

INTERNATIONAL
STANDARD

ISO
4254-6

First edition
1995-12-01

Corrected and reprinted
1996-05-15

**Tractors and machinery for agriculture and
forestry — Technical means for ensuring
safety —**

Part 6:
Equipment for crop protection

ISO 4254-6:1995

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*Tracteurs et matériels agricoles et forestiers — Dispositifs techniques
permettant d'assurer la sécurité —*

Partie 6: Matériel de protection des cultures



Reference number
ISO 4254-6:1995(E)

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.

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.

International Standard ISO 4254-6 was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 3, *Safety and comfort of the operator*.

ISO 4254 consists of the following parts, under the general title *Tractors and machinery for agriculture and forestry — Technical means for ensuring safety*:

- Part 1: *General*
- Part 2: *Anhydrous ammonia applicators*
- Part 3: *Tractors*
- Part 4: *Forestry winches*
- Part 5: *Power-driven soil-working equipment*
- Part 6: *Equipment for crop protection*
- Part 7: *Combine harvesters, forage and cotton harvesters*
- Part 9: *Equipment for sowing, planting and distributing fertilizers*

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International Organization for Standardization
Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

Tractors and machinery for agriculture and forestry — Technical means for ensuring safety —

Part 6: Equipment for crop protection

1 Scope

This part of ISO 4254 specifies special requirements to be considered when designing power-assisted sprayers for crop protection and liquid fertilizer application which are mounted, trailed or self-propelled. The requirements specified in this part of ISO 4254 are supplementary to those in ISO 4254-1.

NOTE 1 It is necessary to take account of any national regulations governing pressurized equipment, if applicable.

2 Normative references

The following standards contain provisions, which, through reference in this text, constitute provisions of this part of ISO 4254. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 4254 are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3600:1981, *Tractors and machinery for agriculture and forestry — Operator manuals and technical publications — Presentation*.

ISO 4254-1:1989, *Tractors and machinery for agriculture and forestry — Technical means for ensuring safety — Part 1: General*.

ISO 5681:1992, *Equipment for crop protection — Vocabulary*.

ISO 8935:1990, *Tractors for agriculture and forestry — Mountings and apertures for external equipment controls*.

ISO 9357:1990, *Equipment for crop protection — Agricultural sprayers — Tank nominal volume and filling hole diameter*.

3 Definitions

For the purposes of this part of ISO 4254, the definitions in ISO 5681 apply.

NOTE 2 Terms used are in accordance with ISO 4254-1.

4 Technical requirements

Sprayers for crop protection shall be designed to withstand all loadings arising from operation under normally intended working conditions as indicated in the operator's manual. Special consideration shall be given to the safe handling of chemical products by the operator. The general technical safety requirements specified in ISO 4254-1 shall be observed.

4.1 Nameplate(s)

4.1.1 Pumps

Information shall be clearly visible and durably attached to the sprayer pump; as a minimum the following details will be given:

- manufacturer or supplier;
- type;
- year of construction and/or manufacturing number;
- maximum flowrates;
- maximum working pressure.

4.1.2 Implement power input connection (P.I.C.)

The nominal speed of rotation in revolutions per minute (r/min) shall be shown near the P.I.C.

4.2 Spray tanks

It shall be possible to secure tank lids and covers against inadvertent loosening or opening. The flow of liquid out of the tank shall always be under the control of the operator. The level of liquid shall be visibly indicated to the operator while he is filling the tank.

The tank nominal volume and filling hole diameter shall comply with ISO 9357.

A strainer shall be provided in the filling aperture.

Pressure tanks shall be provided, with devices which allow safe pressure reduction to be made in case of malfunction.

It shall be possible to empty the tank easily and safely without the use of tools and without contaminating the operator.

Sprayers with a nominal tank volume above 800 l shall be equipped for filling with the sprayer chemical, for example pesticide, in such a way that liquid chemical does not need to be manually poured through the filling aperture of the tank.

4.3 Pressure gauge (manometer)

Sprayers shall have a clearly legible gauge showing the corresponding working pressure. The location of the pressure gauge shall be such that, in the case of leakage, hazards to the operator are minimized.

