Agricultural and forestry machinery — Sprayers and liquid fertilizer distributors — Safety

The European Standard EN 907: 1997 has the status of a British Standard

ICS 65.060.25



Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee AGE/15, Equipment for crop protection, upon which the following bodies were represented:

Agricultural Engineers' Association
British Agrochemicals Association Ltd.
British Crop Protection Council
Health and Safety Executive
Imperial College of Science and Technology
Long Ashton Research Station
Ministry of Agriculture, Fisheries and Food
National Farmers' Union
Silsoe Research Institute
Co-opted members

This British Standard, having been prepared under the direction of the Engineering Sector Board, was published under the authority of the Standards Board and comes into effect on 15 August 1997

© BSI 1997

Amendments issued since publication

Amd. No.	Date	Text affected

The following BSI references relate to the work on this standard: Committee reference AGE/15

ISBN 0580281078

Contents

	Page
Committees responsible	Inside front cover
National foreword	ii
Foreword	2
Text of EN 907	3

© BSI 1997 i

National foreword

This British Standard has been prepared by Technical Committee AGE/15, and is the English language version of EN 907:1997, published by the European Committee for Standardization (CEN).

Cross-references

Publication referred to	Corresponding British Standard		
	BS EN 292 Safety of machinery — Basic concepts general		
	principles for design		
EN 292-1 : 1990	Part 1: 1991 Basic terminology, methodology		
EN 292-2 : 1991	Part 2: 1991 Technical principles and specifications		
and A1: 1995	and AMD 8912, December 1995		
EN 294 : 1992	BS EN 294: 1992 Safety of machinery — Safety distances to prevent danger zones being reached by the upper limbs		
ISO 5681 : 1992	BS 6355: 1983 Glossary of terms for equipment for crop protection		
EN 25353 : 1988	BS 5631 : 1978 Specification for earth moving machinery and tractors and machinery for agriculture and forestry — Seat index point		

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 14, an inside back cover and a back cover.

ii © BSI 1997

EUROPEAN STANDARD NORME EUROPÉENNE EUROPÄISCHE NORM

EN 907

April 1997

ICS 65.060.40

Descriptors: Agricultural machinery, agricultrual sprayers, manure, liquids, safety, requirement, design, hazardous areas, hazards, technical notices, marking

English version

Agricultural and forestry machinery — Sprayers and liquid fertilizer distributors — Safety

Matériel agricole et forestier — Pulvérisateurs et distributeurs d'engrais liquides — Sécurité

Land- und Forstmaschinen — Spritz- und Sprühgeräte zum Ausbringen von Pflanzenschutzmitteln and flüssigen Düngemitteln — Sicherheit

This European Standard was approved by CEN on 1997-04-03. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization Comité Européen de Normalisation Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Page 2

EN 907: 1997

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 144, Tractors and machinery for agricultural and forestry, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 1997, and conflicting national standards shall be withdrawn at the latest by October 1997.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

The annex A is normative and contains the 'List of hazards'.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Contents

		Page
Fore	word	2
0	Introduction	3
1	Scope	3
2	Normative references	3
3	Definitions	3
4	Safety requirements and/or measures	3
4.1	General	3
4.2	Protection against hazards related to moving power transmission parts	3
4.3	Stability	4
4.4	Spray booms	4
4.5	Spray tank	4
4.6	Pressure indicator	5
4.7	Safety valve	5
4.8	Fan	5
4.9	Spray liquid carrying hoses	5
4.10	Spraying manual control	6
4.11	Clean water tank	6
4.12	Manually operated spraying device	6
5	Information for use	6
5.1	Instruction handbook	6
5.2	Marking	6
Ann	ex A (normative) List of hazards	7
Ann	ex B (informative) Examples of some sprayers	11

Page 3 EN 907 : 1997

Introduction

The extent to which hazards are covered is indicated in the scope of this standard. These hazards are specific to sprayers and liquid fertilizer distributors. The hazards that are common to all the agricultural and forestry machines will be dealt with in a general standard on common requirements currently in preparation.

Machines shall comply as appropriate with EN 292 for hazards which are not dealt with and especially with annex A of EN 292-2: 1991/A1: 1995 when EN 292 does not give precise requirements.

