Outdoor Power Equipment Institute

February 19, 2019

Alberta Mills
Secretary
U.S. Consumer Product Safety Commission
4330 East-West Highway
Bethesda, MD 20814

Re: Petition for Revision of 16 C.F.R. Part 1205 – Safety Standard for Walk-Behind Power Lawn Mowers

Dear Secretary Mills:

Pursuant to Sections 7 and 9 of the Consumer Product Safety Act, 15 U.S.C. §§ 2056 and 2058, and U.S. Consumer Product Safety Commission Rules, 16 C.F.R. Part 1051, we submit this Petition for Revision of 16 C.F.R. Part 1205. We believe this Petition seeks a limited, non-material change to the standard on the basis that it prescribes and permits the use of a pictorial-only warning as an alternative to that required by 16 C.F.R. § 1205.6(a), Figure 7. The proposal if approved will provide stakeholders with an option to both modernize and globally-harmonize this important warning to consumers.

INTEREST AND IDENTITY OF PETITIONER

OPEI is an international trade association representing the manufacturers and their suppliers of consumer and commercial outdoor power equipment (OPE), non-road gasoline powered engines, utility & personal transport vehicles, and golf cars. In 2018, OPEI members shipped 5.2 million walk-behind power lawn mowers in the United States, which we estimate is 95% of the U.S. market.

OPEI is also an American National Standards Institute (ANSI) accredited Standards Developing Organization (SDO) that follows a process requiring participation by a diverse panel of stakeholders including producers, consumers, and individuals or organizations having general interest in the subject products. In this role, OPEI proposes and maintains the ANSI standard for the subject products[1], first published in 1960 and subsequently revised through 14 editions to reflect product innovations and market changes. The ANSI standard was notably revised upon the initial effectivity of 16 C.F.R. Part 1205, to include the mandatory CPSC standard as an annex to the voluntary standard.

OPEI additionally serves as a U.S. voice in international standards development for the subject products through the International Organization for Standardization (ISO) and International Electrotechnical Commission (IEC). These activities operate through committees called U.S. Technical Advisory Groups (TAG) which are again governed by ANSI guidelines and also assure participation by a diverse panel of stakeholders. The TAGs function throughout the year to provide

[1] ANSI/OPEI B71.1-2017 – American National Standard for Consumer Turf Care Equipment – Pedestrian-Controlled Mowers and Ride-On Mowers – Safety Specifications (ANSI standard) (Attached as Exhibit A)

U.S. votes on balloted standards, and also field the team of delegates responsible for representing the U.S. at international committee meetings. The U.S. TAGs also have the right to propose new work items, and ultimately new standards, for consideration and publication by the ISO[2] and IEC.

Together, the ANSI and international standards serve as the recognized voluntary standards of choice across all global markets. OPEI member efforts in these various fora help assure that all standards reflect current product innovations and the needs of the market, while always striving to improve global safety standard harmonization.

GLOBAL USE OF PICTORIAL WARNINGS

Consumer models of walk-behind power lawn mowers sold in the U.S. are required to meet the Consumer Product Safety Commission standard, 16 C.F.R. Part 1205 – Safety Standard for Walk-Behind Power Lawn Mowers ("CPSC Standard"). They are also manufactured to meet the ANSI B71.1 voluntary safety standard, or voluntary international standards[3]. As noted, since the adoption of the CPSC Standard, the ANSI standard has evolved to reflect the field experience and other information tracked by the OPEI standard-proposing committee. This evolution has been intended to enhance the safety of the product and to help ensure uniform operator environments for the home consumer. An important aspect of this evolution, and the focus of this petition, is the effective use of pictorial warnings to help address the diversity of languages spoken in the United States and in foreign markets.

OPEI petitions to substitute for Figure 7 in the CPSC Standard a new alternative pictorial warning that will allow manufacturers to conform and harmonize the warnings on walk-behind power lawn mowers globally and effectively communicate the subject warning to consumers, regardless of their spoken language or degree of literacy. Since the adoption of the CPSC Standard over 30 years ago, global standards for effective warnings have evolved. A particular area where industry has had success through voluntary standards development is the adoption and use of pictorials for on-product warnings, examples of which are referenced in both ANSI and international voluntary standards and intended for use across all global markets.

Use of pictorial warnings are particularly effective when one considers that in the United States alone over 300 languages are spoken, and across all global markets considerable numbers of consumers do not proficiently read any language. In consideration of these market realities, providing consumers with understandable, non-language warnings is essential to consumer safety.[4] Further, uniform global warnings on all products with equivalent warning effectiveness, regardless of the nationality and/or language of the consumer, is important for consumer safety.

---

[2] Complete details of OPEI ISO procedures can be found in the *ANSI Procedures for U.S. Participation in the International Standards Activities of ISO*.

[3] ISO 5395-1:2013 – Garden equipment – Safety requirements for combustion-engine-powered lawnmowers – Part 1: Terminology and common tests; ISO 5395-1:2013/Amd 1:2017; ISO 5395-2:2013 – Garden equipment – Safety requirements for combustion-engine-powered lawnmowers – Part 2: Pedestrian-controlled lawnmowers; ISO 5395-2:2013/Amd 1:2016; ISO 5395-2:2013/Amd 2:2017

[4] Standards for warning labels support the use of pictorial-only warnings and ANSI and international standards for the subject products allow for their use with the added requirement that they be explained in the instruction handbook / owner's manual. *See generally* ANSI Z535.

Importantly, the proposed alternative pictorial warning addresses the same hazard of blade injury to feet and hands as the CPSC Standard addressed when written. Additionally, the proposed warning is an enhancement as the pictorial demonstrates potential injuries to both feet and hands where that injury potentially occurs. These approved ISO pictorials have been taken directly from ISO 11684, and have been in broad industry use since 1995. For these reasons, OPEI requests a non-material change to the CPSC Standard to allow manufacturers the option of using a pictorial-only warning label in place of that currently required by the CPSC Standard[5], consistent with pictorial warnings allowed under existing voluntary standards.

ALTERNATIVE WARNING SUBSTITUTION REQUESTED BY THE PETITION

Specifically, OPEI requests that 16 C.F.R. § 1205.6 be revised as follows to allow for an alternative pictorial-only warning:

16 C.F.R. § 1205.6 Warning label for reel-type and rotary power mowers.

(a) *General.* Walk-behind power lawn mowers shall be labeled on the blade housing or, in the absence of a blade housing, on other blade shielding or on an adjacent supporting structure or assembly, with the warning label shown in Fig. 7 (a) or (b). The label (7 (a)) shall be at least 3.25 in (82.5 mm) high and 4 in (102 mm) wide, and the lettering and symbol shall retain the same size relation to each other and to the label as shown in Fig. 7 (a).

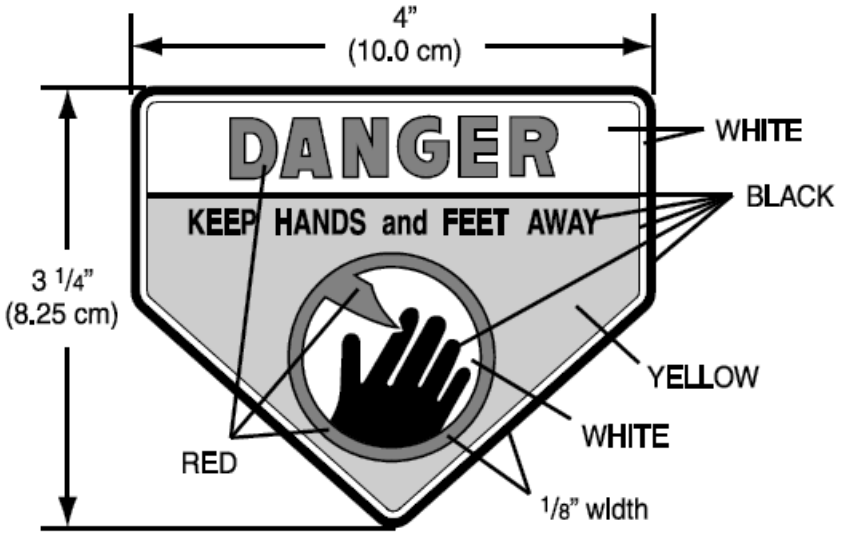


FIGURE 7 (a)

[5] 16 CFR Part § 1205.6 – Warning label for reel-type and rotary power mowers, Figure 7

(b) *Alternative warning label (pictorial-only).* The following pictorial derived from ISO[6] provides an option for a pictorial-only warning for blade contact hazards, as an alternative to 7 (a) above. The label (7 (b)) shall be at least 1.58 in (40.13 mm) high and 4 in (101.60 mm) wide.

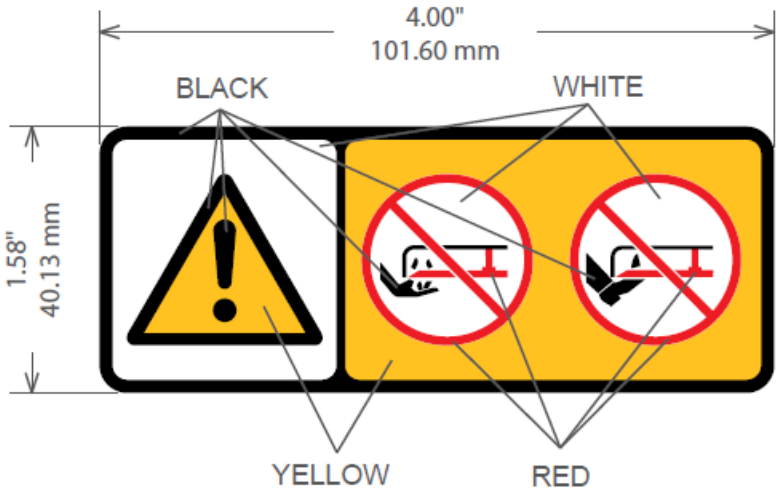


FIGURE 7 (b)

(~~b~~c) *Rotary mowers.* Walk-behind rotary mowers shall have one label as shown in Fig. 7 (a) or (b), on the blade housing. The label shall be located as close as possible to any discharge opening, or, if there is no discharge opening, in a position that is conspicuous to an operator in the normal operating position.

(~~c~~d) *Reel-type mowers*. Walk-behind power reel-type mowers shall have one label as shown in Fig. 7 (a) or (b), located as close to the center of the cutting width of the blade as possible. However, in the absence of a suitable mounting surface near the center of the cutting width, the label shall be placed on the nearest suitable mounting surface to the center of the cutting width.

CONCLUSION

Considering OPEI's long experience in standards development, and recognizing the state-of-art in product warnings, OPEI is confident that the proposed alternative warning is attention grabbing, and as such effective. The use of color, including safety yellow and the red blade and prohibited action slash, also draw attention to the specific blade hazard -- underneath the mower -- addressed by the CPSC standard. It provides an instant reminder of the blade contact hazard to be avoided and injury to be prevented. The blade contact with both the hand and foot has the ability to be comprehended immediately and effectively and recalled far better than words. As an on-product warning, it has the advantage of appearing every time the consumer engages in use of the lawn mower, meaningfully and immediately reinforcing the hazard message on every use.

[6] ISO 11684:1995 – Tractors, machinery for agriculture and forestry, powered lawn and garden equipment – Safety signs and hazard pictorials – General principles

OPEI is also confident that this request for a limited, non-material change to CPSC requirements will appropriately allow the introduction of alternative modernized warnings, while at the same time providing equivalent or improved safety. As demonstrated, the referenced current voluntary standards provide robust requirements by which manufacturers are employing fully equivalent pictorial-only warnings, with the added advantage of improved global harmonization, and improved consumer safety.

For all of these reasons, OPEI requests that the CPSC initiate the process for this limited revision of the standard and reserves the right to request a hearing on this matter.

Best regards,

Daniel J. Mustico
Vice President, Government & Market Affairs
(703) 678-2990; dmustico@opei.org

1001 Pennsylvania Avenue, N.W., Washington, DC 20004-2595 ■ p202 624-2500 ■ f202 628-5116

crowell moring

Cheryl A. Falvey
(202) 624-2675
CFalvey@crowell.com

February 19, 2019

Ms. Alberta Mills
Secretary
U.S. Consumer Product Safety Commission
4330 East West Highway
Bethesda, MD 20814

Re: OPEI Petition

Dear Ms. Mills:

On behalf of the Outdoor Power Equipment Industry (OPEI), we write to submit the attached petition for a non-substantive change to the Safety Standard for Walk-Behind Power Lawn Mowers. The petition seeks a very limited revision of the warning requirements in 16 C.F.R. § 1205.6(a) to allow for an alternative pictogram.

Because the petition proposes only an alternative warning and the standard would remain otherwise unchanged, there are no costs associated with the request, no significant economic impact on small businesses and no environmental impact. The enclosed petition outlines the benefits of the proposed revision to permit a pictorial warning both in terms of enhanced consumer comprehension of the safety risks and improved global harmonization. No additional testing or certification requirements are contemplated as a result of the proposed revision.

