



**SLOVENSKI STANDARD**  
**SIST EN 13790-1:2004**

**01-januar-2004**

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**Kmetijski stroji – Stroji za varstvo rastlin – Preskus naprav v uporabi – 1. del:  
Škropilnice**

Agricultural machinery - Sprayers - Inspection of sprayers in use - Part 1: Field crop  
sprayers

Landmaschinen - Pflanzenschutzgeräte - Prüfung von in Gebrauch befindlichen  
Pflanzenschutzgeräten - Teil 1: Feldspritzen

Matériels agricole - Pulvérisateurs - Contrôle des pulvérisateurs en service - Partie 1:  
Pulvérisateurs pour cultures basses

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65.060.40      Oprema za nego rastlin      Plant care equipment

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 13790-1**

May 2003

ICS 65.060.40

English version

**Agricultural machinery - Sprayers - Inspection of sprayers in use  
- Part 1: Field crop sprayers**

Matériels agricole - Pulvérisateurs - Contrôle des  
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cultures basses

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Gebrauch befindlichen Pflanzenschutzgeräten - Teil 1:  
Feldspritzgeräte

This European Standard was approved by CEN on 25 March 2003.

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

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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## Contents

	Page
Foreword.....	3
Introduction .....	4
1 Scope .....	4
2 Normative references .....	4
3 Inspection .....	4
4 Requirements and method of verification.....	5
4.1 Power transmission parts .....	5
4.2 Pump .....	5
4.3 Agitation.....	5
4.4 Spray liquid tank.....	6
4.5 Measuring systems, controls and regulation systems.....	6
4.6 Pipes and hoses.....	7
4.7 Filtering.....	7
4.8 Spray boom .....	8
4.9 Nozzles.....	9
4.10 Transverse distribution.....	9
5 Test methods.....	10
5.1 Preparation of sprayer.....	10
5.2 Test facilities and methods.....	10
6 Summary of the inspection.....	12
7 Test report .....	12
Annex A (informative) Summary of the inspection .....	13
Annex B (informative) Test report.....	14
Bibliography .....	17

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SIST EN 13790-1:2004

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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.

**EN 13790-1:2003 (E)****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.

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**2 Normative references**

SIST EN 13790-1:2004

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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.

**EN 13790-1:2003 (E)**

**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  $\pm 0,2$  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  $\pm 10$  % 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.

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**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.