1 Scope

This standard specifies safety requirements and their verification for the design and construction of sprayers for pesticide products and liquid fertilizer application. This standard is applicable to mounted, semi-mounted,

trailed and self-propelled agricultural sprays designed for use by one operator only.

It is not applicable to pedestrian controlled sprayers, neither to knapsack sprayers, nor to aerial sprayers. This standard deals with mechanical hazards and risks to the operator when handling the applied chemical products and operation of equipment. It does not cover the hazards related to pressurized tanks.

NOTE 1. Such tanks will be covered by the European Regulations on pressure equipment (currently in preparation).

It describes methods for elimination or reduction risks which need specific requirements for sprayers and liquid fertilizer distributors. It does not deal with general hazards particularly general hazards related to mobility, including those specific to self-propelled machines. These aspects will be dealt with in another standard produced by CEN/TC 144 (see introduction). In addition, it specifies the type of information on safe working practices to be provided by the manufacturer.

The list of significant hazards dealt with in this standard is given in annex A. Annex A also indicates the hazards which have not been dealt with.

Environmental aspects have not been considered in this standard.

This standard applies primarily to machines which are manufactured after the date of issue of the standard. NOTE 2. Non-restrictive examples of machines are given in annex B.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of theses publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 292-1: 1991 Safety of machinery —

Basic concepts, general principles for design — Part 1: Basic terminology,

methodology

EN 292-2: 1991 Safety of machinery —

Basic concepts, general principles for design — Part 2: Technical principles

and specifications

EN 292-2: Safety of machinery —

1991/A1: 1995 Basic concepts, general principles for design — Part 2: Technical principles

and specifications

EN 294: 1992 Safety of machinery — Safety

distances to prevent danger zones being reached by the upper limbs

EN 25353: 1988 Earth-moving machinery and tractors

and machinery for agriculture and forestry — Seat index point

 ${\tt ISO\,5681:1992} \ \ \textit{Equipment for crop protection} --$

Vocabulary

3 Definitions

For the purposes of this standard, the definitions given in ISO 5681 and EN 292-1 apply.

4 Safety requirements and/or measures

4.1 General

Unless otherwise specified in this standard, the machine shall comply with the requirements of tables 1, 3, 4 and 6 of EN 294: 1992.

It shall be possible for the operator to handle and operate the machine, including filling and maintenance, while wearing protective clothing specified in the instructions from the manufacturers of the machine and of the products applied.

It shall be possible to carry out servicing and maintenance operations on pumps and filters without leaking out of the tank, when it is filled to its normal volume. This can be achieved, for example, by appropriate positioning of components, insulation by means of a tap or valves.

4.2 Protection against hazards related to moving power transmission parts

To ensure protection against hazards related to accessible moving power transmission parts, the machine shall be fitted with fixed guards (in accordance with **3.22.1** of EN 292-1: 1991).

When frequent access is foreseen, the machine shall be fitted with guards needing a tool for their opening. These guards shall remain attached to the machine when opened (for example by means of hinges) and automatically lock in the closed position without the use of a tool.

EN 907: 1997

If this type of guard is not used, the machine shall be fitted with:

- interlocking moveable guards (in accordance with **3.22.4** of EN 292-1:1991); or
- movable guards fitted with a device which prevent their opening so long as the parts are moving.

4.3 Stability

4.3.1 General

The machine shall be designed to be stable when parked according to the indications in the instruction handbook with the booms folded on firm ground with an inclination up to 8.5° in any direction.

This requirement shall be met with the tanks empty, then with the tanks full of water, and in both cases with and without optional equipment or cans which the machine has been designed to be fitted with.

4.3.2 Mounted machines fitted with rollers for manual handling when dismounted

Machines equipped with transport rollers for manual handling shall be designed so that they cannot turn over

This requirement shall be checked as follows: Place the machine which has been parked in accordance with the indications in the instruction handbook, on a horizontal and even plane. Then push it at a speed of 1 m/s against a fixed rectangular obstacle 50 mm high and located at a right angle to the direction of movement of the machine.