We ask that the Commission consider the attached petition at its earliest convenience, and believe it meets the procedures for petitioning in 16 C.F.R. Part 1051. In addition to meeting the basic technical requirements, the petition sets forth facts to support the revision, including the industry's experience of over 20 years with ISO-approved pictorials that provide the basis for OPEI's request. *See* 16 C.F.R. §1051.6 (a)(5) (facts may include personal experience). In accordance with the applicable rules, we have mailed the original and five copies of this petition to you at the above referenced address.

Please let us know if you have any questions or would like to discuss further.

Sincerely,

Cheryl A. Falvey

ATTACHMENT - Exhibit A

American National Standard

for Consumer Turf Care Equipment –

Pedestrian-Controlled Mowers and Ride-On Mowers – Safety Specifications

ANSI/OPEI B71.1-2017

Approved American National Standard

ANSI

ANSI/OPEI B71.1-2017
Revision of
ANSI/OPEI B71.1-2012

American National Standard
for Consumer Turf Care Equipment –

Pedestrian-Controlled Mowers
Ride-On Mowers –
Safety Specifications

Secretariat

Outdoor Power Equipment Institute, Inc. (OPEI)

Approved January 24, 2017
Published April 6, 2017

American National Standards Institute, Inc.

American National Standard

Approval of an American National Standard requires review by ANSI that the requirements for due process, consensus, and other criteria for approval have been met by the standards developer.

Consensus is established when, in the judgement of the ANSI Board of Standards Review, substantial agreement has been reached by directly and materially affected interests. Substantial agreement means much more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that a concerted effort be made towards their resolution.

The use of American National Standards is completely voluntary; their existence does not in any respect preclude anyone, whether he has approved the standards or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standards.

The American National Standards Institute does not develop standards and will in no circumstances give an interpretation of any American National Standard. Moreover, no person shall have the right or authority to issue an interpretation of an American National Standard in the name of the American National Standards Institute. Requests for interpretations should be addressed to the secretariat or sponsor whose name appears on the title page of this standard.

CAUTION NOTICE: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken periodically to reaffirm, revise, or withdraw this standard. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute

Published by

American National Standards Institute, Inc.
25 West 43rd Street, New York, NY 10036

Printed in the United States of America

Contents

Page

Tables

Figures

Foreword (This foreword is not part of American National Standard ANSI/OPEI B71.1-2017.)

This standard is a revision of American National Standard for Consumer Turf Care Equipment - Walk-Behind Mowers and Ride-On Machines with Mowers - Safety Specifications, ANSI/OPEI B71.1-2012. The first edition of this standard was approved and published by the American National Standards Institute in 1960. It has been revised fourteen times since initial publication, including this revision.

The present revision was prepared by the Outdoor Power Equipment Institute's (OPEI) Lawn Mower Committee, as part of OPEI's continuing work on standards.

A summary of the principal changes included in this revision are as follows:

Part I - General:

2 Normative references - Removed revision dates

3 Definitions - Updated

Part II - Pedestrian-Controlled Mowers:

5.4 Guards which need frequent access may be no-tools (harmonized with ANSI/OPEI B71.4)

5.5 Pressurized hydraulic hose guarding added (harmonized with ANSI/OPEI B71.4)

6.3 Stored energy safety sign (harmonized with ANSI/OPEI B71.4)

8.1 Revised label durability ASTM reference

10.1.4 Revised other openings - limited number and size

10.2.1 Moved grass catcher durability message to the instructions

10.3.6.1 Defined an operator target for grass catchers structural integrity test

10.3.7.1 Redefined operator target for thrown object test

12.1 Single-color only safety warnings are not permissible

14 Requirements added for mowers not subject to CPSC 1205 regulation

Part III - Ride-On Mowers:

16.2.2.2 Added electrical option for PTO control

17.4 Guards which need frequent access may be no-tools (harmonized with ANSI/OPEI B71.4)

17.6 Pressurized hydraulic hose guarding added (harmonized with ANSI/OPEI B71.4)

18.3 Stored energy safety sign (harmonized with ANSI/OPEI B71.4)

21.1.3 Added ROPS exemption for Out-Front Zero-Turn mowers, 400-600 kg, stability >25 degrees

21.2.4.1 Limited sudden traction test to fixed-ratio transmission units

22.1 Single-color only safety warnings are not permissible

24.1.4 Revised other openings - limited number and size

24.2 Moved grass catcher durability message to the instructions

Figures:

5 Updated figure to match text

6 Updated safety messages, eliminated duplicates, and combined pedestrian-controlled and ride-on

11(g) Figure for new operator target for grass catcher

Consensus for this standard was achieved by use of the Canvass Method. This standard contains annexes that are all informative and are not considered requirements of this standard.

Suggestions for improvement of the standard are welcome. They should be sent to the Outdoor Power Equipment Institute, 341 South Patrick Street, Alexandria, VA 22314, or www.opei.org.

The following organizations, recognized as having an interest in the standardization of safety requirements for pedestrian-controlled mowers and ride-on mowers, were contacted prior to the approval of this revision of the standard. Inclusion in the list does not necessarily imply that the organization concurred with the submittal of the proposal to ANSI.

Producers

Ariens Company
Jacobsen, A Textron Company
Kawasaki Motors Corporation
Scag Power Equipment

Users

Steven A. Points, independent consultant
Thomas L. Wise, independent consultant

General Interest

American Society of Agricultural and Biological Engineers (ASABE)
Consumer Product Safety Commission (CPSC)
Dan Nielsen, independent consultant
Underwriters Laboratories

American National Standard
for Consumer Turf Care Equipment –

Pedestrian-Controlled Mowers and Ride-on Mowers – Safety Specifications

Part I: General

1 Scope

The safety specifications given in this standard are for powered

(a) reel and rotary pedestrian-controlled lawn mowers,
(b) reel and rotary ride-on lawn mowers,
(c) ride-on lawn tractors with mower attachments,
(d) ride-on lawn and garden tractors with mower attachments, and
(e) lever-steer and zero-turn ride-on mowers.

These specifications are intended to provide safety requirements and to help ensure uniform operator environments. They are intended to apply to products specifically intended as consumer products for the personal use of a consumer around a house. These specifications are not intended to apply to commercial products customarily used by hired operators or to products designed primarily for agricultural purposes such as defined in SAE J1116. They are not intended to cover sulky-type units, pedestrian-controlled tractors, flail mowers or sickle bar mowers, and are not intended to completely cover electrical requirements. This standard applies to all aftermarket parts, attachments and accessories. Any manufacturer of aftermarket parts, attachments and accessories is responsible for ensuring compliance to this standard. Safety specifications in this standard apply only to a configuration of attachments/implements/accessories approved by their respective manufacturers.

The U.S. Consumer Product Safety Commission (CPSC) has promulgated a mandatory standard relating to certain aspects of pedestrian-controlled power lawn mower operations (SAFETY STANDARD FOR WALK-BEHIND POWER LAWN MOWERS, CPSC 16 CFR PART1205). A copy of the CPSC mandatory standard is contained in Annex C. The CPSC standard contains requirements for products sold in the US by manufacturers of consumer pedestrian-controlled lawn mowers that meet any of the following criteria:

a) Cutting width between 305 mm (12 inches) and 762 mm (30 inches)
b) Mass less than 90.7 kg (200 pounds)
c) Engine horsepower less than 6 kW (8 hp).

The effective implementation date of this standard shall be two (2) years after the publication date and shall apply to all products built after that date. Manufacturers may also comply with the requirements of this standard any time after the publication date.

2 Normative references

The following standards contain provisions, which through reference in this text, constitute provisions of this American National Standard. All standards are subject to revision, and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

ANSI Z535.4, *Product safety signs and labels*[1)]

[1)] ANSI and ISO standards available from the American National Standards Institute, 25 West 43rd Street, New York, NY 10036; (212) 642-4900; www.ansi.org.

ANSI/OPEI B71.4, *American National Standard for Commercial Turf Care Equipment – Safety Specifications*

ANSI/SAE J1163 *Determining seat index point*

ANSI/SAE J1362, *Graphical symbols for operator controls, and displays on off-road, self-propelled work machines*

ASABE/ISO 3767-1, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment - Symbols for operator controls and other displays – Part 1: Common symbols*[2]

ASABE/ISO 3767-2, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment - Symbols for operator controls and other displays – Part 2: Symbols for agricultural tractors and machinery*

ASTM G152, *Standard practice for operating open flame carbon arc light apparatus for exposure of non-metallic materials*[3]

ASTM G155, *Standard practice for operating Xenon-arc light apparatus for exposure of non-metallic materials*

ASTM F1667, *Standard specification for driven fasteners, nails, spikes, and staples*

(CPSC) 16 CFR PART 1205, *Safety Standard for Walk-Behind Power Lawn Mowers*

ISO 3767-3, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment- – Symbols for operator controls and other displays – Part 3: Symbols for powered lawn and garden equipment*

ISO 5395-1, *Garden equipment – Safety requirements for combustion-engine-powered lawnmowers – Part 1: Terminology and common tests*,

ISO 11684, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment – Safety signs and hazard pictorials – General principles*

ISO 17398, *Safety colours and safety signs – Classification, performance and durability of safety signs*

SAE J156, *Fusible links*[4]

SAE J553, *Circuit breakers*

SAE J554, *Electric fuses (cartridge type)*

SAE J1116, *Categories of off-road, self-propelled work machines*

SAE J1127, *Low voltage battery cable*

SAE J1128, *Low voltage primary cable*

SAE J1284, *Blade type electric fuses*

SAE J1292, *Automobile and motor coach wiring*

SAE J2031, *High-tension ignition cable*

SAE 1117, *Steel, bars, forging, and tubing, free-cutting, 0.14 – 0.20C*

3 Definitions

3.1 attachment: (See *mower attachment*).

---

[2] ASABE standards available from the American Society of Agricultural and Biological Engineers, 2950 Niles Road, St. Joseph, MI 49085; (269) 429-0300; www.asabe.org.

[3] ASTM standards are available from ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428; (610) 832-9585; www.astm.org.

[4] SAE standards are available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096; (724) 776-4970; www.sae.org.

3.2 blade enclosure discharge opening: An opening in a rotary mower housing above the plane of the blade for discharge of grass clippings.

3.3 blade tip circle: The path described by the outermost point of the blade cutting edge as it is rotated about its shaft axis.

3.4 brake: The mechanism used to (a) decelerate, (b) stop, or (c) hold a machine.

3.5 control (convenient to the operator): A control located so that the operator can reach it from the normal operating position (See Figures 2, 3 and 9).

3.6 durable label: A label that shall meet or exceed the requirements of sections 8 and 20 of this standard.

3.7 engine start: The change of engine state from not producing power to producing power.

3.8 front blade enclosure: That portion of the blade enclosure between lines extending forward and outward at 50° (maximum) angles to the longitudinal centerline of the mower from the center of the blade on single blade mowers, or from the center of the outboard blades on multi-blade mowers (See Figures 2, 3, and 8).

3.9 grass catcher: A part or combination of parts that provides a means for collecting grass clippings or debris.

3.10 guard or shield: A barrier that minimizes inadvertent personal contact with hazards created by machine parts or other items.

3.11 horizontal angle of discharge opening: Angle in the horizontal plane of the blade formed by the two lines tangent to the blade tip circle (in the direction of blade rotation) and intersecting the opposite surfaces of the discharge opening. (See Figure 8)

3.12 horizontal plane of blade: The plane determined by the blade tip circle (See Figure 11).

3.13 lift-off: A test condition in which a strip of steel 20 gauge or 1 mm (0.039 in) thick and 50 mm (2 in) wide can be pulled from or moved under the last uphill tire with a force of 9 N (2 lbf) or less.

3.14 lowest blade position: The lowest blade position relative to the surface supporting the wheels under static conditions.

3.15 mowers

3.15.1 lever-steer ride-on: A machine in which steering, traction drive engagement, and speed control functions are combined and controlled by hand-operated lever(s). These lever(s) may also control the braking function. (Also called *lever-steer mower*)

3.15.2 mulching: A rotary mower having a fixed or optional configuration without openings in the blade enclosure, above the plane of the blade, for discharge of grass clippings.

3.15.3 reel: A grass cutting machine that utilizes a power source to rotate one or more helically formed blades about a horizontal axis to provide a shearing action with a stationary cutter bar or bed knife.

3.15.4 rotary: A grass cutting machine that utilizes a power source to rotate one or more cutting blades about a vertical axis (axes).

3.15.5 ride-on: A self-propelled machine that is generally designed for cutting grass and on which the operator sits or stands.

3.15.6 pedestrian-controlled: A grass cutting machine, either pushed or self-propelled, normally controlled by the operator walking behind the unit.

3.15.7 zero-turn: A ride-on lawnmower that can pivot 360 degrees about the midpoint between the drive tires.

