BRITISH STANDARD

BS EN
13790-1:2003

Agricultural machinery — Sprayers — Inspection of sprayers in use —

Part 1: Field crop sprayers

The European Standard EN 13790-1:2003 has the status of a British Standard

ICS 65.060.40

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Foreword

This document (EN 13790-1:2003) has been prepared by Technical Committee CEN/TC 144 “Tractors and machinery for agriculture 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of an identical text or by endorsement, at the latest by November 2003, and conflicting national standards shall be withdrawn at the latest by November 2003.

This European Standard consists of the following Parts, under the general title *Agricultural machinery — Sprayers - Inspection of sprayers in use:*

— *Part 1: Field crop sprayers*

— *Part 2: Air-assisted sprayers for bush and tree crops*

Annexes A and B are informative.

During recent years, several countries have developed systems for inspection of field crop sprayers in use. Developments in this direction have been stimulated by public concern about risks, and the aim of reducing the use of crop protection products.

However, there are three main arguments for the inspection:

— test operator safety (minimum requirements are given concerning operator safety in the use of work equipment at work directive 95/63/CE, amending directive 89/655/CEE, and can be complimented by national regulations);

— less potential risk of environmental contamination by crop protection products;

— good control of the pest with the minimum possible input of crop protection product.

In order to use crop protection products in agricultural production in Europe safely, it is necessary to define the requirements and test methods for sprayers in use. This is a relevant step after having standardized the requirements for new equipment, in respect of safety hazards (see EN 907) and potential risks of environmental contamination (see EN 12761 Parts 1 to 3).

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, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

Standardising the requirements and methods for inspection of sprayers in use, takes into consideration not only the original performance of the spraying equipment, but also its use, care and maintenance. This is the logical link between new equipment of good quality and well educated and concerned users.

The inspection of sprayers in use can be done on a voluntary or mandatory basis. In both cases further official or legal specifications are necessary, e.g. on the execution management of the inspection, which organisations are authorised to carry out the inspection, time intervals between inspections etc... As the specifications of this European Standard are based on EN 907 and EN 12761, it may be the case that sprayers in use which were produced before EN 907 and EN 12761 came into force do not fulfil all the specifications given in this European Standard.

1 Scope

This European Standard specifies the requirements and methods of their verification for the inspection of field crop sprayers in use. It relates mainly to the condition of the sprayer in respect of safety hazards for the test operator, the potential risk of environmental contamination and opportunities to achieve good application.

NOTE Minimum requirements are given concerning operator safety in the use of work equipment at work directive 95/63/CE, amending directive 89/655/CEE, and can be complimented by national regulations.

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 these 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 (including amendments).

EN 837-1, *Pressure gauges – Part 1: Bourdon tube pressure gauges – Dimensions, metrology, requirements and testing.*

ISO 5682-2:1997, *Equipment for crop protection – Spraying equipment – Part 2: Test methods for hydraulic sprayers.*

3 Inspection

The compliance with the requirements defined in the following clauses shall be checked by inspection, function tests and measurements.

NOTE Some of the tests specified in this standard involve processes which could lead to a hazardous situation. Any person performing tests in accordance with this standard should be appropriately trained in the type of work to be carried out. All national regulatory conditions and health and safety requirements should be followed.

4 Requirements and method of verification

4.1 Power transmission parts

4.1.1 The power take-off drive shaft guard and the guard of the power input connection (PIC) shall be fitted and in good condition:

— the different parts of the shaft, the universal joints and locking systems shall not show any mark of excessive wear and shall operate correctly ;

— the function of the guard shall be obvious and the guard shall not show any wear marks, holes, deformations or tears;

— the restraining device that prevents the rotation of the power take-off drive shaft guard shall be present and shall work reliably.

The protective devices and any moving or rotating power transmission parts shall not be affected in their function.

Method of verification: inspection and function test.

4.1.2 A device for supporting the PTO drive shaft when not in use shall be present and in good condition. The chain or device used for restraining the PTO shaft guard shall not be acceptable for this purpose.

The guard of the power input connection (PIC) shall be fitted and in good condition.

4.2 Pump

4.2.1 The pump capacity shall be suited to the needs of the equipment.

a) The pump capacity shall be at least 90 % of its original nominal flow, given by the manufacturer of the sprayer.