4.4 Spray booms

4.4.1 Front mounted booms

In order to provide the driver with protection from the spray, the self-propelled machines with front mounted spray booms shall be:

- fitted with a cab; or
- such as the seat index point (SIP) of the driver's seat (as defined in clause **3** of EN 25353: 1988) is positioned at least 1 000 mm above the maximum working height of the boom.

NOTE. Further requirements will be included at the next revision, particularly with regard to air filtration systems.

4.4.2 Swivelling components

When booms are folded/unfolded in accordance with the information in the instruction handbook, no part of the booms shall normally exceed 4 m from the ground. Booms that can be manually folded/unfolded shall be fitted with two handles located at a distance of at least 300 mm from the nearest articulation. These handles may be integral parts of the boom, provided they are suitably designed and clearly identified. In the case of powered operation, the control shall be of the hold-to-run type and the manual control shall be located outside the swivelling zone.

A device shall be provided to prevent the boom from moving when it is folded in the transport position. If this locking device is a hydraulic valve not directly fitted to the cylinder, the bursting pressure of the circuit's components from the valve to the cylinder shall be four times its allowable pressure.

The locking device and the boom folding/unfolding actions shall be controlled by separate systems.

4.4.3 Means of access

Handholds of the means of access shall not be part of the booms.

4.4.4 Adjustment of the height of the boom

The manual force necessary to adjust the height of the boom shall not exceed 250 N.

Where height adjustment is by a winch, this winch shall be self-arresting and capable of withstanding at least a load equal to 1,3 times the weight of the boom.

The winch shall be operable from the ground or from a platform.

In the case of powered height adjustment, it shall be possible to activate the manual control from the driver's position and the control shall be of the hold-to-run type. To ensure the protection of the operator against crushing and shearing hazards related to a failure of the control circuit, the machine shall be fitted with:

- a device which limits the downward speed of the boom to 10 mm/s; or
- a device which ensures a minimum height of 500 mm between the boom and the ground. It shall only be possible to reduce this distance with an intentional action.

It shall be possible to secure the vertical position of the boom by means of a locking device. If this locking device is a hydraulic valve not directly fitted to the cylinder, the bursting pressure of the circuit's components from the valve to the cylinder shall be four times its allowable pressure.

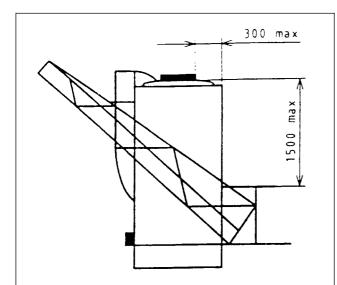
4.5 Spray tank

4.5.1 Prevention of access and contact with chemical when filling

The sprayer shall be equipped with a transfer device (for example a chemical introduction bowl as defined in **3.9.5** of ISO 5681: 1992). If not possible, the filling hole shall be so positioned that the height from the ground or from the platform of the operator is not more than 1500 mm. The horizontal reach between the rim of the hole and the rim of the tank shall not be more than 300 mm (see figure 1).

Any tank opening greater than 400 mm in diameter, or if it is rectangular of more than 400 mm \times 300 mm, shall be provided with a grating which can only be removed by the use of tools.

The openings in the grating shall not exceed the above dimensions.



Dimensions in millimetres

Figure 1. Maximum reach for manual adding of chemicals

4.5.2 Prevention of spillage and overflow

The actual overall volume of the tank shall exceed the nominal volume of at least $5\,\%$.

The lid shall be:

- attached to the machine;
- fitted with a holding device ensuring a closed position by means of a positive mechanical action (for example, lids fixed by screwing);
- tight to the spray mixture.

The level of liquid shall be indicated to the operator during filling and emptying.

Any tanks which are not put under pressure shall have a pressure compensation device for emptying and filling.

4.5.3 Protection from contact with chemical when draining

The operator shall be prevented from contact with the spray mixture when emptying the tank. This requirement is met if:

- the draining outlet can be opened without a tool (for example by means of a tap); and
- the flow is directed away from the operator.

4.6 Pressure indicator

The sprayer shall have a pressure gauge.