3.16 mower attachment (or attachment): A grass-cutting device that utilizes a power source to rotate cutting blades and is designed for use with a propulsion machine.

3.17 neutral-return: A device that will position the ground speed control selector in the neutral position from either the forward or reverse ground travel positions.

3.18 normal operation: Use of the machine which is reasonably foreseeable and which is consistent with such activities as starting, stopping, fueling, connecting to (or disconnecting from) a power source, emptying the grass catcher, mounting and dismounting of ride-on mowers.

3.19 normal operating position: The space within the operator zone (Figure 9) that is occupied by the operator.

3.20 operator-presence control (OPC): A control designed so that it will automatically interrupt power to a drive when the operator's actuating force is removed.

3.21 parking brake system: A system used to hold one or more brakes or braking means continuously in an applied position.

3.22 retard: A delay in the motion of the machine speed control or directional control, or both, or a delay in the machine response to control movement.

3.23 right, left: The designation that refers to the orientation of the machine or mower when the operator is at the normal operating position, facing forward.

3.24 service brake system: The designated primary brake system used for decelerating and stopping a machine.

3.25 shall: The word "shall" is to be understood as a requirement.

3.26 should: The word "should" is to be understood as a recommendation.

3.27 stopping distance: The distance traveled between the point of the first application of the brake control and the point at which the machine or combination comes to rest.

3.28 swing-over handle: A handle that pivots about a horizontal axis from one end of a pedestrian-controlled mower to the other end to allow reversing the direction of travel of the mower without turning the mower around.

3.29 (target) hit: Test projectile passing completely through all layers of the target test material.

3.30 (target) penetration: Rupture of all layers of the Target Test Material.

3.31 (target) strike: Rupture of the front layer and no rupture of the back layer of the Target Test Material.

3.32 tiller bar steering: A 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 mass to shift opposite to the direction of turn.

3.33 tractor

3.33.1 lawn and garden ride-on: A self-propelled machine designed and advertised for general-purpose lawn and garden work, having the following characteristics:

a) It is designed to supply power for home lawn, home garden, and yard maintenance implements;

b) It is generally designed for mowing lawns;

c) It has steerable front wheels and its rear wheels are driven by a single transmission;

d) It shall have all implements separate from the tractor;

e) It provides means to lift an implement such as a moldboard plow, tiller, cultivator, snow thrower, sweeper, or dozer blade.

3.33.2 lawn ride-on: A self-propelled machine designed and advertised for general-purpose lawn work, having the following characteristics:

a) It is designed to supply power for home lawn and yard maintenance implements;

b) It is generally designed for mowing lawns;

c) It has steerable front wheels and its rear wheels are driven by a single transmission;

d) It may have implements separate from the tractor;

e) It may provide for means to lift an implement such as a sweeper or snow thrower.

3.34 vertical plane: Any plane perpendicular to the horizontal plane.

3.35 width of cut: The measurement of cut made by the rotating blades. (See Figures 2, 3, and 8)

3.36 95th percentile man: A test operator with the dimensions and reach as shown in Figure 9.

Part II: Pedestrian-controlled mowers

4 Controls

4.1 Control identification

The controls used for traction speed, gear selection, power source shutoff (unless operator-presence type), power take-off (PTO), service brake, parking brake, and traction clutch (unless operator-presence type) shall be identified by a durable label. Universal symbols in ANSI/SAE J1362 or ASABE/ISO 3767-1, ASABE/ISO 3767-2, or ISO 3767-3 may be used.

4.2 Shutoff control device

A shutoff control device shall be provided to stop operation of the engine (motor). This device shall require manual and intentional activation in order to restart the engine (motor).

4.3 Handle-mounted engine speed controls

Handle-mounted engine speed controls shall move generally forward to increase speed, and generally rearward to decrease speed or stop.

4.4 Self-propelled mowers

Wheel-drive controls shall move generally opposite to the direction of mower travel in order to disengage the drive, except operator-presence controls, which may operate in any direction to disengage the drive. Wheel-drive disengaging controls shall be mounted with the control convenient to the operator while mowing.

5 Guards and shields

5.1 Power drives

All power driven shafts, chains, belts, gears, friction drivers, and pulleys shall be positioned or otherwise guarded to prevent the operator's inadvertent contact during normal operation of the machine.

5.2 Hot surfaces

Engine exhaust components and their guards with a surface temperature greater than 90°C (194°F) for non-metallic materials or 80°C (176°F) for metallic materials shall be guarded from contact so that the spherical tip or conical surface of cone A or B (Figure 1) shall not contact any individual area of 10 cm^2 (1.55 in^2) or more of the hot surface.

Compliance is to be checked according to Test procedure as follows.

5.2.1 Test equipment

The temperature measuring equipment for hot surfaces shall have an accuracy of ± 2°C (3.6°F).

5.2.2 Test procedure

The test shall be conducted in the shade with a wind speed not to exceed 3 m/s (6.7 mi/h). The engine shall be operated at its maximum operating engine speed with the mower blade engaged until the surface temperatures stabilize. Temperatures shall be determined by correcting the observed temperature by the difference between 20ºC (68°F) and the ambient test temperature.

When the distance between the identified hot area and the nearest control, used for normal operation, is in excess of 100 mm (3.9 in), cone A as shown in Figure 1 shall be used. For distances less than or equal to 100 mm (3.9 in) between the identified hot area and the nearest control, cone B 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 nose of the cone shall not be pointed 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 used with the axis of the cone in any direction and moved in any direction.

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: All hoods and guards shall be in their operating position during this test.

NOTE 3: Table 1 summarizes the use of the cones.

Table 1 – Method for the use of the test cones

Distance from nearest control	>100 mm (3.9 in)	≤100 mm (3.9 in)
Type of cone to be used	A	B
Orientation of cone	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	Any direction
Direction of cone movement	Move the cone towards the hot surface	Any direction

5.3 Fuel ignition protection

Overflow fuel shall be diverted away from the muffler outlet area.

5.4 Attachment of guards and shields

Guards or shields may be attached to the machine with common fasteners or other effective means. Access doors or guards which need to be removed for routine or daily maintenance, inspection, or cleaning should be easy to open or remove.

5.5 Pressurized hoses

Where hoses are operating at a maximum working pressure greater than 5000 kPa (725 psi) and are located within 500 mm (20 in) of the operator zone, they shall be located or shielded so that, in the event of a rupture, the fluid cannot be discharged directly on to the operator when in the normal operating position.

The same requirements apply to hoses operating at a maximum working pressure of 500 kPa (73 psi) to 5000 kPa (725 psi) and where the temperature of the pressurized fluid exceeds 50°C (122°F) when operated at an ambient temperature of 20°C ± 5°C (68°F ± 9°F).

Compliance to be checked by inspection and measurement.

6 Servicing

6.1 General requirements

Specific written instructions recommended by the manufacturer shall be provided with the equipment for servicing operations that shall be performed with the engine running.

6.2 Servicing points

Access doors, shields, or guards shall be provided to prevent inadvertent operator contact with hazardous servicing points.

6.3 Stored-energy devices

Stored-energy devices such as, but not limited to, pressurized fluid systems (for example, engine cooling systems and hydraulic accumulators) and spring-loaded mechanisms that can be disconnected or disassembled in a manner that may release energy or material in a hazardous manner (which is not obvious when disconnecting or disassembling a system or component) should have an appropriate safety sign on or near the device. The sign shall include instructions for de-energizing and for proper disassembly, or include a reference to instructions provided in the operator's manual.

7 Electrical requirements

7.1 General

The specifications given in this standard are not intended to cover all electrical requirements. There are such pronounced differences in the sizes and types of electrically driven outdoor power equipment that no materials, conductors, insulation, or other components can be specifically designated as standard. Therefore, all such items shall be carefully chosen for each application, giving maximum consideration to safety, efficiency, and accessibility. For these reasons, the references to the standards and recommended practices of SAE International in this clause should be considered as guidance in design rather than exact conformance requirements. Any equivalent alternates will be considered acceptable.

7.2 Line voltage

The electrical requirement for line voltage equipment is not covered in this standard.

7.3 Low voltage battery powered circuits (not including magneto-grounding circuits)

7.3.1 Insulated cables

Insulated cables comprising wiring circuits should be protected by rubber, plastic, non-metallic tape, or non-metallic braid covering capable of withstanding severe abrasion, except where otherwise protected or not in potentially abrasive contact with metal surfaces. This wiring assembly shall, where possible, be grouped together, be properly supported, and be located so that no portion is in contact with the carburetor, metallic fuel lines, the exhaust system, moving parts, or sharp edges. Any edges of metal members subject to contact with the cables shall be rounded or protected to prevent possible damage to the cables by cutting or abrasion. (See SAE J1127, J1128, J1292, and J2031.)

7.3.2 Battery installation

The compartment for a vented storage battery shall also be vented. Drainage of contents from the battery in operating position shall not come in contact with parts that will be critically affected in such a manner as to create a hazard.

7.3.3 Overload protection

All circuits, except starting motor and ignition circuits, shall have overload protective devices on the battery feed side of switches, except that, for two wire, non-grounded systems, the overload protection shall be located in either line. (See SAE J156, J553, J554, and J1284.)

7.3.4 Terminals and non-insulated electrical parts

Protection shall be provided against short-circuiting of terminals and uninsulated electrical parts during normal refueling, lubrication, and servicing. Terminals and electrical parts other than those having zero potential to ground shall be insulated if they are located within the reach of the extended body and hand of a 95^{th} percentile adult male operator standing unassisted in the position where he would most usually perform refueling, lubrication, and servicing. Terminals beyond reach, and those covered by guards that do not need to be removed for normal servicing, are required to be insulated only in accordance with the insulation requirements of electrical specifications otherwise referred to in this standard.

8 Label durability requirements

8.1 General

Required labels shall be certified by the machine manufacturer to meet the following label durability requirements.

Permanent safety signs are considered to have a reasonable life if the sign has good color and legibility for a period of at least five years. Exterior durability is based on vertical exposure tests for weatherability in the extreme climate of the United States, or a 2000-hour carbon-arc test in accordance with ASTM G152 (Cycle 1) or a 2000-hour xenon-arc test in accordance with ASTM G155 (Cycle 1). Other acceptable weather durability tests are from ISO 17398:2004, including the open-flame carbon-lamp accelerated weathering test (7.3.2) or the xenon-arc artificial-weathering resistance test (7.3.4).

Other test methods may be used, providing the method ensures equal or superior sign durability.

8.2 Additional requirements

Labels shall form a durable bond with the base material surface and shall show no appreciable loss of adhesion or legibility during weathering exposure or exposure to spilled fuel or oil. When processed and applied in accordance with the label manufacturer's recommendations, labels shall be weather resistant in accordance with 8.1 and, following normal cleaning procedures, shall show no appreciable fading, discoloration, cracking, crazing, blistering, or dimensional change. Labels shall not curl at the edges.

8.3 Types considered durable

8.3.1 Embossed, indented, cast, or molded labels shall be considered sufficient to meet the requirements of 8.1.

8.3.2 Metal plates more than 0.48 mm (0.019 in) thick with embossed or etched lettering, and fastened with rivets or equivalent fastening means, shall be considered sufficient to meet the requirements of 8.1.

8.4 Silk screening

Silk screening or other types of marking, when used, shall meet the applicable requirements of 8.1 and 8.2.

9 General requirements – Blade rotation warning

An indicator of blade rotation shall be provided on mowers that operate so quietly that it may not be evident that the blades are rotating.

10 Specific requirements – Rotary mowers

10.1 Blade enclosure

10.1.1 General

The mower blade shall be enclosed except on the bottom, and the enclosure shall extend 3 mm (0.12 in) minimum below the lowest cutting point of the blade in the lowest blade position, including tolerance, except for the discharge openings and such other openings as described in 10.1.2 and 10.1.4. Any extension of the walls of the blade enclosure not meeting this requirement shall be considered as part of the discharge opening. All parts of the enclosure shall comply with the tests given in 10.3.5 and 10.3.7.

10.1.2 Front blade enclosure (See Figures 2 and 3)

The highest point on the bottom edge of the blade enclosure, front, except the discharge opening, shall be such that any line extending from such point at a maximum of 15° downward from the horizontal toward the blade shaft axis (axes) shall not intersect the horizontal plane within the blade tip circle, nor shall any such point be more than 32 mm (1.25 in) above the horizontal plane of the blade in the lowest blade position. The highest point in the openings of a front comb or rake arrangement shall be considered as a point on the bottom edge of the blade enclosure, front. A mower with a swing-over handle shall have no front openings in the blade enclosure.

10.1.3 Discharge openings

The discharge openings shall be so placed or guarded that grass or debris will not discharge directly into the operator zone, as shown in Figures 2 and 3. The tangential extension of the walls of the discharge chute shall not intersect the operator zone when the mower is set at any height of cut. No tangential line in the plane of the blade tip circle shall intersect the operator zone without first contacting the blade enclosure or guard.