Method of verification: measurement according to 5.2.1.a); or

b) the pump shall have sufficient flow rate capacity in order to be able to spray at maximum working pressure as recommended by the sprayer or the nozzle manufacturer during test with the largest nozzles mounted on the boom while maintaining a visible agitation as specified in 4.3.

Method of verification: measurement according to 5.2.1.b).

4.2.2 There shall be no visible pulsations caused by the pump.

Method of verification: inspection and function test.

4.2.3 When there is a pressure safety valve on the pressure side of the pump, this valve shall work reliably.

Method of verification: inspection and function test.

4.2.4 There shall be no leakages (e.g. dripping) from the pump.

Method of verification: inspection.

4.3 Agitation

A clearly visible recirculation shall be achieved when spraying at the nominal p.t.o speed, with the tank filled to the half of its nominal capacity.

Method of verification: inspection.

4.4 Spray liquid tank

4.4.1 There shall be no leakages from the tank or from the filling hole when the cover is closed.

Method of verification: inspection.

4.4.2 There shall be a strainer in good condition in the filling hole.

Method of verification: inspection.

4.4.3 There shall be a grating in the chemical introduction container, if provided.

Method of verification: inspection.

4.4.4 Pressure compensation (to avoid over- or underpressure in the tank) shall be ensured.

Method of verification: inspection.

4.4.5 There shall be a clearly readable liquid level indicator on the tank which is visible from the driver's position and from where the tank is filled.

Method of verification: inspection.

4.4.6 It shall be possible to collect the emptied spray liquid simply, without tools, reliably and without spillage (for example using a tap).

Method of verification: function test.

4.4.7 If there is a non-return device on the water filling device of the tank, this device shall work reliably.

Method of verification: inspection and function test.

4.4.8 The chemical introduction container, if provided, shall work reliably.

Method of verification: function test.

4.4.9 The cleaning device for crop protection product containers, if provided, shall work reliably.

Method of verification: function test.

4.5 Measuring systems, controls and regulation systems

4.5.1 All devices for measuring, switching on and off and adjusting pressure and/or flowrate shall work reliably and there shall be no leakages.

Method of verification: inspection and function test.

4.5.2 The controls necessary for spraying shall be mounted in such a way that they can be easily reached and operated during the application and information provided for example on displays that can be read respectively.

Switching on and off of all nozzles shall be possible simultaneously

NOTE Turning of the head and the upper body is acceptable.

Method of verification: inspection.

4.5.3 The scale of the pressure gauge shall be clearly readable and suitable for the working pressure range used.

Method of verification: inspection.

4.5.4 The scale shall be marked:

— at least every 0,2 bar for working pressures less than 5 bar;

— at least every 1,0 bar for working pressures between 5 bar and 20 bar;

— at least every 2,0 bar for working pressures more than 20 bar.

Method of verification: inspection.

4.5.5 For analogue pressure gauges the minimum diameter of the pressure gauge cases shall be 63 mm.

Method of verification: measurement.

4.5.6 The accuracy of the pressure gauge shall be ± 0,2 bar for working pressures between 1 bar (included) and 2 bar (included).

From a pressure of 2 bar, the pressure gauge shall measure with an accuracy of ± 10 % of the real value.

The pointer on the pressure gauge shall remain stable in order to permit reading-off of the working pressure.

Method of verification: according to 5.2.2.

4.5.7 Other measuring devices, especially flow meters (used for controlling the volume/hectare rate), shall measure within a maximum error of 5 % of the real data.

Method of verification: according to 5.2.3.

4.6 Pipes and hoses

4.6.1 There shall be no leakages from pipes or hoses when tested up to the maximum obtainable pressure for the system.

Method of verification: inspection and function test.

4.6.2 Hoses shall be positioned in such a way that there are no sharp bends and no abrasion which makes the woven fabric visible.

Method of verification: inspection.

4.7 Filtering

4.7.1 There shall be at least one filter on the pressure side of the pump and in case of positive displacement pumps also one filter on the suction side.

NOTE Nozzle filters are not considered as pressure side filters.

The filter(s) shall be in good condition and the mesh size shall correspond to the nozzles fitted according to the instructions of nozzle manufacturers.