4.4 Control of maximum working pressure

Sprayers shall be provided with a device that prevents the working pressure exceeding the maximum permissible working pressure by more than 20 %, if the maximum permissible working pressure is less than 100 bar. If the maximum permissible working pressure is greater than 100 bar, then the device shall limit the pressure to 10 % above the maximum permissible working pressure. It shall not be possible to bypass this device. Adjustment of the safety device shall be secured against unauthorized modification. Fluid flow from safety devices shall be arranged to discharge safely.

The piping system, including gauge and manometer piping and all hoses, on the pressure side, shall be capable of withstanding at least 1,5 times the stated maximum working pressure without leaking.

4.5 Spraying booms and associated equipment

Filters and all elements containing liquid shall be designed to minimize the retention and discharge of the spray liquid during the cleaning process.

For boom sprayers, folding the boom shall not cause a major risk of exposure to the person(s) doing the spraying. Nor shall the boom constitute a physical obstruction at the operator's seat, or obstruct access to the filling aperture or any other location requiring operator access on the sprayer.

It shall be possible to secure spraying booms in position during transit.

4.5.1 Swivelling components

Trap and shear points which can arise when changing from working to transport position and vice-versa shall

- a) in the case of machines with the boom position changed by hand or with additional mechanical assistance, for example a spring, be safeguarded at the trap and shear points;
- b) in the case of machines with the boom position changed by powered assistance, for example hydraulically, carry a warning decal adjacent to the trap or shear points;
- c) be identified in the operator's manual.

4.5.2 Fans/ventilators

For fans and ventilators, clearances as specified in ISO 4254-1:1989, subclauses 7.1.5 to 7.1.6.1 shall be maintained with respect to operator access at the air inlets and outlets.

Where fans and ventilators cannot function correctly with these clearances, adequate guarding and warning signs shall be fitted close to air inlets and outlets to prevent accidental injury. The risk of such dangers shall be referred to in the operator's manual.

4.5.3 Manually operated spraying devices

Manually operated spraying devices, for example spray-guns, lances, shall be so designed that inadvertent release of liquid cannot occur.

The control shall lock in the "off" or "closed" position but it shall not be possible to lock it in the "on" or "open" position.

4.6 Hoses

Hoses shall be durably marked identifying either directly or indirectly the manufacturer and maximum permissible working pressure.

4.7 Hose couplings

Hose couplings shall be designed so that they cannot become loose or develop leaks when subjected to static or shock loads arising from normal operation.

4.8 Controls

Controls shall be located so that they are within easy reach of the operator when operating the sprayer. Controls shall be clearly marked or labelled, and easily adjustable.

Remote control apertures and mountings shall be in conformity with ISO 8935.

It shall be possible to cut off the liquid flow to nozzles from the operator's seat.

4.9 General

Liquids other than water shall not be piped through the operator's cab, or close to the operator's seat when no cab is fitted.

A clean water tank of minimum 15 l capacity shall be provided for operator washing purposes.

5 Optional fittings

It is recommended that the following optional fittings be offered by the manufacturer:

- suction hoses with non-return valves;
- chemical filling device for sprayers with tanks of 800 l volume or less;
- anti-drip devices (check valves);
- device for the transport of containers of formulated products.

6 Safety information

Safety information (see for example 4.5.1 and 4.5.2) shall be labelled on the sprayer.

7 Operator's manual

The manufacturer or supplier of sprayers shall supply an operator's manual with the equipment.

The manual shall be prepared in accordance with ISO 3600, and contain as a minimum the following information:

- a) starting and stopping procedures;
- b) safe parking procedure;
- c) transport arrangements;
- d) method of pressure reduction (particularly for manually operated sprayers);
- e) requirements for storage when there is a risk of freezing;
- f) the prohibition of arc or oxyacetylene welding or cutting on implements containing nitrate of ammonium or its residues due to the possibility of fire or the creation of noxious vapours;
- g) the danger at shear and trap points when folding the spray boom;
- h) requirements for maintenance and cleaning;
- i) requirements concerning all applicable safety regulations;
- j) the prohibition of use of special working fluids;
- k) that the safety instructions provided by the manufacturer of agropharmaceutical products shall be observed when these are being handled;
- l) details of the adjustment of the sprayer when using different nozzles.

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ICS 65.060.40

Descriptors: agricultural machinery, crop protection, crop treatment equipment, accident prevention, operator protection, safety devices, specifications, safety requirements.

Price based on 3 pages