10.1.4 Other openings

Openings in the surface of the blade enclosure are permitted in accordance with the following:

a) Openings in the top surface of the blade enclosure are permitted.

b) Openings in the side of the blade enclosure shall:

- Not exceed a total number of 10;
- Not exceed 10.5 mm (.413 in) square.

These openings shall not allow a direct line of sight between the operator's zone (see Figure 9) and any portion of the blade(s) before and after testing in accordance with 10.3.5 (Structural Integrity Test) and 10.3.7 (Thrown Object Test).

10.2 Protective guards

10.2.1 Guards and grass catchers

Any guards required for the mower to meet the discharge opening requirements shall pass the test given in 10.3.5. If either guard or grass catcher is so required, the mower shall comply with the following requirements:

a) Warning instructions shall be affixed to the mower near the discharge opening(s) conveying the message that the mower shall not be operated without either the entire grass catcher or the guard in place. Such instructions shall be legible to a person of normal vision and height standing upright 610 mm (24 in) away from the machine and adjacent to the sign.

b) The grass catcher or the guard shall be shipped and sold as part of the mower.

10.2.2 Rear protective guard (Trailing shield)

A protective shield shall be provided at the rear of the mower and shall extend to not more than 6 mm (0.25 in) above a level supporting surface at all cutting heights. For cutting widths less than 750 mm (30 in), the trailing shield shall have a composite width, including wheels, within the width of cut area, of at least 90% of the width of cut. For cutting widths greater than or equal to 750 mm (30 in), the trailing shield shall have a minimum composite width of 90% of the distance between the wheels.

10.3 Performance tests

10.3.1 General test requirements

Unless otherwise specified, all test conditions shall be as follows:

a) The mower attachment shall be mounted on the machine;

b) The mower shall rest on a horizontal surface;

c) The mower shall be operated at the mower manufacturer's specified maximum engine (motor) speed, which is the fastest speed that the mower manufacturer intends the engine (motor) to run with the blades engaged, taking into account all tolerances;

d) Resilient restraints may be used to keep the mower in position during tests.

10.3.2 Impact test

10.3.2.1 Test procedure

Completely encircle the mower at the time of test by a wall of 350 lbm double wall cardboard resting on the floor. The wall shall be approximately 610 mm (24 in) from the blade tip circle with a minimum height of 610 mm (24 in) above the horizontal plane of the blade tip circle. Position the mower over an SAE 1117 free cutting steel rod, 25 mm (1 in) in diameter, which has been placed into a test fixture as shown in Figure 4. The blades shall be adjusted to the cutting height closest to 50 mm (2 in) and shall be so positioned that when the rod is injected into the rotating blade, the blade will strike the exposed portion of the rod within 50 mm (2 in) of the tip of the blade. The rod shall be injected once into the path of the blade. The test shall be conducted once for each blade assembly of the mower. A new mower may be used for each test.

10.3.2.2 Test acceptance

Failure for this test shall be any of the following:

a) Target penetration by any part of the mower;

b) Breakage of the blade;

c) Detachment of the blade from the lawnmower.

Breakage of the shearing device or chipping of the blade cutting edge is not considered a test failure.

NOTE: This test does not require that the machine be suitable for use after the test.

10.3.3 Unbalance test

10.3.3.1 Test procedure

Completely encircle the mower at the time of test with a wall of 350 lbm double wall cardboard resting on the floor. The wall shall be approximately 610 mm (24 in) from the blade tip circle with a minimum height of 610 mm (24 in) above the horizontal plane of the blade tip circle.

A blade unbalance in gram-meters (inch-ounces), as determined by the formula

$$24L^3 = \text{g-m of unbalance } (L^3/1855 = \text{in-oz of unbalance})$$

shall be created by removing or adding material until the desired unbalance is obtained. Dimension *L* is the diameter of the blade tip circle in meters (inches). The mower shall be run in this unbalanced condition for an uninterrupted period of 1 hour or until the unit fails structurally as a result of this test, whichever comes first. The test shall be conducted for each blade assembly of the mower. It is permissible to test all blade assemblies of a multi-spindle mower simultaneously. A new mower may be used for each test.

The unbalance value given above is the total unbalance for each spindle of the mower regardless of the number of blades on each spindle. The unbalance is calculated based on the longest blade on each spindle and applies to the same blade.

10.3.3.2 Test acceptance

Failure for this test shall be the loss of any part from the unit or the failure of any component.

10.3.4 Blade security test

This test shall be conducted on blade assemblies in which the blade is driven by friction such as clamping the blade against or between its driving members.

10.3.4.1 Test procedure

a) Apply a torque to the blade or blade retaining device to the value specified by the manufacturer; if no torque value is specified, the test shall be conducted in an "as received" condition;

b) Lock the blade shaft against rotation during the test;

c) Conduct the test once for each blade attachment design;

d) Perform this test successively on all blade fasteners and on any blade or blade support that can be made to rotate relative to the shaft;

e) Apply a torque to the blade in the direction of normal rotation until the component, under test, turns relative to the shaft, or until a torque limit of 68 Nm (50 ft lbf) is reached. If the blade or blade support turns relative to the shaft, it shall be turned in the same direction 15 revolutions or until the torque applied reaches the 68 Nm (50 ft lbf) limit. The blade shall also be turned in the opposite direction 15 revolutions or until the torque applied reaches the 68 Nm (50 ft lbf) limit;

f) As an alternative test method, the blade and blade-retaining device may be removed from the mower and tested on a similar shaft or on a fixture that approximates the blade mounting.

10.3.4.2 Test acceptance

To pass this test:

a) The blade or blade-retaining device shall show no evidence of failure;

b) The initial fastener torque shall remain unchanged in both directions after the 68 Nm (50 ft lbf) of torque has been obtained and shall not have changed more than ±10 percent at the end of 15 revolutions.

10.3.5 Structural integrity test – Blade enclosure and guards

10.3.5.1 Test requirements (See Figure 11)

The mower or mower attachment shall be equipped with a 19 mm (0.75 in) plywood panel, which shall be faced with a steel plate of at least 16 gauge (0.065 in) thickness or a single steel plate with a minimum of 4 mm (0.157 in) thickness for wear resistance, parallel to and 16 mm (0.63 in) below the horizontal plane of the blade. The panel shall extend a minimum of 25 mm (1 in) beyond the blade tip circle at the discharge openings. An air inlet hole shall be provided that is concentric with each blade tip circle with an approximate maximum diameter as shown in Table 2. On mulching mowers only, the concentric air inlet opening of the mower support fixture may be increased to a diameter up to 80% of the blade tip circle (BTC), provided a minimum of 25 mm (1 in) is maintained between the edge of the injection opening periphery and the edge of the concentric air inlet opening. The opening between the lower edge of the blade enclosure and the panel shall be closed except at the discharge openings. The holes in the test panel for the introduction of the test material shall be 25 mm (1 in) in diameter and generally equally spaced from the primary hole, which shall be located 45 degrees from a radial line drawn through A, the center point of the discharge opening, in a direction opposite to the blade rotation, as shown in Figure 11 (a, b, c, or d). The angular location of the other holes may be varied slightly to avoid interference with the structural components or the test equipment. The test material shall be injected with sufficient energy that it will rise a minimum of 13 mm (0.5 in) and a maximum of 300 mm (12 in), if unobstructed, above the horizontal plane of the blade. Spring, air, or other assists may be used to ensure proper introduction of the test material.

Table 2 – Air inlet hole for structural integrity test for pedestrian-controlled mowers and mower attachments

Mower type	Air inlet diameter
Non-Mulching	0.3 x BTC
Mulching	0.8 x BTC

10.3.5.2 Test procedure

a) Introduce, in an upward vertical direction, 100 steel balls (45 Rockwell C minimum hardness), 13 mm (0.5 in) in diameter, one at a time through two or more equally spaced holes for each blade. The balls shall be divided in approximately equal numbers among the holes;

b) Conduct the test one time for each blade assembly;

c) A new blade enclosure or mower attachment may be used for each blade of multi-blade mowers.

10.3.5.3 Test acceptance

Failure for this test shall be any of the following:

a) Penetration of more than one-half of the ball through any surface of the blade enclosure;

b) Breaking off or bending of any part of the blade enclosure, guard, or grass catcher being tested that would not allow the mower to comply with 10.3.7 (Thrown objects).

c) Creation of any opening that does not comply with 10.1.4 (Other openings)

Note: Balls that escape around the edge of hinged discharge covers are not considered to be penetration of the deck housing.

10.3.6 Structural integrity tests – Grass catcher

A grass catcher provided by the mower manufacturer for use with a mower shall be tested in accordance with 10.3.6.1. A grass catcher that is designed for use on more than one type of mower shall be tested for each application.

10.3.6.1 Test procedure

a) Use the mower test requirements and procedures of 10.3.5.1 and 10.3.5.2 with a grass catcher mounted on the mower;

b) Provide bystander targets, as shown in Figure 11 (f, g and h), for each test. For multi-blade mowers, this test need be performed only for the blade(s) nearest the discharge openings;

c) Close any opening between the bottom panel and the lower edge of the grass catcher;

d) For rear-discharge pedestrian-controlled mowers, an additional panel of 350 lbm test, double-wall corrugated cardboard shall be placed to delineate the mower side of the operator zone, as shown in Figure 11(g). This operator zone target shall extend from the ground level of the mower upward to a height of 2134 mm (84 in) and width of 900 mm (35.4 in), and located at the rear of the handle, with the handle in the highest operating position. Targets shall be placed no more than 457 mm (18 in) from the top surface of the grass catcher and on each side of the grass catcher. These targets shall cover the entirety of the side and top surfaces of the grass catcher. The target for the top surface of the grass catcher

may rest on top of the mower handle if the handle positions the target less than 457 mm (18 in) from the top surface of the grass catcher. Removal or repositioning of the handle for the purposes of conducting this test is allowed as per manufacturer recommendation.

e) The structural integrity test shall be performed prior to the thrown object test and shall be performed for each discharge opening for which a grass catcher is provided by the mower manufacturer. The structural integrity and thrown object tests shall be performed with the same catcher and mower.

f) A new mower or mower attachment may be used for each set of the following tests:

1) The ball test shall be performed prior to the nail test and shall be performed for each discharge opening for which the mower manufacturer provides a grass catcher;

2) The nail test shall be performed identically to the ball test except that it shall consist of the upward vertical introduction of 200 sixpenny steel common nails, 51 mm (2 in) long, in accordance with ASTM F1667, one at a time, headfirst. The test shall be performed with the same catcher and mower used for the ball test.

10.3.6.2 Test acceptance

Failure for this test shall consist of evidence of any of the following:

a) Penetration of the bystander target;

b) Any strike or penetration of the operator zone target;

c) Any opening of a zipper, bag seam, or other components;

d) Dislodging of the grass catcher from its adapter or falling from its operating position.

10.3.7 Thrown object test

10.3.7.1 Test equipment

10.3.7.1.1 Enclosure

The test enclosure shall be constructed generally as shown in Figure 5(a). Variations to accommodate different mower types and configurations are shown in Figures 5(b) and 5(c).

The target panels shall consist of 8 cardboard areas, each 900 mm (35.4 in) high, perpendicular to the base so as to form an octagon. In order to facilitate the counting of hits, the panel supports should be designed to allow sliding in and out of at least one target panel. The target in the operator area of a pedestrian-controlled mower above 900 mm (35.4 in) shall consist of a single sheet of Kraft paper rising to a height of 2000 mm (79 in) and 900 mm (35.4 in) wide.

The cardboard shall be tested immediately before and after the thrown object test by utilizing the fixture shown in Figure 5(g). The cardboard shall be cut into test samples of 150 mm (6 in) square. Position the cardboard squares centered on the bottom plate of test fixture. Squares may be secured at the edges by tape or adhesive. Cover with the top plate. Make sure the center holes in the steel plates are aligned and that the cardboard is flattened by the steel top plate. Raise the penetrator to the recommended height and allow the penetrator to fall on the cardboard samples. Repeat five times.

When dropped from 300 mm (12 in), the spherical end of the penetrator shall not penetrate completely through the test samples more than two out of five drops. When dropped from 400 mm (16 in), the spherical end of the penetrator shall penetrate completely through the test sample in at least four out of five drops. If

the penetrator penetrates the cardboard more than the allotted number of times permitted by the acceptance criteria when dropped 300 mm (12 in), add sufficient sheets of appropriate Kraft paper to the target face of the cardboard in order to meet penetration requirements.

The target panels shall generally be located perpendicular to a radial line extending 750 mm ±50 mm (30 in ±2 in) from the blade tip circle of single spindle mowers, or to the nearest blade tip circle of multi-spindle mowers, as shown in Figure 5(b) and Figure 5(c). If the target panel interferes with a part of the mower such as a grass catcher, handle or wheel, the target shall be moved back to avoid such interference.