Method of verification: inspection and function test.

4.7.2 If an isolating device is provided, it shall be possible, with the tank filled to its nominal volume, to clean filters without any spray liquid leaking out except for that which may be present in the filter casing and the suction lines.

Method of verification: inspection.

4.7.3 Filter inserts shall be changeable.

Method of verification: inspection.

4.8 Spray boom

4.8.1 The boom shall be stable in all directions, i.e. not loose in any joints and not be bent.

The right and the left parts of the boom shall be of the same length.

Method of verification: inspection.

4.8.2 When provided, the automatic resetting of booms shall operate if fitted with the device, to move backwards and forwards, in case of contact with obstacles.

Method of verification: inspection and function test.

4.8.3 The boom shall be securely lockable in the transport position.

Method of verification: inspection and function test.

4.8.4 The nozzle spacing and their orientation shall be uniform along the boom, except for special equipment such as border spraying. By design, it shall not be possible to modify unintentionally the position of the nozzles in working conditions, for example by folding/unfolding the boom.

Method of verification: inspection and measurement.

4.8.5 When measured stationary on a level surface, the distance between the lower edges of the nozzles and the surface shall not vary more than 10 cm or 1 % of the half working width.

Method of verification: inspection and measurement.

4.8.6 Regardless of the distance of the boom above the ground, no liquid shall be sprayed on to the sprayer itself. This does not apply if needed by function and if dripping is minimised.

Method of verification: inspection.

4.8.7 A device shall be fitted to prevent damage to the nozzles if the boom hits the ground, if the working width of the boom is $\geq$ 10 m.

Method of verification: inspection.

4.8.8 It shall be possible to switch on and off individual boom sections.

Method of verification: inspection and function test.

4.8.9 Height adjustment devices shall work reliably.

Method of verification: function test.

4.8.10 Devices for damping unintended boom movements and slope compensation systems shall work reliably.

Method of verification: function test.

4.8.11 When measured at the inlet of the boom sections, the pressure shall not vary more than 10 %, when the sections are closed one by one.

Method of verification: according to 5.2.7.

4.9 Nozzles

4.9.1 All nozzles shall be identical (type, size, material and origin) all along the boom, except where they are intended for a special function for example the end nozzles for border spraying.

Other components (nozzle filters, anti drip devices) shall be equivalent all along the boom.

Method of verification: inspection.

4.9.2 After being switched off, the nozzles shall not drip. 5 s after the spray jet has collapsed there shall be no dripping.

Method of verification: inspection.

4.10 Transverse distribution

For the transverse distribution, the requirements and test methods of 4.10.1 or 4.10.2 shall apply.

NOTE 1 If nozzles are used on a boom to form a uniform spray, 4.10.1 or 4.10.2 applies; in other cases, 4.10.2 applies.

NOTE 2 A compared evaluation of the two methods given in 4.10.1 and 4.10.2 will be carried out during the revision of this standard to check whether preference may be given to one of these methods.

4.10.1 Measurement on patternator

a) The transverse distribution, within the total overlapped range, shall be uniform. The transverse distribution is evaluated on the basis of the coefficient of variation which shall not exceed 10 %; and

b) the amount of liquid collected by each patternator groove within the overlapped range shall not deviate more than ± 20 % of the total mean value.

Method of verification: measurement according to 5.2.4.

4.10.2 Flow rate measurement

4.10.2.1 The deviation of the flow rate of each nozzle of the same type shall not exceed ± 10 % of the nominal flow rate indicated by the manufacturer.

Method of verification: measurement according to 5.2.5.

4.10.2.2 The pressure drop between the measuring point for pressure on the sprayer and the end of each boom section width shall not exceed 10 % of the pressure shown on the pressure gauge**.**

Method of verification: measurement according to 5.2.6.

5 Test methods

5.1 Preparation of sprayer

The test shall not start if requirements of 4.1.1 are not verified.

Before the inspection takes place, the sprayer shall be carefully cleaned. Certain attention shall be paid to rinsing and internal cleaning of the sprayer including filters and filters inserts, and external cleaning of those parts of the sprayer that are most exposed to the crop protection product when spraying.

