ANSI/ASABE AD4254-6:2009 AUG2013 (2017)
Agricultural machinery — Safety — Part 6: Sprayers and liquid fertilizer distributors

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ANSI/ASABE AD4254-6:2009 AUG2013 (R2017)
Approved September 2013 and reaffirmed December 2017 as an American National Standard

Agricultural machinery — Safety — Part 6: Sprayers and liquid fertilizer distributors

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This standard was reviewed for adoption by the ASABE Application Systems technical subcommittee and has been formerly approved by the Power and Machinery Division. Adopted by ASABE August 2013; approved as an American National Standard September 2013; reaffirmed by ASABE and ANSI December 2017.

Keywords: Application equipment, Fertilizer, Liquid fertilizer distributors, Pesticides, Safety, Sprayer

0 Foreword

0.1 ANSI/ASABE AD4254-6:2009, Agricultural machinery — Safety — Part 6: Sprayers and liquid fertilizer distributors, is an adoption with deviations of the identically titled ISO standard ISO 4254-6:2009, Agricultural machinery — Safety — Part 6: Sprayers and liquid fertilizer distributors. Deviations noted in the following Foreword sections pertain to those provisions where harmonization could not be achieved between ASABE and the International Standard.

0.2 ANSI/ASABE AD4254-6:2009 is to be used together with ISO 4254-1, specifies the safety requirements and their verification for the design and construction of mounted, semi-mounted, trailed and self-propelled agricultural sprayers for use with pesticide products and liquid fertilizer application, designed for use by one operator only. In addition, it specifies the type of information on safe working practices (including residual risks) to be provided by the manufacturer.

This part of ISO 4254 is not applicable to:

— pedestrian-controlled sprayers;

— knapsack sprayers;

— aerial sprayers;

— handheld spraying devices (e.g. spray guns).

When requirements of this part of ISO 4254 are different from those which are stated in ISO 4254-1, the requirements of this part of ISO 4254 take precedence over the requirements of ISO 4254-1 for machines that have been designed and built according the provisions of this part of ISO 4254.

This part of ISO 4254, taken together with ISO 4254-1, deals with all the significant hazards, hazardous situations and events relevant to sprayers and liquid fertilizer distributors when they are used as intended and under the conditions foreseen by the manufacturer (see Clause 4), excepting the hazards arising from:

— automatically actuated height adjustment systems;

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— electrostatic phenomena;

— electromagnetic compatibility;

— the environment, other than noise;

— inhalation of spraying chemical products due to a lack of effective methods to maintain breathing air quality inside the cab;

— roll-over and tip-over of self-propelled machines with a ride-on driver;

— vibration (except the declaration);

— dust emission;

— burns;

— moving parts for power transmission except strength requirements for guards and barriers;

— safety and reliability of control systems;

— travelling function of self-propelled machines.

NOTE: ISO 14982 specifies test methods and acceptance criteria for evaluating the electromagnetic compatibility of all kind of mobile agricultural machinery.

This part of ISO 4254 is not applicable to sprayers and liquid fertilizer distributors which are manufactured before the date of publication of this document by ISO.

0.3 Six normative references are listed in ISO 4254-6:2009. These references have been reviewed and accepted as part of the adoption with deviations of the ISO document in ANSI/ASABE AD4254-6:2009.

0.4 This standard has been approved as an American National standard by ANSI (American National Standards Institute).

0.5 This standard deviates from ISO 4254-6:2009 as follows:

0.5.1 Replace section 5.3.2.1 with “A safety sign(s) shall be provided to inform of possible overhead power line contact on agricultural equipment that exceeds 4.3 m (14 ft) in height during any mode of operation, transport, or preparation for transport.”

0.5.2 In Table 2, Additional means of verification of safety requirements and/or protective measures given in this part of ISO 4254, for section 5.3.2.1 change “height of 4 m...” to “height of 4.3 m....” Add: Safety sign to provide warning of overhead power lines for equipment > 4.3 m.

0.5.3 In section 5.9 remove “manual” from the header and paragraph. Revised wording:

> “Each machine shall be equipped at the driver's position with a spraying stop control device to safely stop the flow (e.g. by means of two valves placed in series). When the spraying stop control has been actuated, the volume dripping from each nozzle shall be minimized.”

0.5.4 In section 7.2.3 remove “maximum pump pressure” and “nominal frequency of rotation”.

0.5.5 In section 7.2.3 add “model number”.

Text of ISO 4254-6:2009, Agricultural machinery — Safety — Part 6: Sprayers and liquid fertilizer distributors, follows.

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1 Scope

This part of ISO 4254, to be used together with ISO 4254-1, specifies the safety requirements and their verification for the design and construction of mounted, semi-mounted, trailed and self-propelled agricultural sprayers for use with pesticide products and liquid fertilizer application, designed for use by one operator only. In addition, it specifies the type of information on safe working practices (including residual risks) to be provided by the manufacturer.