The target shall be divided into elevation zones by horizontal lines as indicated in Figure 5(a). The lower elevation zone is defined by the area between the base and the 300 mm (12 in) line. The middle elevation zone is defined by the area between the 300 mm (12 in) and 450 mm (18 in) lines. The top elevation zone is defined by the area above the 450 mm (18 in) line to the top of the 900 mm (35.4 in) target.

The operator's target area shall be centered on the handle. For mowers with movable offset handles, the operator's target area shall be centered on the handle. The handle shall be positioned to the left to locate the left limit of the operator target area and then to the right to locate the corresponding right limit. The width of the operator's target area shall be increased to equal the amount of offset between the two handle locations (width = 900 mm (35.4 in) + offset amount.

10.3.7.1.2 Base

The test enclosure shall consist of a test fixture base of 19 mm (0.75 in) plywood covered with 500 mm (20 in) squares of coconut matting nailed to the plywood with nails spaced as shown in Figure 5(h) and Figure 5(i). The coconut matting shall have approximately 19 mm (0.75 in) fibers embedded in a PVC base weighing approximately 7000 g/m^2 (1.43 lbm/ft^2). The minimum base size shall be 1500 mm (60 in) larger than the cutting width and 1500 mm (60 in) larger than the distance between the forward edge of the leading blade tip circle and the rear edge of the trailing blade tip circle shown in Figure 5(c).

10.3.7.1.3 Target composition

A single target panel may be any of the following (See Figure 5(j)) that meets the penetration tests:

a) A single sheet of corrugated cardboard;

b) A single sheet of corrugated cardboard with sufficient sheets of appropriate Kraft paper added in front of the target face;

c) Two sheets of corrugated cardboard stacked together.

The cardboard construction may have two or three liners and have one or two flutes.

The Kraft paper used for the operator target above 900 mm (35.4 in) shall be a nominal 150 g/m^2 (3.56 lb/ft^2) construction. The sheet(s) of Kraft paper which may be added to the face of the corrugated cardboard targets below 900 mm (35.4 in) may be any weight that allows them to meet the penetration requirements.

10.3.7.2 Five hundred projectiles consisting of 6.35 mm (0.25 in) diameter steel balls (45 Rockwell C minimum hardness) shall be used.

10.3.7.3 Injection points shall be provided at the 12 o'clock position as shown in Figure 5(b) and Figure 5(c) and located at 25 mm ± 5 mm (1 in ± 0.25 in) inside the blade tip circle for the injection of projectiles. An injection point shall be provided for each blade of a multi-spindle mower.

The injection tube outlets shall be fixed and flush with the upper surface of the coconut mat [see Figure 5(i)] and the system shall be so arranged that the ball may be injected with variable velocity. The ball injection mechanism shall ensure consistent free rise heights within a range of 100 mm (4 in).

Adjust the velocity with which the ball is ejected so that the ball rises not less than 30 mm (1.25 in) above the surface of the coconut matting and within an angle of 10° of the vertical axis.

10.3.7.4 Test method

The test shall be conducted for each blade assembly. New blade(s) should be used for each test (500 projectiles) unless the blade is not damaged by projectile impact. New blades shall be used for the thrown object test if the deck/blade assembly has undergone the structural integrity test.

The mower blade shall be adjusted to a 30 mm (1.25 in) cut height or the next higher cutting position when set on a hard level surface. Mowers with a maximum height setting of 30 mm (1.25 in) or less shall be set at their maximum height setting.

With the mower in place and the blade cutting height adjusted and the engine operating at the manufacturer's specified maximum engine speed, allow balls one at a time into the mower. Increase the velocity of the ball in small increments until the mower blade hits each ball. This procedure is intended to ensure that the ball rise height is as low as possible and yet ensures regular blade impact with the ball. Start the test when this minimum velocity is established. Chipped or damaged balls shall be replaced.

Inject 500 projectiles into each injection point for each test. On multi-spindle mowers, the test shall be run for each spindle with the results evaluated for each test.

During any of the tests, in the event of excessive hits at a localized area, it may be necessary to repair or replace the target before continuing with the tests. Balls remaining within the test fixture (or on the test surface) may be removed at the option of the tester to minimize ricochet hits.

If a retest is required, a new blade shall be used for each test of 500 projectiles unless the blade is not damaged by impact with the projectiles.

Count and record hits. Projectiles that hit and damage the centerline of the target zone height line shall be scored with the target zone below that line.

10.3.7.5 Test acceptance

10.3.7.5.1 General

A test (500 projectiles) shall be run on each spindle. On multi-spindle mowers, the total hits for each spindle shall be added together and divided by the number of spindles to obtain an average number of hits which is used for test acceptance.

10.3.7.5.2 Discharge mowers

For discharge mowers, there shall be no more than an average of 45 hits between the base and the 450 mm (18 in) line (lower and middle elevation zones) of which not more than six may be above the 300 mm (12 in) line (middle

elevation zone). There shall be no hits above the 450 mm (18 in) line (top elevation zone). There shall be not more than two hits in the operator target zone between the base and the 450 mm (18 in) line.

10.3.7.5.3 All other mowers

For all other mowers, there shall be no more than an average of 30 hits between the base and the 450 mm (18 in) line (lower and middle elevation zones) of which not more than six may hit the target above the 300 mm (12 in) line (middle elevation zone). There shall be no hits above the 450 mm (18 in) line (top elevation zone). There shall be not more than two hits in the operator target zone between the base and the 450 mm (18 in) line in accordance with Table 3. The average hits in any zone shall not exceed the number noted.

Table 3 – Average hits in any zone

Target Zone	Discharge Mowers	All Other Mowers
Total 0 – 450 mm (0 – 18 in)	45	30
300 > 450 mm (12 > 18 in)	6	6
450 > 900 mm (18 > 35.4 in)	0	0
Operator Target Area (above 450 mm (18 in))	0	0
Operator Target Area (0 – 450 mm (0 – 18 in))	2	2

10.3.7.5.4 Additional testing

In the event of a test failure, the same machine may be tested two more times or two additional machines may be tested. If the same machine or either of the additional machines fails a test, the model is considered not to be in compliance with the thrown objects requirement of this standard.

10.4 Starting arrangement

If the engine starting position is not within the operator zone (Figure 9), the starting mechanism shall be arranged in such a way that, to use it, an operator need not stand within the horizontal angle of discharge opening. (See Figure 8)

10.5 Mower stabilization

A mower with a rope starter, which is located more than 610 mm (24 in) from the top of the mower handle, shall have a labeled designated area for stabilizing the mower when starting the engine.

10.6 Blade speed

The maximum tip speed of any blade shall be 5791 m/min (19000 ft/min), except where guarding exists offering 360° shielding within 6 mm (0.25 in) of ground level.

10.7 Handle structure

10.7.1 Fastening

The mower handle shall be fastened to the mower so as to prevent unintentional uncoupling while in operation. This requirement is satisfied when no uncoupling occurs when tests in 10.3.3 and 10.7.3 are conducted.

10.7.2 Operating positions

A positive up stop shall be provided that does not allow the rearward part of the handle to come closer than 762 mm (30 in) horizontally behind the closest path of the mower blades during normal operation. The exceptions described in 10.7.2.1 and 10.7.2.2 shall be allowed.

10.7.2.1 Swing-over handle

A swing-over handle shall be allowed if positive operating positions are provided. If, during normal operation, a disengaging mechanism is provided to bypass the operating

positions in order to swing the handle over the mower, the mechanism shall automatically lock back into the operating positions. A mower with a swing-over handle shall meet the requirements of this standard for all operating positions of the handle.

10.7.2.2 Handle storage position

If a handle storage position is provided, the handle shall automatically or manually lock back into the operating positions when the handle is moved into these positions, and instructions for preparing the handle for storage shall be included in the operator's manual.

10.7.3 Handle structure test

10.7.3.1 Test procedure

The mower shall be positioned on a horizontal supporting surface and restrained from movement at the wheels or blade enclosure. A static force of 223 N (50 lbf) shall be applied to the rearward part of the handle on the longitudinal centerline of the mower in a direction toward the front of the mower and parallel to the supporting surface.

10.7.3.2 Test acceptance

There shall be no failure of the handle and handle supporting structure while the static force is applied. Upon removal of the force, the mower shall comply with the requirement given in 10.7.2.

11 Specific requirements – Reel mowers

11.1 Blade stopping time

At both extremes of cut height adjustment, the blades shall stop rotating from the manufacturer's specified maximum speed within 7 seconds after the operator declutches (if a clutch is provided), or after the operator shuts off the drive power (if a clutch is not provided). The mower shall have a minimum run in period of 1 hour prior to test.

11.2 Handle structure

The handle structure requirements of 10.7.3 shall apply.

11.3 Self-propelled (SP) interlock

A means shall be provided to prevent the starting of the engine while the wheel drive is engaged. Such means shall not be required on units equipped with operator-presence controls.

12 Safety messages – Pedestrian-controlled mowers

12.1 On-product labeling

A safety sign with the following safety practices or a similar set of messages shall be provided on the machine. The label should be visible to an operator in the normal operating position, if possible:

a) Read operator’s manual

b) Maintain safety devices

c) Keep bystanders away

d) Look behind while backing

e) Avoid steep slopes

This safety label shall conform to ANSI Z535.4 or ISO 11684. Pictorials may be used to convey this message. Additional statements or pictorials of safety practices are allowed. Use of ONLY single-color molded in warning is not permissible.

12.2 Safety instructions

A manufacturer shall supply, with the equipment, instructions for operation such as those shown in Figure 6. Instructions may be tailored to the specific mower design. Statements may be omitted if not applicable or modified to fit the manufacturer's recommendations for a specific machine.

12.3 Safety pictorials and wording

Safety pictorials, as shown in Annex B, may be used to supplement product safety information. If used, appropriate explanatory text shall be included in the operator's manual.

13 Requirements – Mowers which meet the exclusions of CPSC 1205.1 (c) (pedestrian-controlled machines ≥ 200 lbm, ≥ 8 hp and ≥ 30 in width of cut)

13.1 Machine identification

The mower shall be provided with identification giving:

a) Name of the manufacturer or supplier,

b) Markings that uniquely identify the machine (such as, model and/or serial number), and

c) Contact information for a source of replacement parts.

The label shall meet the durability requirements given in Section 8.

13.2 Foot probe

13.2.1 Test procedure

The equipment for the foot probe test shall be as illustrated in Figure 10(a). The test shall be conducted under static conditions on a flat surface. The test shall be conducted with the blades in the highest and lowest cutting positions. If the blade path height is different for different blade speeds or blade options, the test shall be conducted so as to include the two extremes of blade height. The probe shall be held in a vertical plane perpendicular to the flat surface and rotated in that plane a maximum of 15 degrees, as shown in Figures 10(b) and 10(c), and shall be tested in all positions within those rotation limits. The probe shall be inserted as far as possible at any point of the discharge opening with a horizontal force of 20 N (4.5 lbf) or until the blade enclosure lifts from the original position, whichever occurs first. The probe shall remain on the floor. For purposes of the foot probe test, discharge chute deflectors are considered to be part of the blade enclosure.

The sides of any discharge chute shall be probed if they are less than 3 mm (0.12 in) below the lowest cutting point of the blade.

The probe shall be applied between the rear wheels of all pedestrian-controlled units.

The highest cutting position for this test shall not exceed 203 mm (8 in). Components of the mower or machine (such as frames or wheels) may be considered part of the blade enclosure for the purpose of this test.

13.2.2 Test acceptance

The probe shall not enter the path of the blade or blade assemblies.

13.3 Safety label

A safety pictorial warning of blade contact shall be placed on the mower at or near each discharge opening. The warning may be placed on the discharge chute extension or deflector if it automatically returns to the guarded position after any movement from that position. If a signal word is used, it shall be DANGER. The warning shall conform to the requirements of ANSI Z535.4, ISO 11684 or CPSC 1205. Use of multiple safety symbols/signal words is permissible. Use of ONLY single-color molded in warning is not permissible.

13.4 Blade stop

A means shall be provided that will automatically stop the blades while the engine continues to run or stop the engine and the blades when the operator leaves the normal operating position. If the operator

returns to the operator's position before the blades have stopped, the blades may automatically resume operation. Blade starting shall require intentional reactivation by a means other than the operator-presence control after stopping.

The blade stopping time shall meet the requirements of Section 23.2 (Blade stopping time – 5 seconds and 5,000 cycle durability test).

14 Additional requirements – Mowers not subject to CPSC 1205 regulation (pedestrian-controlled machines ≤ 200 lbm, ≤ 8 hp, ≤ 30 in width of cut)

14.1 Protective shields – Foot probe

The mower shall meet the requirements of CPSC 1205.4.

14.2 Mower controls – Blade stop

The mower shall meet the requirements of CPSC 1205.5.

14.3 Machine identification

The mower shall meet the identification requirements of 13.1 (Machine identification).

14.4 Safety label

The mower shall meet the labelling requirements of 13.3 (Safety label).