Visible and other known faults should preferably be remedied before the inspection. A preparatory "rough inspection" should be done at the site of the ordinary inspection, in order to avoid wasting time making measurements on sprayers with very obvious serious faults.

The owner/operator of the sprayer should preferably be present at the inspection.

5.2 Test facilities and methods

5.2.1 Pump capacity measurement

a) The error of the flowmeter shall not exceed 2 % of the measured value when the capacity of the pump is ≥ 100 l and 2 l/min when the capacity of the pump is < 100 l. The flow shall be measured at free outlet and at one pressure between 8 bar and 10 bar, or if lower at the highest permitted working pressure for the pump.

b) On sprayers not fitted with a test adapter or for pumps for which the maximum working pressure is not known (see 4.2.1), a calibration pressure gauge shall be placed at an end nozzle and the maximum working pressure recommended by the sprayer or the nozzle manufacturer during test shall be established.

5.2.2 Verification of the sprayers pressure gauges

5.2.2.1 Specifications of pressure indicators used for verification

Analogue pressure gauges used for testing shall have a minimum diameter of 100 mm. Other minimum requirements on pressure gauges used for testing are given in Table 1.

Table 1 — Characteristics of pressure gauges used for testing (in accordance with EN 837-1)

Pressure range Δp bar	**Scale unit max.** bar	**Accuracy** bar	**Class required**	**Scale end value** Bar
$0 < \Delta p \leq 6$	0,1	0,1	1,6 1,0 0,6	6 10 16
$6 < \Delta p \leq 16$	0,2	0,25	1,6 1,0	16 25
$\Delta p > 16$	1,0	1,0	2,5 1,6 1,0	40 60 100

The pressure gauge shall be checked at least once a year.

5.2.2.2 Verification method of the sprayer pressure gauge

The sprayers pressure gauge shall be tested on the sprayer or on a test bench. Measurements shall be done with increasing and decreasing pressures respectively.

5.2.3 Flow meters for controlling the volume/hectare rate

The error of the measuring instruments in the test equipment shall not exceed 1,5 % of the measured value.

5.2.4 Measurement of the uniformity of the transverse volume distribution with a patternator

A patternator with grooves 100 mm wide and at least 80 mm deep measured as a distance between the top and the bottom of the groove shall be used to measure the uniformity of the transverse volume distribution.

Groove patternator shall be at least 1,5 m long. The groove width shall be adhered to with a tolerance of ± 2,5 mm. Prior to the start of the test, the grooves to be used shall be checked by suitable means such as a pattern to see whether the above tolerance limits are adhered to. The graduated cylinders shall be of the same type and size and have a capacity of at least of 500 ml. Scale graduation shall be a maximum of 10 ml. The error shall not be greater than 10 ml or 2 % of the measured value.

The groove width of patternator working in steps with electronic data sampling (e.g. scanners) shall correspond to the mentioned dimensions. The tolerance is ± 1 mm. When passing the measuring track, the positioning in the single steps shall be completed with an accuracy of ± 20 mm. The measuring error of the flow volume of the single grooves at a flow volume of 300 ml/min shall be less than 4 %. The instruction handbook shall give information on how to adjust the patternator.

Provisions shall be taken to avoid the results of the measurements being influenced by climatic conditions.

Patternators of different types can be used, if at least the same measuring results and accuracy is achieved.

The size of the test bench shall be suited to the size of the boom to be tested and to the type of spraying and also to ensure that the overlapped range is covered completely.

5.2.5 Measurement of the flow rate

This test may be performed with nozzles on the boom or removed from the boom. It shall ensure that the spray jet is correctly formed.

The measuring error shall not exceed 2,5 % of the measured value.

5.2.5.1 Measurement with nozzles fitted on the boom

The flow rate of each nozzle shall be measured according to clause 8 of ISO 5682-2:1997.

5.2.5.2 Measurement with nozzles removed from the boom

The measurement of the flow rate of each nozzle shall be made on a test bench.

5.2.6 Measurement of the pressure drop

A standard pressure gauge shall be located at the same place as a nozzle at the end of each boom section. At least two reference pressures shall be established at the pressure gauge of the sprayer. The values indicated by the pressure gauge of the sprayer shall be compared with the value measured by the standard pressure gauge.

