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Snow throwers — Safety requirements and test procedures —

Part 1: Terminology and common tests

Chasse-neige — Exigences de sécurité et essais —

Partie 1: Terminologie et essais communs

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Contents

Page

Foreword ..... **iv**
Introduction ..... **v**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **1**
3.1 General 2
3.2 Snow thrower configurations 3
4 Common test methods **4**
4.1 General 4
4.2 Structural integrity of non-metallic snow discharge chutes and deflectors 4
4.2.1 Test procedure 4
4.2.2 Test acceptance 4
4.3 Hot surfaces 4
4.3.1 Requirement 4
4.3.2 Verification 4
4.4 Fuel 8
4.4.1 Fuel tank overfill test 8
4.4.2 Fuel line axial pull test 8
5 Requirements for markings, warnings and labels **9**
5.1 Markings 9
5.2 Warnings 9
5.3 Label durability requirements 10
Annex A (informative) **Examples of machines covered by this document** **11**
Bibliography **14**

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 13, *Powered lawn and garden equipment*.

This first edition of ISO 8437-1, together with ISO 8437-2, ISO 8437-3 and ISO 8437-4, cancels and replaces ISO 8437:1989, which has been technically revised. It also incorporates the Amendment ISO 8437:1989/Amd.1:1997.

A list of all parts in the ISO 8437 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

The structure of safety standards in the field of machinery is as follows.

a) Type-A standards (basic standards) give basic concepts, principles for design and general aspects that can be applied to machinery.

b) Type-B standards (generic safety standards) deal with one or more safety aspects or safeguards that can be used across a wide range of machinery:

   1) type-B1 standards on particular safety aspects (e.g. safety distances, surface temperature, noise);

   2) type-B2 standards on safeguards (e.g. two-handed controls, interlocking devices, pressure sensitive devices, guards).

c) Type-C standards (machinery safety standards) deal with detailed safety requirements for a particular machine or group of machines.

This document is a type-C standard as stated in ISO 12100.

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

— machine manufacturers (small, medium and large enterprises);

— health and safety bodies (regulators, accident prevention organizations, market surveillance, etc.).

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

— machine users/employers (small, medium and large enterprises);

— machine users/employees (e.g. trade unions, organizations for people with special needs);

— service providers, e.g. for maintenance (small, medium and large enterprises);

— consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document.

The machinery concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in the Scope of this document.

When provisions of this type-C standard are different from those which are stated in type-A or type-B standards, the provisions of this type-C standard shall take precedence over the provisions of the other standards for machines that have been designed and built according to the provisions of this type-C standard.

Snow throwers — Safety requirements and test procedures —

Part 1: Terminology and common tests

1 Scope

This document defines terms and definitions and common test methods applicable to combustion engine powered pedestrian-controlled and ride-on snow throwers. It is intended to be used with ISO 8437-2, ISO 8437-3 and ISO 8437-4 to achieve the full requirements and means of verification for pedestrian-controlled and ride-on snow throwers.

The ISO 8437 series deals with significant hazards, hazardous situations and events relevant to snow throwers used as intended and under the conditions reasonably foreseeable by the manufacturer.

It does not apply to the following:

— electrically powered and battery powered snow throwers;

— hand-held snow throwers;

— airport or highway snow removal machines and equipment;

— machines intended for use in potentially explosive atmospheres.

It does not deal with hazards related to the following:

— battery circuits exceeding 42 V;

— mains connected starting motor;

— magneto grounding circuits;

— working environment;

— electromagnetic compatibility.

The ISO 8437 series is not applicable to machines that were manufactured before the date of its publication.

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 12100, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

ISO 17398:2004, *Safety colours and safety signs — Classification, performance and durability of safety signs*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12100 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 General

3.1.1
barrier
vertical plane determined by an obstruction, such as a handle or steering wheel, that restrains the operator

Note 1 to entry: See ISO 8437-2:2019, Figure 1.

3.1.2
braking distance
distance travelled between the point of the first application of the brake control and the point at which the machine comes to rest

3.1.3
clutch
device used for engaging or disengaging the load from the power source

3.1.4
collector
auger or similar device used to gather snow

3.1.5
collector housing
structure, framework or integral shields that limit access to, and egress of, material from a *collector* (3.1.4)

3.1.6
hazard zone
three-dimensional space that might be hazardous for a person to occupy

Note 1 to entry: The hazard zone moves with the discharge chute and does not include the space behind the discharge chute that is guarded by the discharge chute.

Note 2 to entry: See ISO 8437-2:2019, Figure 1 and ISO 8437-3:2019, Figure 1.

3.1.7
impeller
power-driven device that transfers energy to discharge the snow

Note 1 to entry: When the collecting function of a device is combined with the impelling function, this device will be called an "impeller".