Part III: Ride-on mowers

15 Machine identification

The mower shall be provided with identification giving:

a) Name of the manufacturer or supplier,

b) Markings that uniquely identify the machine (such as model and/or serial number), and

c) Contact information for a source of replacement parts.

The label shall meet the durability requirements of clause 20 (Label durability requirements).

16 Controls

16.1 General requirements

16.1.1 Control identification

The controls used for traction speed, gear selection, power source shutoff (unless operator-presence type), PTO, service brake, parking brake, and traction clutch (unless operator-presence type) shall be identified by a durable label. Universal symbols as illustrated in ANSI/SAE J1362 or ASABE/ISO 3767-1, ASABE/ISO 3767-2, or ISO 3767-3 may be used.

16.1.2 Shutoff control device

A shutoff control device shall be provided to stop operation of the engine (motor). This device shall require manual and intentional activation in order to restart the engine (motor).

16.1.3 Hand control

The direction of motion for an engine (motor) speed hand lever control shall be generally forward or upward, or both, to increase speed, and generally rearward or downward, or both, to decrease speed or stop.

16.2 Ride-on mowers

16.2.1 General requirements

16.2.1.1 A key switch, or similar device, shall be provided to prevent unauthorized operation of the machine.

16.2.1.2 Foot pedals shall have slip resistant surfaces or other means of minimizing the possibility of the operator's foot slipping off the pedals.

16.2.1.3 Retard, as applied to combination directional and variable speed controls or directional controls, or their effect on the motion of the machine whether actuated by hand, foot, or other means, shall be accomplished by at least one of the following:

a) A change in direction of the control actuation other than the general path described by the control. A distinct actuation at right angles to the general control motion shall be required;

b) A distinct change in force level of the control actuation at the point of control entry into the selected direction;

c) A positive means of retarding machine acceleration, such as use of linkage or valves.

For lever-steer mowers, the motion of the steering control lever(s) shall not be hindered.

16.2.1.4 A disengaging (disconnect) means shall be provided between the engine (motor) or power source and the blades. For blades directly attached to electric motors, this disconnect means shall be between the motors and the power source (battery).

16.2.1.5 A means shall be provided that will automatically stop the blades while the engine continues to run or stop the engine and the blades when the operator leaves the normal operating position. If the operator returns to the normal operating position before the blades have stopped, the blades may automatically resume operation. Blade starting shall require intentional reactivation by a means other than the operator-presence control after stopping.

16.2.1.6 A means shall be provided that automatically stops or disengages the traction drive when the operator leaves the normal operating position.

16.2.1.7 The operator position sensor described in 16.2.1.5 and 16.2.1.6 shall be operable under all normal operating conditions to allow the operator freedom to shift body mass and position to accommodate operation on slopes and still allow the operator to retain control of the machine; that is, reduce inadvertent and unnecessary stopping of the mower blades or interruption of the engine ignition.

16.2.1.7.1 The mower shall be positioned on a 15° test slope with its longitudinal axis perpendicular to the slope with a test operator on the mower. The test operator shall have a mass of 48 – 57 kg (105 – 125 lbm) and height of 1.5 – 1.63 m (59 – 64 in). The seat shall be adjusted for the operator. With the operator positioned against the seat back support, the operator shall be able to operate the following controls through their full operating range:

a) Steering;

b) Traction drive (transmission of speed selector, traction drive disengagement means, or both);

c) PTO drive (mower drive);

d) Service brake.

The operator's spine shall remain generally vertical in a lateral plane. The machine shall be checked in both directions. The mower shall remain operational without having to exert other than the normal contact with the operator-presence control.

16.2.1.7.2 If the operator sensor described in 16.2.1.5 and/or 16.2.1.6 is a seat sensor, then the sensor shall undergo one of the following test procedures:

Procedure 1

a) Place the machine on a surface level within 1°;

b) With the seat located in the position established in 16.2.1.7.1, place the seat index point (SIP) measuring device (as described in ANSI/SAE J1163), without the weights, on the seat cushion, and slide the device rearward to contact the seat back. The SIP should be centered on the cushion in the normal operating position;

c) Add weights as indicated by the vertical arrow in Figure 1 of ANSI/SAE J1163 to bring the total mass of the device to within 28 kg to 30 kg (62 lbm to 66 lbm), and adjust the device to a level position;

d) The SIP device shall be tipped 15° to the right and to the left without slipping, or until the SIP device movement is restricted. The SIP shall be held stationary for at least 5 seconds. The mower blades, engine ignition, and traction drive shall remain continuously operational.

Procedure 2

a) Place the machine on a surface level within 1°;

b) Utilize an operator as described in 16.2.1.7.1. The operator shall be seated in the normal operating position with both hands on the steering wheel and shall be in contact with the seat back support;

c) The seat shall be adjusted for the operator such that operation of the steering, traction drive (transmission of speed selection, traction drive disengaging means, or both), PTO drive (mower drive), and service brake can be accomplished through their full operating range;

d) The operator shall lean to the right and to the left a minimum of 15° from vertical or until further movement is restricted. The operator shall attempt to keep the spinal column straight. The operator shall hold the maximum left and right hand lean positions for at least 5 seconds. The mower blades, engine ignition, and traction drive shall remain continuously operational.

16.2.1.8 A means shall be provided that limits reverse drive operation with powered blades to ground speeds no greater than 0.3 m/s (1 ft/s). An override capability may be provided to permit reverse drive with powered blades at ground speeds greater than 0.3 m/s (1 ft/s). If an override capability is provided, the override shall automatically deactivate when at least one of the following three actions occurs:

a) The blade(s) is (are) re-engaged or

b) The engine is restarted or

c) The directional control is moved from reverse.

Ride-on mowers with zero-turn radius capability and machines with front mount mowers are excluded from the requirement.

16.2.1.9 A means may be provided to allow stationary operation of the PTO with the operator not in the normal operating position. Such means shall automatically return to the operational mode described in 16.2.1.5 when the operator resumes mobile operation.

16.2.2 Clutch controls

16.2.2.1 Traction clutch and/or neutral-return

16.2.2.1.1 Foot pedal control

When provided, a foot pedal control shall be actuated by the operator's left foot, with the direction of motion forward or downward, or both, for disengagement, except for the operator-presence control. A foot actuated operator-presence control, when provided, shall produce clutch engagement by a forward or downward motion. It shall be overridden by the service brake. A right-foot operator-presence control shall be outboard of the service brake pedal.

16.2.2.1.2 Hand-operated control

When provided, a hand-operated control shall be moved generally rearward or toward the operator for disengagement, except for the operator-presence control. The operator-presence control shall be overridden by the service brake.

16.2.2.1.3 Traction clutch and/or neutral-return, and brake combined

When a foot-operated (either foot) combination machine-clutch or neutral-return, or both, and brake control are used, the direction of actuation shall be forward or downward, or both, to cause traction disengagement and brake engagement. Provision shall be made to retain control of the machine during the transition zone of brake disengagement to traction engagement.

16.2.2.1.4 Lever-steer controls

On lever-steer mowers, the engagement or disengagement of the clutch is accomplished by displacement of the levers. Movement of the lever(s) generally

forward shall result in forward motion. Movement of the lever(s) generally rearward shall result in rearward motion.

16.2.2.2 Attachment drive (power takeoff) controls when part of the machine

16.2.2.2.1

a) The positions for engagement and disengagement shall be clearly identified with a durable label.

b) The control shall be located convenient to the operator.

c) If a mechanical control is used, control movement shall be generally forward or upward, or both, for engagement, and generally rearward or downward, or both, for disengagement.

d) If an electrical control is used, a means shall be provided to protect against inadvertent actuation. Such means could include: pull for engagement, shielding around the control, press and hold engagement delay, protection by location or other means that fulfill the intent of this requirement. Disengagement shall require a single motion.

16.2.2.2.2 A combination traction clutch and constant running or transmission driven clutch for the attachment drives shall comply with 16.2.2.1.

16.2.2.3 Start interlock

Interlocks shall be provided to prevent the engine (motor) from being started by conventional means unless the attachment drives are disengaged or in neutral. This shall apply to electric motor drives only if the attachment power is taken from the machine motor.

16.2.3 Brake controls

16.2.3.1 Service brakes

A service brake control shall be provided.

16.2.3.1.1 Foot-operated brakes

16.2.3.1.1.1 Brakes combined with traction clutch or neutral-return, or both, shall meet the requirements of 16.2.2.1.3.

16.2.3.1.1.2 For foot actuation, the direction of motion shall be generally forward, or downward, or both, for stopping.

16.2.3.1.1.3 When independent wheel brakes are provided with a pedal to control each wheel, the left pedal shall control the left wheel and the right shall control the right wheel. In addition, means shall be provided to lock the pedals together.

16.2.3.1.2 Combined lever-steer and brake controls

Braking shall be accomplished by motion of the lever(s) in a direction opposite that of machine travel.

16.2.3.2 Parking brake

16.2.3.2.1 The parking brake control shall be in a location convenient to the operator. The direction of engagement shall be clearly identified with a durable label.

16.2.3.2.2 A hand-operated parking brake control, when provided, shall be moved rearward or upward to engage or set.

16.2.3.2.3 A foot-operated parking brake control, when provided, shall be moved downward or forward to engage or set.

16.2.3.2.4 An automatically operated parking brake, when provided, shall be actuated when the operator-presence control is released.

16.2.3.2.5 The parking brake may be in combination with the service brake.

16.2.3.2.6 The parking brake may be in combination with lever-steer controls. For this combination, the parking brake shall be engaged when one or both levers are moved to the park brake position from the neutral position.

16.2.4 Foot-operated engine (motor) speed control

When a foot-operated engine (motor) speed control pedal is provided, it shall be operated by the right foot, with the general direction of motion forward or downward, or both, to increase speed. It shall be in a location convenient to the operator.

16.2.5 Traction speed control

16.2.5.1 Fixed ratio transmission speed selector controls, when provided, shall be in a location convenient to the operator, and the shifting patterns shall be clearly identified with a durable label.

16.2.5.2 Hand-operated direction clutching controls for engine drive machines (non-variable speed), when provided, shall be moved forward for forward machine motion and rearward for rearward machine motion. A neutral position shall be provided, and provisions shall be made to retard movement of the controls into the forward or rearward directions. Hand-operated direction controls for electric drive machines (non-variable speed), when provided, shall be moved forward for forward machine motion and rearward for rearward machine motion. Provision shall be made for a means of retarding the controls or their effects when moving into the forward or rearward directions.

16.2.5.3 A hand-operated variable speed machine control, when provided, shall be moved generally forward or upward, or both, to increase speed.

16.2.5.4 Hand-operated combination directional and variable speed controls, when provided, shall have a definite neutral zone with some means of retarding the control or its effect when moving into the forward or rearward direction. The controls shall be moved generally forward for forward travel and increasing forward speed, and generally rearward for rearward travel and increasing rearward speed. The controls shall remain in the selected position or move to a slower speed position unless repositioned by operator action.

16.2.5.5 The foot actuated combination directional and variable speed control shall be operated as follows:

a) If a single pedal is used for the combination directional and variable speed control, it shall be operated by the right foot. It shall produce forward motion with a generally forward or downward toe motion on the pedal and rearward motion with a generally rearward or downward heel motion. Increased displacement of the pedal shall produce increased speed in either direction. Provisions shall be made for a definite neutral zone with some means of retarding the control or its effect when moving into the forward or rearward directions;

b) If two pedals are used for the combination directional and variable speed control, they shall both be operated by the right foot. A generally forward or downward motion on the outer pedal shall produce reverse motion and increased rearward speed of the machine. A generally forward or downward motion on the inner pedal shall produce forward motion and increased forward speed of the machine.

16.2.5.6 Traction speed control interlocks for engine drive machines shall be provided to prevent the engine (motor) from being started by conventional means unless the traction drive is disengaged or in neutral. For electric drive machines, provision shall be made for traction speed control interlocks that prevent the motor from being started unless the traction drive is disengaged or in neutral or unless the speed control is in the neutral or "off" position.

16.2.5.7 For lever-steer mowers, movement of the lever(s) shall be generally forward for forward motion, and generally rearward for rearward motion. Increased displacement of the lever(s) shall produce increased traction speed. A neutral zone or position shall be provided.

16.2.6 Steering control

16.2.6.1 Steering motion

16.2.6.1.1 Ride-on mowers (except lever-steer mowers)

The machine shall turn right when the steering controls are turned in a clockwise motion. The machine shall turn left when the steering controls are turned in a counterclockwise motion.

16.2.6.1.2 Lever-steer mowers with two control levers

The machine shall turn right when the left lever is displaced further in the direction of machine travel than the right lever. The machine shall turn left when the right lever is displaced further in the direction of machine travel than the left lever.

16.2.6.1.3 Lever-steer mowers with a single control lever with lateral displacement for steering control

The machine shall turn right when the lever is moved generally to the right. The machine shall turn left when the lever is moved generally to the left.