The working pressure or pressures shall be clearly readable from the driver's position. Turning of the head and the upper body is acceptable.

The gauge case shall be isolated from the spray mixture.

For analogue pressure gauges, the minimum diameter of pressure gauge cases shall be:

- 63 mm where the gauge is connected to controls and positioned within the hand reach of the operator or between the hitch points of the three-point linkage and the tractor;
- 100 mm in all other cases.

The allowable pressure shall be indicated on the pressure gauge by a red line.

The pressure gauge shall be located so that the spray does not reach the operator in the event of leakage.

4.7 Safety valve

The sprayer shall be provided with a safety valve preventing the pressure from exceeding the allowable pressure of the circuit, as indicated by the manufacturer, by more than 20 %.

The adjustment of the safety valve shall be protected against any unauthorized modification. The actuation of the safety valve shall not cause any spill or leakage of liquid out of the circuit.

This requirement does not apply to sprayers fitted with a centrifugal pump whose maximal pressure, whatever the output, cannot exceed 20 % of the allowable pressure of the circuit.

4.8 Fan

The fan shall be placed or protected in such a way that when the sprayer is operating, it shall not be able to draw in or discharge foreign matter which could injure the operator.

NOTE. More precise requirements on position of air inlet or a testing clause for verification will be included in the next revision of this standard.

Access to the fan shall be prevented by fixed guards, which may be a combination of imperforate and mesh guards conforming to tables 1, 3, 4 and 6 of EN 294: 1992.

When the pump drive and the fan drive are not controlled independently, it shall be possible to disengage the fan drive from the pump drive from the ground or from a platform.

4.9 Spray liquid carrying hoses

For machines equipped with a cab, hoses shall not be located in the sprayer cab. For machines without a cab, hoses and their connecting devices shall be protected by imperforate screens so that leakage cannot contaminate the operator.

All pressurized hoses shall be directly marked in a durable way with the allowable pressure.

The allowable hose pressure and the allowable connecting devices pressure shall be at least equal to the allowable circuit pressure indicated by the manufacturer.

Tank filling devices shall be designed so that spray liquid cannot return from any tank to the filling supply.

Page 6

EN 907: 1997

4.10 Spraying manual control

When the spraying stop control has been activated, the volume dripping from each nozzle shall not exceed 2 ml timed over a 5 min period. The measuring shall be started 8 s after the flow to the spray boom has been shut off.

It shall be possible for the operator to activate the spraying manual controls, when operating, from the driver's position.

4.11 Clean water tank

Sprayers shall be equipped with a clean water tank for the operator's use with a minimum capacity of 15 l. This tank shall be totally isolated from the other parts of the machine and shall be fitted with a tap which can be opened without being continuously pressed.

4.12 Manually operated spraying device

Manually operated spraying devices (e.g. spray guns) shall be designed so that no inadvertent release can occur (e.g. by a separate manually controlled latch or lock). They shall be lockable in the closed position and not lockable in the open position.

5 Information for use

5.1 Instruction handbook

Comprehensive instructions and information on all aspects of maintenance and the safe use of the machine shall be provided in the instruction handbook. It shall comply with **5.5** of EN 292-2: 1991.

In particular, the following points shall be emphasized:

- a) the restarting procedures for the machine after wintering;
- b) methods for adjusting the pressure;
- c) details of adjustments to be made to the sprayer when various nozzles are used;
- d) the folding/unfolding procedures for the boom;
- e) the requirement that any maintenance intervention, in particular welding, shall only be undertaken after the spraying circuit of the machine has been rinsed:
- f) the procedures to be followed for dealing with blocked nozzles and other breakdowns in the field;
- g) precautions to be taken by operators against contamination, i.e. the wearing of personal protective equipment, the use of equipment facilitating the direct introduction of pesticides products and liquid fertilizers into the tank, etc. at each of the following stage of use;
- filling the tank and adding chemicals;
- spraying;
- adjustments;
- draining and cleaning the tank;
- changing chemicals;
- servicing.