5.2.7 Measurement of the pressure variation when the sections are closed

A standard pressure gauge shall be located at the same place as a nozzle at the inlet of the section. The variation of the value indicated by the standard pressure gauge is observed when the sections are closed one by one.

5.2.8 Other test facilities

Tachometer (P.T.0), measuring tape (nozzle spacing and height), stop watch (flow rate, distribution), measuring cylinder (with measuring range 2 l, scale division 20 ml, error 20 ml) or flow meter (nozzle output) and air pressure gauge (pressure pulsation damper).

6 Summary of the inspection

A summary of the inspection is given in annex A.

7 Test report

A test report shall be given to the user directly following the inspection at the inspection site. This report shall mention any malfunctions of the sprayer and inform the user of the repairs required to be made to his equipment. The test report shall also include the results of the measurements.

An example of a test report is given in annex B.

Annex A
(informative)

Summary of the inspection

Clause	Requirement	Inspection/ Function test	Measure-ment	Note
4.1	Power transmission parts	X		
4.2	Pump			
4.2.1	- Capacity		X	
4.2.2	- Pulsations	X		On pressure gauge
4.2.3	- Pressure safety valve, if applicable	X		
4.2.4	- Leakages	X		
4.3	Agitation	X		Half filled tank
4.4	Spray liquid tank			
4.4.1	- Leakages	X		
4.4.2	- Strainer	X		In the filling hole
4.4.3	- Grating, if applicable	X		In the introduction
4.4.4	- Pressure compensation	X		container
4.4.5	- Level indicator	X		
4.4.6	- Emptying	X		
4.4.7	- Non return device, if applicable	X		
4.4.8	- Chemical introduction container, if applicable	X		Reliable
4.4.9	- Can cleaning device, if applicable	X		Reliable
4.5	Measuring systems, controls and regulation systems			
4.5.1	- Reliability/leakages	X		Reliable
4.5.2	- Operation of controls	X		
4.5.3 -4.5.6	- Pressure gauge	X	X	
4.5.7	- Other measuring devices		X	
4.6	Pipes and hoses			
4.6.1	- Leakages	X		Maximum obtainable
4.6.2	- Bending/abrasion	X		pressure for the system
4.7	Filtering			
4.7.1	- Filter presence	X		
4.7.2	- Cleaning, if applicable	X		
4.7.3	- Filters inserts changeability	X		
4.8	Spray boom			
4.8.1	- Stable/Straight	X		
4.8.2	- Automatic resetting	X		
4.8.3	- Safely lockable	X		In transport position
4.8.4	- Nozzle spacing/orientation	X	X	Uniform
4.8.5	- Nozzle height	X	X	
4.8.6	- Sprayer contamination by spray	X		
4.8.7	- Prevention of nozzle damage	X		
4.8.8	- Boom sections control	X		
4.8.9	- Height adjustment	X		
4.8.10	- Damping, slope compensation	X		In spray position
4.8.11	- Pressure variations		X	Boom/closing sections
4.9	Nozzles			
4.9.1	- Identical	X		
4.9.2	- Dripping	X		
4.10	Distribution			
4.10.1	- Measurement on patternator		X	
4.10.2	- Flow rate measurement		X	

NOTE: Inspection = looking at the machine to see it is all there;
Function test = a check on the normal operation of the machine/component to see that it performs as specified;
Measurement = determining a value by using some form of device or instrument.

Annex B
(informative)

Test report

Test station:	**Test Report** **for the inspection of field crop sprayers** **according to EN 13790-1**
Owner's identity:	
Owner's address:	Manufacturer ..... Type ..... Serial-No ..... Year of construction ..... ☐ Mounted ☐ trailed ☐ self-propelled sprayer Owned by ☐ farmer ☐ contractor ☐ machine ring
Remarks:	
Result of the inspection ☐ no defect ☐ minor defect ☐ critical defects	Signature ..... Label ☐ yes ☐ no Date .....