16.2.6.1.4 Lever-steer mowers with a single control lever with rotational displacement for steering control

The machine shall turn right when the left extremity of the control is rotated in the direction of machine travel. The machine shall turn left when the right extremity of the control is rotated in the direction of machine travel.

16.2.6.2 Locking of steering mechanism

The steering mechanism shall not lock in any operating position.

16.2.6.3 Tiller bar steering

Tiller bar steering shall not be permitted.

16.2.7 Lift controls for attachments

16.2.7.1 Lift controls actuated from the operator's position shall be located convenient to the operator. The direction of actuation shall be clearly and durably labeled.

16.2.7.2 When a hand control is provided, the direction of motion shall be generally forward or downward to lower and rearward or upward to raise the attachments.

16.2.7.3 When a heel-and-toe foot control pedal is provided for a powered lift, the direction of motion of the forward part of the pedal shall be generally downward to lower and upward to raise the implement or equipment.

16.2.7.4 When a non-powered foot-operated control is provided, the direction of motion shall be generally downward or forward to lift and upward or rearward to lower.

16.2.7.5 The lift action of a power operated (battery or accumulator) lift device shall be rendered inoperative by the removal of a key or by some similar device.

17 Guards and shields

17.1 Power drives

Nip and pinch points (related to exposed gears, friction drive components, belts, chains, and idlers) and outside faces of pulleys, sheaves, sprockets, and gears shall be guarded by location or otherwise guarded to prevent inadvertent contact by the operator during normal operation of the machine.

A component is sufficiently guarded if it cannot be contacted with the probe shown in Figure 7 when tested in accordance with 17.1.1.

These guarding requirements do not pertain to contact during maintenance activities or to the following components:

a) Belts, chains, and smooth components that do not have an exposed pinch point;

b) Rotating shafts protruding less than half of their outside diameter.

17.1.1 Test procedure

CAUTION: The following procedures should be conducted with the engine *not* running.

Insert the probe (Figure 7) into all openings to its maximum depth (100 mm or 4.0 in) or until a force of 20 N (4.5 lbf) is attained. As the probe is inserted, rotate and position it in all possible angles within the opening, attempting to contact the part or parts under test. The finger probe shall not be inserted beyond the length of the probe (100 mm or 4.0 in).

17.1.2 Guarded by location

A riding mower hazard shall be considered "guarded by location" if one of the following applies:

a) The hazard is covered by other parts or components of the machine, or because of its remote location cannot be contacted with the finger probe shown in Figure 7 when held by a 95th percentile man seated in the normal operating position and maneuvering the probe in any manner;

b) The hazard is under and within the perimeter of the chassis elements, such as the frame, fender, and footrest, and the hazard cannot be reached with the finger probe shown in Figure 7 when held by a 95th percentile man seated in the normal operating position and maneuvering the probe as follows:

   1) From above the chassis elements, downward through openings in or between the elements;

   2) Underneath the chassis elements allowing only horizontal or downward probe movement, or both. Upward probe movement shall not be permitted.

c) The hazard is controlled by an operator-presence control such that the operator, when functioning in accordance with (a) and (b) cannot reach the hazard while simultaneously actuating the operator-presence control in its normal manner.

17.1.3 Rotating engine screen

A rotating engine screen shall be guarded to prevent contact by the operator in the normal operating position.

The engine screen is sufficiently guarded if it cannot be contacted with the probe shown in Figure 7 when tested in accordance with 17.1.1 with the guards and covers in place.

17.2 Hot surfaces

Engine exhaust components and their guards with a surface temperature greater than 90°C (194°F) for non-metallic materials or 80°C (176°F) for metallic materials shall be guarded from contact so that the tip or conical surface of cone A or B (Figure 1) shall not contact any individual area of 10 cm^2 (1.55 in^2) or more of the hot surface.

Compliance is to be checked according to test procedure as follows.

17.2.1 Test equipment

The temperature measuring equipment for hot surfaces shall have an accuracy of ±2°C (±3.6°F).

17.2.2 Test procedure

The test shall be conducted in the shade with a wind speed not to exceed 3 m/s (6.7 mi/h). The engine shall be operated at its maximum operating engine speed with the mower blades engaged

until the surface temperatures stabilize. Temperatures shall be determined by correcting the observed temperature by the difference between 20ºC (68°F) and the ambient test temperature.

When the distance between the identified hot area and the nearest control, used for normal operation, is in excess of 100 mm (4 in), cone A as shown in Figure 1 shall be used. For distances less than or equal to 100 mm (4 in) between the identified hot area and the nearest control, cone B 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 nose of the cone shall not be pointed 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 used with the axis of the cone in any direction and moved in any direction.

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: All hoods and guards shall be in their operating position during this test.

NOTE 3: Table 4 summarizes the use of the cones.

Table 4 – Method for the use of the test cones

Distance from nearest control	>100 mm (4 in)	≤100 mm (4 in)
Type of cone to be used	A	B
Orientation of cone	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	Any direction
Direction of cone movement	Move the cone towards the hot surface	Any direction

17.3 Fuel ignition protection

Overflow fuel shall be diverted away from the muffler outlet area.

17.4 Attachment of guards and shields

Guards or shields may be attached to the machine with common fasteners or other effective means. Access doors or guards which need to be removed for routine or daily maintenance, inspection, or cleaning should be easy to open or remove.

17.5 Movable seat structures

Seat structures that must be moved to permit access to a manual rewind starter shall be hinged in such a way that the seat automatically returns to the normal seating position if the operator attempts to resume the normal operating position.

17.6 Pressurized hoses

Where hoses are operating at a maximum working pressure greater than 5000 kPa (725 psi) and are located within 500 mm (20 in) of the operator zone, they shall be located or shielded so that, in the event of a rupture, the fluid cannot be discharged directly on to the operator when in the normal operating position.

The same requirements apply to hoses operating at a maximum working pressure of 500 kPa (73 psi) to 5000 kPa (725 psi) and where the temperature of the pressurized fluid exceeds 50°C (122°F) when operated at an ambient temperature of 20°C ± 5°C (68°F ± 9°F).

Compliance to be checked by inspection and measurement.

18 Servicing

18.1 General requirements

If there are service operations that require the engine to be running, then specific written instructions shall be provided.

18.2 Servicing points

Access doors, shields, or guards shall be provided to prevent inadvertent operator contact with hazardous servicing points.

18.3 Stored-energy devices

Stored-energy devices such as, but not limited to, pressurized fluid systems (e.g. engine cooling systems and hydraulic accumulators) and spring-loaded mechanisms that can be disconnected or disassembled in a manner that may release energy or material in a hazardous manner (which is not obvious when disconnecting or disassembling a system or component) should have an appropriate safety sign on or near the device. The sign shall include instructions for de-energizing and for proper disassembly, or include a reference to instructions provided in the operator's manual.

19 Electrical requirements

19.1 General

The specifications given in this standard are not intended to completely cover electrical requirements. There are such pronounced differences in the sizes and types of electrically driven outdoor power equipment that no materials, conductors, insulation, or other components can be specifically designated as standard. Therefore, all such items shall be carefully chosen for each application, giving maximum consideration to safety, efficiency, and accessibility. For these reasons, the references to the standards and recommended practices of SAE International in this section should be considered as guidance in design rather than exact conformance requirements. Any equivalent alternates will be considered acceptable.

19.2 Line voltage

The electrical requirement for line voltage equipment is not covered in this standard.

19.3 Low voltage battery powered circuits (not including magneto grounding circuits)

19.3.1 Insulated cables

Insulated cables comprising wiring circuits should be protected by rubber, plastic, non-metallic tape, or non-metallic braid covering capable of withstanding severe abrasion except where otherwise protected or not in potentially abrasive contact with metal surfaces. This wiring assembly shall, where possible, be grouped together, be properly supported, and be located so that no portion is in contact with the carburetor, metallic fuel lines, the exhaust system, moving parts, or sharp edges. Any edges of metal members subject to contact with the cables shall be rounded or protected to prevent possible damage to the cables by cutting or abrasion. (See SAE J1127, J1128, J1292, and J2031.)

19.3.2 Battery installation

The compartment for a vented storage battery shall also be vented. Drainage of contents from the battery in the operating position shall not come in contact with parts that will be critically affected in such a manner as to create a hazard.

19.3.3 Overload protection

All circuits, except starting motor and ignition circuits, shall have overload protective devices on the battery feed side of switches, except that for two wire, non-grounded systems, the overload protection shall be located in either line. (See SAE J156, J553, J554, and J1284.)

19.3.4 Terminals and non-insulated electrical parts

Protection shall be provided against short-circuiting of terminals and uninsulated electrical parts during normal refueling, lubrication, and servicing. Terminals and electrical parts other than those

having zero potential to ground shall be insulated if they are located within the reach of the extended body and hand of a 95th percentile adult male operator standing unassisted in the position where he would most usually perform refueling, lubrication, and servicing. Terminals beyond reach, and those covered by guards that do not need to be removed for normal servicing, are required to be insulated only in accordance with the insulation requirements of electrical specifications otherwise referred to in this standard.

20 Label durability requirements

20.1 General

Required labels shall be certified by the machine manufacturer to meet the following label durability requirements.

Permanent safety signs are considered to have a reasonable life if the sign has good color and legibility for a period of at least five years. Exterior durability is based on vertical exposure tests for weatherability in the extreme climate of the United States, or a 2000-hour carbon-arc test in accordance with ASTM G152 (Cycle 1) or a 2000-hour xenon-arc test in accordance with ASTM G155 (Cycle 1). Other acceptable weather durability tests are from ISO 17398:2004, including the open-flame carbon-lamp accelerated weathering test (7.3.2) or the xenon-arc artificial-weathering resistance test (7.3.4).

Other test methods may be used, providing the method ensures equal or superior sign durability.

20.2 Additional requirements

Labels shall form a durable bond with the base material surface and shall show no appreciable loss of adhesion or legibility during weathering exposure or exposure to spilled fuel or oil. When processed and applied in accordance with the label manufacturer's recommendations, labels shall be weather resistant in accordance with 20.1 and, following normal cleaning procedures, shall show no appreciable fading, discoloration, cracking, crazing, blistering, or dimensional change. Labels shall not curl at the edges.

20.3 Types considered durable

20.3.1 Embossed, indented, cast, or molded labels shall be considered sufficient to meet the requirements of 20.1.

20.3.2 Metal plates more than 0.48 mm (0.019 in) thick with embossed or etched lettering, and fastened with rivets or equivalent fastening means, shall be considered sufficient to meet the requirements of 20.1.

20.4 Silk screening

Silk screening or other types of marking, when used, shall meet the applicable requirements of 20.1 and 20.2.

21 Requirements – Ride-on mowers

21.1 General requirements

21.1.1 Slip resistant surface

A slip resistant surface or other means shall be provided to minimize the possibility of an operator's foot slipping off the support or platform.

21.1.2 Seat support

The operator's seat shall have a back support at least 115 mm (4.5 in) high at the rear above the seating surface to retain the operator.

This requirement shall not apply to machines where the operator sits astride the frame and holds handlebars or a control bar.

21.1.3 Roll over protective structure (ROPS)

ROPS is required for:

a) mowers with a mass ≥ 400 kg (882 lbm) and < 600 kg (1323 lbm) and having a lateral or longitudinal stability angle ≤ 30 degrees (per the test procedure described in 21.2.2).

b) zero-turn mowers with rear engine, transmission steer, two rear drive wheels, front caster wheels and a mid-mounted cutting deck with a mass ≥ 400 kg (882 lbm).

c) mowers with a mass ≥ 600 kg (1323 lbm).

If the mower is equipped with ROPS, it shall also be equipped with a seat belt. ROPS and seat belts shall comply with nationally or internationally recognized standards appropriate for the product.

ROPS is not required for:

a) mowers with a standing operator

b) mowers with an operator who sits astride a seat (with unobstructed egress to the rear)

c) mowers with an out-front deck and integral grass catcher with a mass ≥ 400 kg (882 lbm) and < 600 kg (1323 lbm) and having lateral and longitudinal stability angles ≥ 25 degrees (per the test procedure described in 21.2.2)

d) mowers with a mass < 400 kg (882 lbm)

Mass includes:

a) base machine

b) heaviest mowing attachment

c) fluid levels full

d) empty grass catcher if integral to the mower

Mass does not include:

a) ROPS

b) operator

c) grass catcher attachment

d) other attachments

e) optional ballast weights

f) additional wheel equipment

g) other special equipment and loads

21.2 Stability tests

21.2.1 General requirements

Unless otherwise specified, these tests shall apply for all combinations of tires for the machine and all wheel tread settings approved by the machine manufacturer. The mower shall be attached to the machine and set to its highest position for all tests. The following requirements shall apply:

a) No attachment or ballast shall be added to the machine, except in the following cases:

1) Grass catcher attachments supplied or offered by the machine manufacturer shall be added. The ballast supplied with the grass catcher attachment may be added;

2) The ballast supplied with the mower attachment may be added when testing with mower attachments that are not supplied with the machine;

3) The ballast recommended by the manufacturer as required equipment for front-mounted attachments and rear-mounted mower attachments may be added when testing with front-mounted attachments or rear-mounted mower attachments that are not supplied with the machine.

b) Pneumatic tires shall be inflated to the pressure recommended in the operator's manual for normal operation;

c) For static tests (see 21.2.2)

1) A lift-off gauge consisting of a 20 gauge or 1-mm (0.039 in) steel strip, 50 mm (2 in) wide with a length sufficient to extend beyond the tire footprint, shall be placed under the uphill tires positioned parallel to the axis of rotation of the tires.