- h) that mounted sprayers shall not be used in front of the tractor where there is no cab;
- i) that entering the tank is prohibited;
- j) the need to ensure that no other person is standing near the machine, in particular near the fan;
- k) the risk of unintentional contact with overhead power lines, for machines for which the height of the spray booms can exceed 4 m;
- l) the procedures to be followed for parking the machine.

5.2 Marking

5.2.1 General

The marking shall comply with **5.4** of EN 292-2: 1991. All machines shall be marked legibly and indelibly with at least the information given in **5.2.2** to **5.2.5**.

5.2.2 Sprayers

At least the following information shall be marked on sprayers:

- name and address of the manufacturer;
- vear of construction;
- designation of series or type;
- serial number, if any;
- allowable circuit pressure;
- mass when empty;
- allowable total weight;
- nominal rotational frequency and direction of rotation of the power input connection (marked by an arrow), when applicable;
- nominal power in kW (for self-propelled machine).
 In addition:
 - a warning placed on the tank shall indicate that it

is prohibited to enter into the tank;

- for machines, for which the height of the booms can exceed 4 m, a warning placed at the driver's position shall draw the attention to the risk of unintentional contact with overhead power lines;
- a warning placed on the clean water tank shall indicate that it shall be filled only with clean water.

5.2.3 *Pumps*

At least the following information shall be marked on pumps:

- name and address of the manufacturer;
- serial number;
- maximum pump output;
- maximum pump pressure;
- maximum pump output at maximum pressure;
- nominal and maximum frequency of rotation.

5.2.4 *Hoses*

The allowable pressure shall be marked on hoses.

Annex A (normative)

List of hazards

Table A.1 gives the list of hazards based on EN 292-1:1991 and EN 292-2:1991 and annex A of EN 292-2:1991/A1:1995.

Table A.2 gives the list of hazards due to the mobility of the machine.

The meaning of the different indications given in the last column (solutions given by this standard) of these tables is:

- 'not relevant': the hazard is not significant for the machine;
- 'dealt with': the hazard is significant. The measures given in the indicated clauses provide guidance for dealing with the hazard in accordance with the principles of safety integration of EN 292; that means:
- elimination or reduction of the risk by design, as far as possible;
- protection measures;
- information for the residual risks.
- 'partly dealt with': the hazard is significant for several parts of the machine. The measures given in the indicated clauses dealt with this hazard for some of these parts. In other parts where the hazard is significant, other measures, not included in this standard, will have to be applied in order to deal with this hazard;
- 'not dealt with': the hazard is significant for the machine but has not been taken into account during the preparation of this European Standard.

Table	e A.1 List of hazards			
Hazards		Relevant clauses (informative)		Solutions given by this standard
		EN 292-1	EN 292-2	
1	Mechanical hazards (caused for example by:	4.2	_	_
	- shape;			
	– relative location;			
	- mass and stability (potential energy of elements);			
	- mass and velocity (kinetic energy of elements);			
	- inadequacy of the mechanical strength;			
	– accumulation of potential energy by:			
	– elastic elements (springs), or			
	– liquids or gases under pressure, or			
	- vacuum of the machine parts or workpieces).			
1.1	crushing hazard	4.2.1, 4.2.2	3.2	dealt with in 4.1 , 4.2 , 4.4.2 , 4.4.3 , 4.4.4 , 5.1
1.2	shearing hazard	4.2.1,4.2.2	3.2, 4.1.1	dealt with in 4.1 , 4.2 , 4.4.2 , 4.4.3 , 4.4.4 , 5.1
1.3	cutting or severing hazard	4.2.1, 4.2.2	3.2	dealt with in 4.1 , 4.2 , 4.4.2
1.4	entanglement hazard	4.2.1, 4.2.2	_	dealt with in 4.1 , 4.2 , 4.8
1.5	drawing-in or trapping hazard	4.2.1	3.11, 4.1.1, 6.1.2	dealt with in 4.1 , 4.2 , 4.4.2 , 4.5 , 5.1 , 5.2
1.6	impact hazard	4.2.1	_	dealt with in 4.1 , 4.2 , 4.4.2
1.7	stabbing or puncture hazard	4.2.1	_	not relevant

