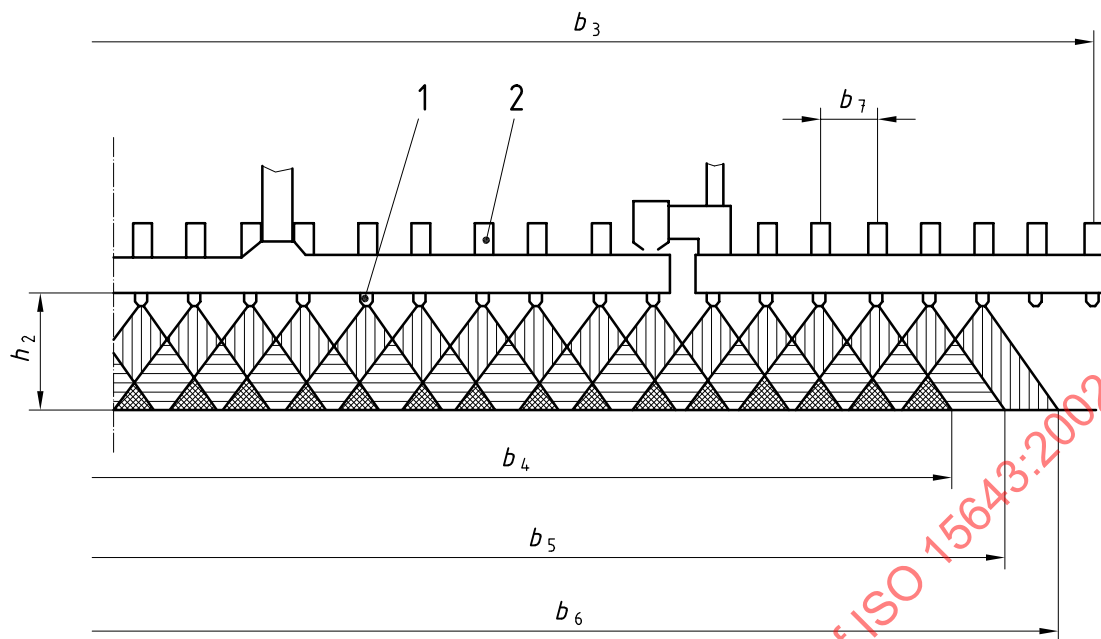


c) Bar in two pull-out extensions

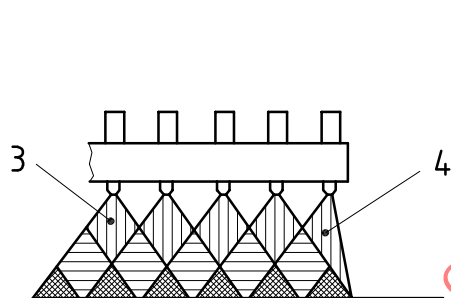
$b_1$  Minimum width of bar in transport position

$b_2$  Maximum width of bar in working position

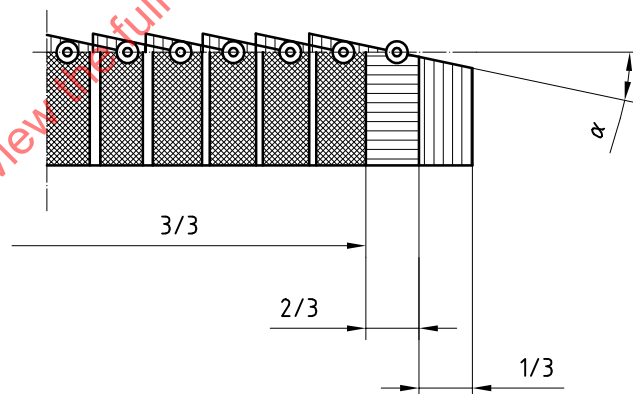
Figure 6 — Different designs of spray bar set-up



a) Spray bar composed of central unit and two extensions



b) Extension bar with correcting nozzle



c) Spray bar with the width of the pavement covered with three (3/3), two (2/3) and one (1/3) nozzle(s)

- $b_3$  Bar width  
 $b_4$  Full portion spreading width  
 $b_5$  Medium spreading width  
 $b_6$  Covered spreading width  
 $b_7$  Spacing of nozzles  
 $h_2$  Spreading height  
 $\alpha$  Angle of nozzle placing in top view

#### Key

- 1 Nozzle  
 2 Individual nozzle  
 3 Flat binder jet shape  
 4 End flow correcting nozzle

Figure 7 — Spacing of nozzles and binder jet shape