This part of ISO 4254 is not applicable to:

— pedestrian-controlled sprayers;

— knapsack sprayers;

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This part of ISO 4254, taken together with ISO 4254-1, deals with all the significant hazards, hazardous situations and events relevant to sprayers and liquid fertilizer distributors when they are used as intended and under the conditions foreseen by the manufacturer (see Clause 4), excepting the hazards arising from:

— automatically actuated height adjustment systems;

— electrostatic phenomena;

— electromagnetic compatibility;

— the environment, other than noise;

— inhalation of spraying chemical products due to a lack of effective methods to maintain breathing air quality inside the cab;

— roll-over and tip-over of self-propelled machines with a ride-on driver;

— vibration (except the declaration);

— dust emission;

— burns;

— moving parts for power transmission except strength requirements for guards and barriers;

— safety and reliability of control systems;

— travelling function of self-propelled machines.

NOTE: ISO 14982 specifies test methods and acceptance criteria for evaluating the electromagnetic compatibility of all kind of mobile agricultural machinery.

This part of ISO 4254 is not applicable to sprayers and liquid fertilizer distributors which are manufactured before the date of publication of this document by ISO.

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2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 4254-1:2008, Agricultural machinery — Safety — Part 1: General requirements

ISO 5353:1995, Earth-moving machinery, and tractors and machinery for agriculture and forestry — Seat index point

ISO 5681:1992, Equipment for crop protection — Vocabulary

ISO 12100-1:2003, Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology

ISO 12100-2:2003, Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles

ISO 13857:2008, Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5681 and ISO 12100-1, and the following apply.

3.1

sprayer

appliance for application of pesticide products and liquid fertilizer

3.2

aerial sprayer

sprayer designed to be mounted to a plane or helicopter

4 List of significant hazards

Table 1 gives the significant hazard(s), the significant hazardous situation(s) and hazardous event(s) covered by this part of ISO 4254 that have been identified by risk assessment as being significant for this type of machine, and which require specific action by the designer or manufacturer to eliminate or to reduce the risk.

Attention is drawn to the necessity to verify that the safety requirements specified in this part of ISO 4254 apply to each significant hazard presented by a given machine and to validate that the risk assessment is complete.

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Table 1 – List of significant hazards associated with sprayers and liquid fertilizer distributors

No.[a]	Hazard, hazardous situation or hazardous event	Origin	Clause/subclause of ISO 4254-1:2008	Clause/subclause of this part of ISO 4254
A.1	**Mechanical hazards**			
A.1.1	Crushing hazard	Folding or unfolding of the boom, calibration, insufficient clearance zone when hitching, failure of control system	4.7, 4.14.5, 5.1.3.3, 5.2	5.1, 5.3, 5.3.3, 5.11, 7.1
A.1.2	Shearing hazard	Folding or unfolding of the boom, calibration, failure of control system	4.4, 4.8, 5.1.4	5.1, 5.3.2, 5.3.3, 7.1
A.1.3	Cutting or severing hazard	Folding or unfolding of the boom, calibration	4.1, 4.14.5, 6.4	5.1, 5.3.2
A.1.4	Entanglement hazard	Drawing-in by the fan, power take-off drive shaft	4.1, 4.14.5, 5.1.4, 5.2	5.1, 5.7
A.1.6	Impact hazard	Movement of the boom when it is folded in transport position, insufficient clearance zone when hitching	4.1, 4.14.3, 5.1.4, 5.2	5.1, 5.3.2, 5.11
A.1.9	High pressure fluid ejection hazard	Rupture of pressurized components (e.g. hoses)	4.10.2	5.6, 5.8
A.2	**Electrical hazards**			
A.2.2	Contact of persons with live parts (direct contact) or with parts which have become live under faulty conditions (indirect contact)	Contact of the boom with overhead power line	—	5.3.2, 7.1, 7.2
A.4	**Hazards generated by noise**		4.2, 8.1.q), Annex B	5.13
A.5	**Hazards generated by materials and substances**			
A.5.1	Hazards resulting from contact with or inhalation of harmful fluids, gases, mists, fumes and dusts	Contact with chemical products (when spraying with self-propelled machines with front booms, filling or draining the spray tank, handling)	4.10, 4.12, 5.4, 5.6, 8.1	5.1, 5.3.1, 5.4, , 5.8, 5.9, 5.10, 5.12
A.6	**Hazards generated by neglecting ergonomic principles in machinery design**			
A.6.1	Unhealthy postures or excessive efforts	High actuating forces for adjusting the height of the boom, inadequate location of the filling hole of the spray tank, insufficient clearance zone when hitching	4.4.3, 4.4.5, 4.5.1, 4.5.1.2.3, 4.14.3, 5.2	5.3.3, 5.4.1, 5.11
A.6.2	Inadequate consideration of hand-arm or foot-leg anatomy	Inadequate location of the filling hole of the spray tank, insufficient clearance zone when hitching	4.5.2.3, 4.6.1, 4.6.3, 5.1.1, 5.1.4, 5.1.5,	5.4.1, 5.11
A.6.7	Inadequate design, location or identification of manual controls	Inadequate location of the filling hole of the spray tank, contact of the boom	4.4, 4.6, 5.1.1, 6.1	5.3.2, 5.3.3, 5.9

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