Table	e A.1 List of hazards (continued)			
Hazards		Relevant clauses (informative)		Solutions given by this standard
1.8 1.9	friction or/abrasion hazard high pressure fluid ejection hazard	4.2.1 4.2.1	3.3 b)	not relevant partly dealt with in 4.7 , 4.9
1.10	ejection of parts (of machinery and processed material/workpieces)	4.2.2	3.8	dealt with in 4.1 , 4.5.2 , 4.6 , 4.7 , 4.8 , 4.9 , 4.12 , 5.1
1.11	loss of stability (of machinery and machine parts)	4.2.2	3.3, 6.2.5	dealt with in 4.3, 5.1
1.12	slip, trip and fall hazards in relationship with machinery (because of their mechanical nature)	4.2.3	6.2.4	dealt with in 4.4.3 , 4.5.1
2	Electrical hazards, caused for example by:	4.3	3.9	-
2.1	electrical contact (direct or indirect)	4.3	_	dealt with in 4.4.2 , 5.1 , 5.2
2.2	electrostatic phenomena	4.3	_	not dealt with
2.3	thermal radiation or other phenomena such as ejection of molten particles, and chemical effects from short-circuits, overloads etc.	4.3	_	not relevant
2.4	external influences on electrical equipment	4.3	3.4	not dealt with
3	Thermal hazards resulting in:	4.4	3.6.3	-
3.1	burns and scalds, by a possible contact of persons, by flames or explosions and also by the radiation of heat sources	4.4	-	not dealt with (only relevant for self-propelled machines)
3.2	health-damaging effects by hot or cold work environment	4.4	_	not relevant
4	Hazards generated by noise, resulting in:	4.5	3.6.3	_
4.1	hearing losses (deafness), other physiological disorders, (e.g. loss of balance, loss of awareness)	4.5	-	not dealt with
4.2	interference's with speech communication, acoustic signals, etc.	4.5	_	not relevant
5	Hazards generated by vibration (resulting in a variety of neurological and vascular disorders)	4.6	3.6.3	not dealt with (only relevant for self-propelled machines)
6	Hazards generated by radiation, especially by:	4.7	_	-
6.1	electrical arcs	_	_	not relevant
6.2	lasers	_	_	not relevant
6.3	ionizing radiation sources	4.7	_	not relevant
6.4	machines making use of high frequency electromagnetic fields	_	_	not relevant
7	Hazards generated by materials and substances processed, used or exhausted by machinery, for example:	4.8	3.3 b)	_

Table	A.1 List of hazards (continued)			
Hazards		Relevant clauses (informative)		Solutions given by this standard
7.1	hazards resulting from contact with or inhalation of harmful fluids, gases, mists, fumes and dusts	4.8	_	dealt with in 4.1 , 4.4.1 , 4.5 , 4.9 , 4.10 , 4.11 , 4.12 , 5.1 , 5.2
7.2	fire or explosion hazard	4.8	-	dealt with in 4.6 , 4.7 , 5.1
7.3	biological and micro-biological (viral or bacterial) hazards	4.8	_	not relevant
8	Hazards generated by neglecting ergonomic principles in machine design (mismatch of machinery with human characteristics and abilities) caused for example by:	4.9	3.6	_
8.1	unhealthy postures or excessive efforts	4.9	3.6.1, 3.6.4	dealt with 4.4.4 , 4.5.1
8.2	inadequate consideration of human hand-arm of foot-leg anatomy	4.9	3.6.9	dealt with in 4.5.1
8.3	neglected use of personal protection equipment	5.5	-	dealt with in 5.1, 5.2
8.4	inadequate area lighting	_	3.6.5	not relevant
8.5	mental overload or underload, stress, etc.	4.9	3.6.4	not relevant
8.6	human error	4.9	3.6	dealt with in 5.1 , 5.2
9	Hazard combinations	4.10	-	not relevant
10	Hazards caused by failure of energy supply, breaking down of machinery parts and other functional disorders, for example:	5.2.2	3	_
10.1	failure of energy supply (of energy and/or control circuits)	3.16	3.7	dealt with in 4.4.4 , 5.1
10.2	unexpected ejection of machine parts or fluids	_	3.8,4	dealt with in 4.6 , 4.7 , 4.9
10.3	failure, malfunction of control system (unexpected start up, unexpected overrun)	3.15, 3.16, 3.17	3.7	not relevant
10.4	errors of fitting	_	-	dealt with in 5.1, 5.2
10.5	overturn, unexpected loss of machine stability	4.2.2	6.2.5	not relevant
11	Hazards caused by (temporary) missing and/or incorrectly positioned safety related measures/means, for example:	_	4	
11.1	all kinds of guard	3.22	4.2	not relevant
11.2	all kinds of safety related (protection) devices	3.23	4.2	dealt with in 5.1
11.3	starting and stopping devices	_	3.7	not relevant