			Defect				General remarks on the state of the sprayer
Subject	**Description**	**Requirement** [a]	no	minor defects	critical	repaired	
1.Power transmission		Guards	☐	☐	☐	☐	
2. Pump	☐ Piston	Capacity	☐	☐	☐	☐	
	☐ Diaphragm	Pulsations	☐	☐	☐	☐	
	☐	Pressure safety valve [a]	☐	☐	☐	☐	
	.....l/min at ....bar	Leakages	☐	☐	☐	☐	
3. Agitation	☐ mechanic ☐ hydraulic	Recirculation	☐	☐	☐	☐	

			Defect				General remarks on the state of the sprayer
Subject	**Description**	**Requirement** [a]	no	minor defects	critical	repaired	
4. Spray liquid tank	Volume l	Leakages	☐	☐	☐	☐	
		Strainer	☐	☐	☐	☐	
		Grating (introduction container) [a]	☐	☐	☐	☐	
		Pressure compensation	☐	☐	☐	☐	
		Level indicator	☐	☐	☐	☐	
		Emptying	☐	☐	☐	☐	
		Non-return device[a]	☐	☐	☐	☐	
		Chemical introduction container [a]	☐	☐	☐	☐	
		Can cleaning device[a]	☐	☐	☐	☐	
5. Measuring systems, controls and regulation systems		Function	☐	☐	☐	☐	
		Leakages	☐	☐	☐	☐	
		Operation of controls	☐	☐	☐	☐	
		Pressure gauge					
		- readability	☐	☐	☐	☐	
		- marking	☐	☐	☐	☐	
		- diameter	☐	☐	☐	☐	
		- accuracy	☐	☐	☐	☐	
		- steadiness of pointer	☐	☐	☐	☐	
		Other measuring devices	☐	☐	☐	☐	
		(error $<$ 5 %)					
6. Pipes and hoses		Leakages	☐	☐	☐	☐	
		Bending/abrasion	☐	☐	☐	☐	
7. Filtering		Filter presence	☐	☐	☐	☐	
		Cleaning [a]					
		Filters inserts changeability	☐	☐	☐	☐	

			Defect				General remarks on the state of the sprayer
Subject	**Description**	**Requirement** [a]	no	minor defects	critical	repaired	
8. Spray boom	Working width ..... m	Stability/straightness	☐	☐	☐	☐	
	Nozzle spacing ..... cm	Symmetry	☐	☐	☐	☐	
	Number of sections	Automatic resetting	☐	☐	☐	☐	
		Safely lockable	☐	☐	☐	☐	
		Nozzle spacing/orientation	☐	☐	☐	☐	
		Nozzle height (10 cm or 1 %)	☐	☐	☐	☐	
		Sprayer contamination	☐	☐	☐	☐	
		Prevention of nozzle damage	☐	☐	☐	☐	
		Boom sections control	☐	☐	☐	☐	
		Height adjustment	☐	☐	☐	☐	
		Damping	☐	☐	☐	☐	
		Slope compensation	☐	☐	☐	☐	
		Pressure variations at section inlets (< 10 %)	☐	☐	☐	☐	
9. Nozzles	Number of nozzles	Identical	☐	☐	☐	☐	
	Type	Dripping	☐	☐	☐	☐	
10. Transverse distribution	Actual C_V ..... %	Coefficient of variation (≤ 10 %)	☐	☐	☐	☐	
		Max. deviation from mean value (≤ 20 %)	☐	☐	☐	☐	
		OR					
		Deviation of flow rate from nominal flow rate (≤ 10 %)	☐	☐	☐	☐	
		Pressure drop (measuring point/end of section, ≤ 10 %)	☐	☐	☐	☐	

[a] if applicable

Bibliography

[1] EN 907:1997, *Agricultural and forestry machinery – Sprayers and liquid fertilizer distributors – Safety.*

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[3] EN 12761-2:2001, *Agricultural and forestry machinery – Sprayers and liquid fertilizer distributors – Environmental protection – Part 2: Field crop sprayers.*

[4] EN 12761-3:2001, *Agricultural and forestry machinery – Sprayers and liquid fertilizer distributors – Environmental protection – Part 3: Air-assisted sprayers for bush and tree crops.*

[5] *Directive 95/63/EC, Minimum safety requirements for the use of work equipment by workers at work (amendment to Directive 89/655/EEC).*

[6] *Directive 89/655/EEC, Minimum safety requirements for the use of work equipment by workers at work.*

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