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Agricultural and forestry machines — Inspection of sprayers in use —

Part 5: Aerial spray systems

Matériel agricole et forestier — Contrôle des pulvérisateurs en service —

Partie 5: Systèmes aériens de pulvérisation

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

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Contents

Page

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 6, *Equipment for crop protection*.

A list of all parts in the ISO 16122 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Significant areas are sprayed globally by fixed wing and rotary aircraft in order to overcome serious pest threats to agriculture and forestry. Aerial application is used where difficult terrain or crop (forests) dictate as well as for timely application to large areas in order to maximize efficient use of crop protection products and minimize environmental impact. This document specifies requirements and methods for their inspection in use of such spray systems. Industry stakeholders such as the USA National Agricultural Aviation Association (NAAA) and their partner National Agricultural Aviation Research and Education Fund have provided input to the development.

Agricultural and forestry machines — Inspection of sprayers in use —

Part 5: Aerial spray systems

1 Scope

This document specifies the requirements, test methods and verification of the inspection of aerial fixed wing and rotary aircraft spray systems for agriculture, forestry, turf, and vegetation control in transport access ways (such as gas and electric lines), with regard to minimizing the potential risk of environmental contamination during use.

This document applies only to manned aerial aircraft. It does not cover aircraft safety and design criteria for air worthiness, aircraft registration, pilot or operator requirements, all of which are specified separately by countries or regions.

This document relates mainly to the condition of the equipment with respect to its potential risk for the environment and its performance to achieve good applications.

The general requirements of ISO 16122-1 apply where appropriate, including for the protection of inspectors during an inspection.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 5681, *Equipment for crop protection — Vocabulary*

ISO 5682-1:2017, *Equipment for crop protection — Spraying equipment — Part 1: Test methods for sprayer nozzles*

ISO 5682-2:2017, *Equipment for crop protection — Spraying equipment — Part 2: Test methods to assess the horizontal transverse distribution for hydraulic sprayers*

ISO 16122-1:2015, *Agricultural and forestry machinery — Inspection of sprayers in use — Part 1: General*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
fixed wing aircraft
aircraft with fixed wings approved by local or national authority and equipped for the application of plant protection products and fertilizers, on crops, including forestry and grasslands

3.2
rotary aircraft
helicopter (rotary propelled) aircraft approved by local or national authority, and equipped for the application of plant protection products and fertilizers, on crops, including forestry and grasslands

3.3
global navigation satellite system
GNSS
generic term for satellite navigation systems that provide autonomous geospatial positioning with global coverage

[SOURCE: ISO/TS 11356:2011, 3.2]

4 Requirements

4.1 General requirements

The spray system shall be cleaned and free from any damage that could cause spray liquid to leak from the tank, its lid (which shall be in good condition), its fittings, the pump, pipework and nozzles.

Compliance shall be checked by visual inspection.

4.1.1 Static leak test

A test for static leaks shall be performed with the tank filled to its nominal capacity with the aircraft parked on a level horizontal surface and the pump not running.

Compliance shall be checked by visual inspection.

4.1.2 Dynamic leak test

There shall be no visible leakage from pipes or hoses including their couplings when tested up to the maximum obtainable pressure from the system. If the following testing requires disassembly this test shall be repeated after completing reassembly.

Compliance shall be checked by visual inspection and function test.

4.2 Sprayer tanks

4.2.1 General

The tank surface shall be free from external and internal cuts or abrasion that may compromise wall integrity. There should be no loose parts in the spray tank.

Compliance shall be checked by visual inspection.

4.2.2 Tank opening(s)

Any tank opening greater than 400 mm in diameter shall be provided with a secured bar or coarse grating which can only be removed by the use of tools. The openings in the grating shall not exceed the 400 mm in order to prevent operator exposure.

Any opening lid shall be tightly sealed to avoid spillage.

Compliance shall be checked by measurement and visual inspection.

4.2.3 Strainers

Strainers with 20 mesh openings are recommended prior to transfer into the tank and strainers should be per recommendations of system manufactures and shall be free from damage or blockage.

Compliance shall be checked by visual inspection.

4.2.4 Emptying

No puddling of liquid shall be visible in bottom of spray tank after draining or cleaning procedure.

Compliance shall be checked by visual inspection and function test.

4.2.5 Tank emptying device

It shall be possible to use an emptying device while aircraft is parked such that emptying of the residual is achieved.

It shall be possible to collect the liquid at an outlet without contaminating the environment and without potential risk of exposure of the operator.

Compliance shall be checked by visual inspection.

4.2.6 Tank contents indicator(s)

The indication of contents shall be clearly readable from the pilot or operators position and from where the tank is filled. Turning of the head and the upper body is acceptable.

Compliance shall be checked by visual inspection.

4.2.7 Tank agitation

Spray tanks shall include operational recirculation/agitation systems that maintain an obviously disturbed surface with the tank filled to at least half its nominal volume. If the mix tank is located on operational site, testing shall be at nominal maximum batch volume and normal pump flowrate.

Compliance shall be checked by visual inspection.

4.3 Hoses and lines

4.3.1 General

All pressurized hoses shall be clearly marked with the maximum working pressure. Also, hoses and their connecting devices shall be protected by imperforate screens, so that leakage within the cockpit cannot come into contact with the pilot or operator.

Pressurized spray lines shall be equipped with quick-acting shut-off valve that allow suction back return to the spray tank for rapid de-pressurization of the spray boom unless liquid flow is controlled by starting and stopping the pump. All such controls shall be operable by the pilot or operator when in their normal operating position during spraying.

Compliance shall be checked by visual inspection and function test.

4.3.2 Bending/abrasion

Hoses shall not show excessive bending or abrasion through contact with surrounding surfaces. They shall be free from defects such as excessive surface wear, cuts or cracks. Hoses shall not have any deformation which can disturb the liquid flow.

Compliance shall be checked by visual inspection.