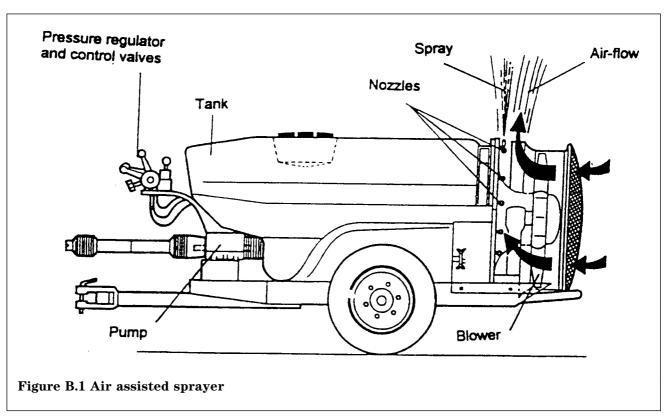
Table A.1 List of hazards (continued)				
Hazards		Relevant clauses (informative)		Solutions given by this standard
11.4	safety signs and signals	_	3.6.7, 5.2, 5.3, 5.4	not relevant
11.5	all kinds of information or warning devices	_	5.4	dealt with in 5.1
11.6	energy supply disconnecting devices	_	6.2.2	not relevant
11.7	emergency devices	_	6.1	not relevant
11.8	feeding/removal means of workpieces	_	3.11	not relevant
11.9	essential equipment and accessories for safe adjusting and/or measuring	3.3, 3.11	3.12, 6.2.1, 6.2.3, 6.2.6	dealt with in 5.1
11.10	equipment evacuating gases, etc.	_	_	not relevant

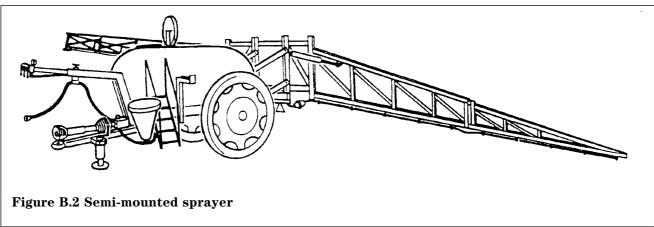
Table A.2 List of hazards due to mobility				
Hazards		Solutions given by this standard		
12	Inadequate lighting of moving/working area	not dealt with (only relevant for self-propelled machines)		
13	Hazards due to sudden movement, instability, etc.	dealt with in 4.3		
14	Inadequate/unergonomic design of driving/operating position	_		
14.1	hazards due to dangerous environments (contact with moving parts, exhaust gases etc.)	not dealt with (only relevant for self-propelled machines)		
14.2	inadequate visibility from drivers/operators position	not dealt with (only relevant for self-propelled machines)		
14.3	inadequate seat/seating (SIP)	not dealt with (only relevant for self-propelled machines)		
14.4	inadequate/unergonomic design/positioning of controls	dealt with in 4.4.2 , 4.4.4 , 4.10 (partly dealt with for self-propelled machines)		
14.5	starting/moving of machinery	dealt with in 4.4.2 (partly dealt with for self-propelled machines)		
14.6	traffic of machinery	not dealt with (only relevant for self-propelled machines)		
14.7	movement of pedestrian controlled machinery	not relevant		
15	Mechanical hazards	-		
15.1	hazards to exposed persons due to in controlled movement	not relevant		
15.2	hazards due to break-up and/or ejection of parts	not relevant		
15.3	hazards due to rolling over (deflection limiting volume: DLV)	not dealt with (only relevant for self-propelled machines)		
15.4	hazards due to falling objects (DLV)	not relevant		
15.5	inadequate means of access	dealt with in 4.4.3 (partly dealt with for self-propelled machines)		
15.6	hazards caused due to towing, coupling, connecting, transmission, etc.	not dealt with		
15.7	hazards due to batteries, fire, emissions of dust and gas, etc.	not dealt with (only relevant for self-propelled machines)		