3.1.8
impeller housing
structure, framework or integral shield that limits access to, and egress of, material from the *impeller* (3.1.7)

3.1.9
normal operation
use of the machine that is reasonably foreseeable and that is consistent with such activities as starting, stopping, fuelling and connecting to (or disconnecting from) a power source, and mounting and dismounting of ride-on tractors

3.1.10
operator-presence control
OPC
control designed so that it will automatically interrupt power to a drive when the operator's actuating force is removed

3.1.11
parking brake
device to prevent a stopped machine from moving

3.1.12
reject ring
cover having the shape of a ring or disk that is attached to a rotating body [e.g. sideways of *collector* (3.1.4) or *impeller* (3.1.7)] to provide protection against drawing-in or trapping

3.1.13
service brake system
means for decelerating and stopping a machine from its ground travel speed

3.1.14
snow clean out tool
tool for clearing blockages of the discharge chute

3.1.15
snow discharge chute
movable or fixed component that directs snow discharging from the *impeller housing* (3.1.8)

3.1.16
snow discharge deflector
movable component used to direct snow discharging from a snow *discharge chute* (3.1.15)

3.1.17
tiller bar steering
steering means that extends from one side or opposite sides of the axis of steering control rotation, the use of which tends to cause the operator's weight to shift opposite to the direction of turn

3.2 Snow thrower configurations

Note 1 to entry See Annex A.

3.2.1
hand-held snow thrower
snow thrower that, at some time during *normal operation* (3.1.9), is intended to be completely supported by the user

3.2.2
lever-steer ride-on snow thrower
machine in which steering, traction-drive engagement and speed-control functions are combined and controlled by hand-operated lever(s)

3.2.3
ride-on snow thrower
self-propelled machine, on which an operator rides; generally used for mowing with an attachment that is designed for throwing snow

3.2.4
self-propelled snow thrower
snow thrower equipped with a means for powered propulsion, other than the *collector* (3.1.4) or *impeller* (3.1.7), such as wheels or tracks

3.2.5
pedestrian-controlled snow thrower
snow throwing machine, pushed or self-propelled, normally controlled by the operator walking behind the unit, including machines with an attachment that is designed for throwing snow

3.2.6
single-stage snow thrower
machine that uses a single high-speed *impeller* (3.1.7) to both move the snow into the machine and force it out of the discharge chute, typically used for light duty work

3.2.7
multi-stage snow thrower
machine that uses one or more augers to break up snow and move it into a high-speed *impeller* (3.1.7) that will throw the snow out of the discharge chute

4 Common test methods

4.1 General

If not otherwise specified within this document, the tests can be carried out in any order and on separate machines.

4.2 Structural integrity of non-metallic snow discharge chutes and deflectors

4.2.1 Test procedure

A smooth steel sphere having a diameter of 50 mm ± 2 mm and weighing 0,55 kg ± 0,03 kg shall be used.

If parts can be struck from above, the sphere shall be dropped vertically; if not, the sphere shall be suspended by a cord and allowed to fall from rest as a pendulum to strike the parts. In either case, the vertical travel of sphere shall be at least 1,3 m.

One drop shall be made on each part being tested.

The part(s) shall be conditioned at –20 °C for minimum of 7 h prior to testing. They shall be tested immediately upon removal from the conditioning chamber.

4.2.2 Test acceptance

The part shall have failed this test if either of the following occurs:

a) cracking that affects the functional strength of the part;

b) any condition that results in non-compliance with applicable clauses of this document.

4.3 Hot surfaces

4.3.1 Requirement

Engine exhaust components and their guards that have a surface temperature above ambient, i.e. greater than 90 °C for non-metallic materials or 80 °C for metallic materials, and that can be contacted during normal operation shall be guarded from inadvertent contact so that the tip or conical surface of cone A or B shall not contact any individual area of 10 cm^2 or more of the hot surface.

4.3.2 Verification

The temperature measuring equipment for hot surfaces shall have an accuracy of ±2 °C. The test shall be conducted in the shade with a wind speed not to exceed 3 m/s. The engine shall be operated at

its maximum operating engine speed with the impeller and/or collector engaged until the surface temperatures stabilize. Temperatures shall be determined by correcting the observed temperature by the difference between the 4 °C and the test ambient temperature [i.e. corrected temperature (°C) = observed temperature (°C) − ambient temperature (°C) + 4 °C].

When the distance (see Table 1) between the identified hot area and the nearest control is in excess of 100 mm, cone A as shown in Figure 1 shall be used. For distances less than 100 mm between the identified hot area and the nearest control, cone B as shown in Figure 1 shall be used. For cone A, with the axis of the cone anywhere between 0° and 180° to the horizontal and with the nose or point of the cone in a downward-to-horizontal direction, move the cone towards the hot surface. The cone shall not be moved in an upward direction. When moving the cone, determine if contact is made with the hot surface area(s) with the cone tip or conical surface of the cone. Cone B shall be applied with the axis of the cone in all directions and moved in all directions.

If the area is interrupted, the surface is defined as follows.

a) If a marked surface (with area A1) consists of multiple separate surfaces of which the sum of the areas (A2) exceeds 80 % of A1, then A1 shall be considered as one uninterrupted area (see Figure 2).

b) Surfaces where the structure does not allow a ball with 2 mm diameter to penetrate more than 2 mm below highest parts of the structure shall be considered as part of area A1 (see Figure 2).

c) If the marked surface (with area A1) includes holes of which the sum of the areas (A3) is less than 20 % of the area of marked surface (A1) then A1 shall be considered as one uninterrupted area (see Figure 3).

NOTE 1 It is not necessary to test the accessibility of hot parts while they are hot. Allow the hot parts to cool before using the cone(s).

NOTE 2 Table 1 summarizes the use of the cones.