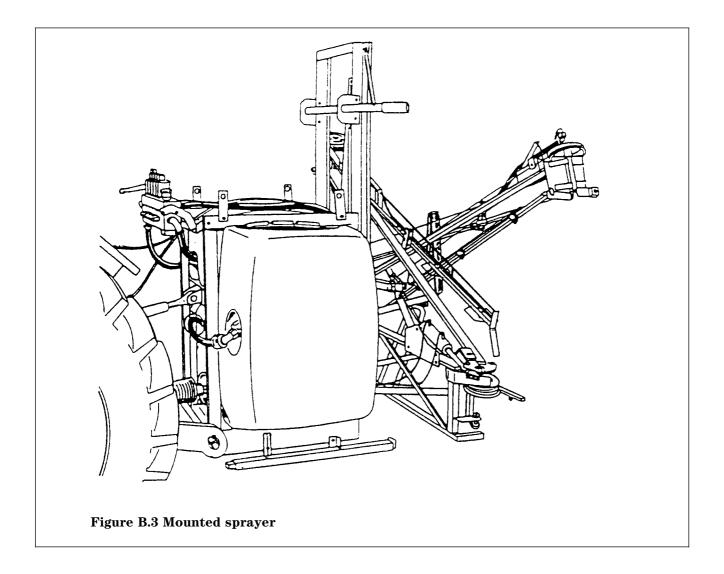
Annex B (informative)

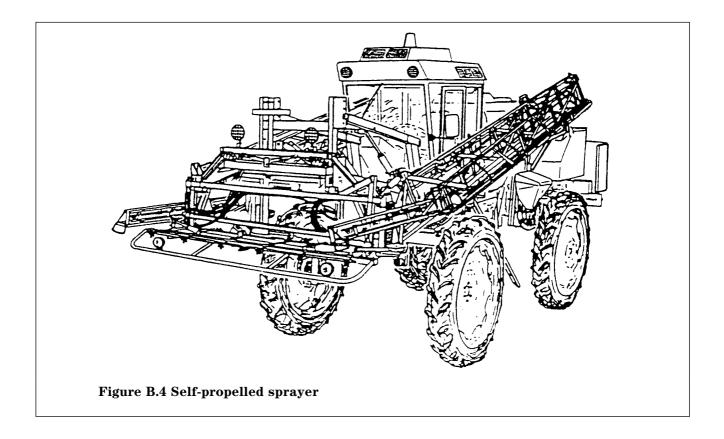
Examples of some sprayers

These examples are functional representations of the machines and do not illustrate the safety measures required by this standard.









14 blank

List of references

See national foreword.

BSI — British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover. Tel: 020 8996 9000. Fax: 020 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: 020 8996 9001. Fax: 020 8996 7001.

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact the Information Centre. Tel: 020 8996 7111. Fax: 020 8996 7048.

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration. Tel: 020 8996 7002. Fax: 020 8996 7001.

Copyright

Copyright subsists in all BSI publications. BSI also holds the copyright, in the UK, of the publications of the international standardization bodies. Except as permitted under the Copyright, Designs and Patents Act 1988 no extract may be reproduced, stored in a retrieval system or transmitted in any form or by any means – electronic, photocopying, recording or otherwise – without prior written permission from BSI.

This does not preclude the free use, in the course of implementing the standard, of necessary details such as symbols, and size, type or grade designations. If these details are to be used for any other purpose than implementation then the prior written permission of BSI must be obtained.

If permission is granted, the terms may include royalty payments or a licensing agreement. Details and advice can be obtained from the Copyright Manager. Tel: 020 8996 7070.