2) Lift-off shall have occurred when the lift-off gauge can be pulled from or moved under the last uphill tire with a force of 9N (2 lbf) or less.

d) For dynamic tests (see 21.2.3 and 21.2.4):

1) Unless otherwise specified, the engine shall be operating at the maximum-governed no-load speed approved by the machine manufacturer;

2) A means shall be provided to protect the operator during these tests;

3) These tests shall be conducted on a substantially level (not to exceed ±1% grade), dry, smooth, hard surfaced area of concrete, asphalt (or other surface with equivalent coefficient of surface friction), that is free from loose material;

4) An operator with a minimum mass of 91 kg (200 lbm) shall be seated on the machine during the tests with seat adjusted to the worst-case condition as determined by the manufacturer;

5) Grass catcher attachments supplied or offered by the machine manufacturer shall be tested empty. The ballast supplied with the grass catcher may be added;

6) Lever-steer machines are exempt from the dynamic stability tests (21.2.3 and 21.2.4).

21.2.2 Static stability tests

21.2.2.1 Test conditions without grass catcher attachment

a) All measurements are made under static conditions;

b) A 91-kg (200-lbm) mass secured to the seat shall be used to simulate an operator. The center of gravity of the mass shall be 150 mm (6 in) above the lowest point of the operator supporting surface of the seat and 250 mm (10 in) forward of the seat back. The forward measurement of 250 mm (10 in) shall be made from the back of an actual operator when seated normally on the unit. If the seat is adjustable, it shall be positioned at the most forward position when checking forward stability and in the most rearward position when checking rearward stability;

c) All wheels shall be held in the straight-ahead position and may be locked to prevent rotation about the axle.

21.2.2.1.1 Test procedure

Place the machine, supported on its wheels, on a variable slope, single plane (tilt table) with a friction surface equivalent to a 16 - 36 grit abrasive material.

a) *Longitudinal*: The machine shall be positioned on the tilt table with its longitudinal centerline perpendicular to the intersection line of the lowest edge of the table and a horizontal plane. Place the lift off gauges under the uphill tires. Position the unit first with the front end on the downhill side, and then with the rear end on the downhill side;

b) *Lateral*: The machine shall be positioned with its longitudinal centerline parallel to the lowest edge of the table and a horizontal plane. Place the lift off gauges under the uphill tires. Position the unit first with its right side on the downhill side, and then with the left side on the downhill side.

The table shall be tilted to the minimum angles of 21.2.2.1.2. The lift-off gauges shall be pulled along the longitudinal centerline of the gauge.

21.2.2.1.2 Test acceptance

The machine wheels shall not lift off the table before the tilt angle specified in (a) and (b) is reached.

a) *Longitudinal test angle*: The machine wheels shall not lift off the table before 30° (57.7% slope) is reached.

b) *Lateral test angle*: The machine shall not lift off before 25° (46.6% slope) is reached, except that prevention of machine rollover by the deck is permissible.

21.2.2.2 Test conditions with grass catcher attachment

A grass catcher attachment supplied or offered by the machine manufacturer shall be tested with a filled catcher container. Testing is required on catchers that are fully machine supported, and attachments equipped with support wheels/rollers/casters that are not in contact with the ground support surface when the containers are loaded.

21.2.2.2.1 Test procedure

Fill the catcher container to its volumetric struck level capacity or full enclosed capacity with material that has a minimum specific mass of 192 kg/m^3 (12 lbm/ft^3). Settling of the material is acceptable. Follow the test conditions and procedures outlined in 21.2.2.1 and 21.2.2.1.1 (a) and (b).

21.2.2.2.2 Test acceptance

The machine wheels shall not lift-off the table before the tilt angle specified in (a) and (b) is reached.

a) *Longitudinal test angle*: 20° (36.4% slope)

b) *Lateral test angle*: 20° (36.4% slope)

21.2.2.3 Zero-turn machines with mid-mounted mowers and ROPS

21.2.2.3.1 The ROPS shall be installed with ballast, if required, and any other attachments to provide the worst-case conditions for stability.

21.2.2.3.2 Follow the test conditions and procedures outlined in 21.2.2.

21.2.2.3.3 Test acceptance

Lift-off shall not occur before the tilt angles specified in (a) and (b) are reached:

a) *Longitudinal*: 25° (46.6% slope);

b) *Lateral*: 20° (36.4% slope).

21.2.3 Dynamic turn stability tests

21.2.3.1 Test equipment

The machine shall be equipped with lateral outriggers to indicate lift off of the wheels on the portion of the frame that supports the operator's seat to prevent overturn during the test and to determine test acceptance.

21.2.3.2 Test procedure

a) The operator's torso shall remain generally stationary with respect to the static seating position within 10°;

b) The machine shall be driven in a straight line at its maximum governed speed;

c) While the mower is proceeding in a straight line, the hand-operated steering controls shall be gradually moved to cause the machine to turn right. The controls shall be moved until the controls reach the extent of their travel. The machine shall stay in the turned condition for 5 seconds;

d) Then, the test shall be repeated, with the machine turning to the left.

21.2.3.3 Test acceptance

Lift-off of the wheels shall not exceed 5°.

21.2.4 Sudden traction control test

21.2.4.1 General requirements

This test shall be conducted on fixed ratio transmission machines with a foot operated clutch and also shall be conducted on variable drive (e.g. hydrostatic, friction disc, etc.) machines where the transmission drive selector does not return to neutral when the foot operated clutch is disengaged.

21.2.4.2 Test procedure

a) The operator's torso shall remain generally stationary, with respect to the static seating position, within 10°;

b) The test shall be conducted with the machine set for maximum ground speed and shall be conducted in forward travel;

c) With the machine positioned to travel in a straight line, the traction drive shall be engaged by suddenly releasing the foot operated clutch control. If possible, this should be done by sliding the foot sideways off of the foot operated clutch and allowing the clutch to engage quickly.

21.2.4.3 Test acceptance

The machine shall meet at least one of the following:

1) Lift-off of the wheels shall not exceed 10°.

2) The machine has a positive stop that will prevent the machine from tipping more than 20°.

NOTE: The machine should be equipped with a longitudinal outrigger to prevent overturn during the test and to determine test acceptance.

21.3 Braking requirements

21.3.1 General requirements

Braking system requirements shall apply to the machine and attachment combination. For these tests, the machine shall be equipped with the tires offered by the manufacturer that provide the least tread area in contact with the test surface.

21.3.2 Service brake system

21.3.2.1 Effectiveness test

21.3.2.1.1 Test requirements

a) Conduct all stops on the same test surface as used in 21.2.1(d) (3);

b) An operator with a minimum mass of 91 kg (200 lbm) shall be seated on the machine during the test;

c) When testing a machine equipped with separate clutch and brake control means, the clutch shall be disengaged simultaneously with the brake engagement;

d) Auxiliary retarder, variable ratio drive, or other auxiliary braking devices shall not be used in the brake control, unless such retardation is automatic with normal braking procedure. Description and use of such devices shall be noted in the test report.

21.3.2.1.2 Test procedure

a) Operate the machine at its maximum forward and reverse velocity;

b) Apply a force not exceeding 220 N (50 lbf) to the brake control;

c) Measure the stopping distance and machine velocity in both directions.

21.3.2.1.3 Test acceptance

The machine shall stop in both directions in a distance of 0.19 m per km/h (1 ft per mi/h) up to a maximum machine velocity of 13 km/h (8 mi/h). For example, a machine moving at 8 km/h (5 mi/h) shall stop in 1.5 m (5 ft). For machine speeds in excess of 13 km/h (8 mi/h):

$$S = 0.0147V^2 \ (S = V^2/8)$$

where S is stopping distance in meters (feet) and V is test speed in kilometers per hour (miles per hour).

The service brake may be a hydrostatic or electric traction drive system.

When the service brake is controlled by the traction drive, a separate service brake control is not required.

21.3.2.2 Durability test

The service brakes shall be certified by the machine manufacturer to meet the following durability requirements. When the service brake is the drive system, this test is not required.

21.3.2.2.1 Test procedure

a) The machine shall be operated at its maximum forward velocity;

b) The braking means shall be subjected to 5000 stopping cycles with a minimum machine deceleration as defined in 21.3.2.1.3;

c) Occurrences of wheel lock up shall be minimized;

d) The machine operator shall have a minimum mass of 91 kg (200 lbm).

21.3.2.2.2 Test acceptance

The braking means shall meet the requirements of 21.3.2.1.3 without adjustment and with maximum brake input force of 444 N (100 lbf).

21.3.2.3 Proof load test

21.3.2.3.1 Test procedure

The test shall be applied to each brake control. When the service brake is the drive system, this test is not required.

21.3.2.3.1.1 Foot-operated controls

A constant 1665 N (375 lbf) load shall be applied to the brake control for 5 seconds in the direction of brake actuation. Surrounding structure may absorb a portion of the load if this condition would normally occur when performed by the operator.

21.3.2.3.1.2 Hand-operated controls

A constant 622 N (140 lbf) load shall be applied to the brake control for 5 seconds in the direction of brake actuation.

21.3.2.3.2 Test acceptance

After release of the load on the brake control, the service brake shall meet the requirements of 21.3.2.1.3.

21.3.3 Parking brake system

21.3.3.1 General requirements

A means shall be provided to prevent the machine from being driven with the parking brake or lock engaged and set.

21.3.3.2 Test requirements

a) The transmission speed selection shall be in neutral with the engine shut off;

b) Tests shall be run with and without an operator. The minimum mass of the operator shall be 91 kg (200 lbm).

21.3.3.3 Test procedure

Conduct all tests on a smooth, flat surface with tractive conditions equivalent to resting on a 16 to 36 grit abrasive material.

21.3.3.4 Test acceptance

The machine shall be equipped with a parking system that shall hold the machine in any direction when parked on a 16.7° (30%) slope.

21.4 Attachment drive clutch

A disconnect device shall be provided between the engine (motor) or power source and the attachment. For direct attachment to electric motors, this disconnect shall be between the motor and the power source (battery).

22 Safety messages – Ride-on mowers

22.1 On-product labeling

A safety sign with the following safety practices or a similar set of messages shall be provided on the machine:

a) Read operator’s manual

b) Maintain safety devices

c) Keep bystanders away

d) Look behind while backing

e) Avoid steep slopes

f) Never carry children

The safety sign should be visible to an operator in the normal operating position. This safety sign shall be tailored to the specific mower design and the manufacturer’s recommendations for its use and shall conform to the requirements of ANSI Z535.4 or ISO 11684. Pictorials may be used to convey this message. Additional statements or pictorials of safety practices are allowed. Use of ONLY single-color molded in warning is not permissible.

22.2 Safety instructions

A manufacturer shall supply, with the equipment, instructions for operation such as those shown in Figure 6. Instructions may be tailored to the specific mower design. Statements may be omitted if not applicable or modified to fit the manufacturer’s recommendations for a specific machine.

Additionally, a manufacturer shall provide instructions for checking the function of starting interlocks, blade OPCs, traction drive OPCs and back over protection system and override.

22.3 Safety pictorials

Safety pictorials, as shown in Annex B, may be used to convey product safety information. If used, appropriate explanatory text should be included in the operator's manual.

23 General requirements – Ride-on rotary and reel mowers

23.1 Blade rotation warning

An indicator of blade rotation shall be provided on mowers that operate so quietly that it may not be evident that the blades are rotating.

23.2 Blade stopping time

23.2.1 The blades shall stop rotating from the manufacturer's specified speed within 5 seconds at both extremes of cut height adjustment: (1) when the blade engagement drive is disengaged or disconnected, and (2) when the operator-presence means, as specified in 16.2.1.5, is actuated.

Prior to the test, the lawnmower shall be adjusted according to the operator's manual. The lawnmower shall be operated for 15 minutes. During this 15-minute period, the blade control shall be operated 10 times.

23.2.2 The machine manufacturer shall certify that the blade stopping time is equal to or less than 5 seconds after the blades have been operated for 5000 on/off cycles. The controls used to cycle the blade(s) are selected at the manufacturer's discretion. Each blade on/off cycle shall include:

a) Accelerating the blade to the manufacturer's specified maximum speed;

b) Actuation of the blade stop means (blade engagement control or OPC);

c) Sufficient time for the blade to decelerate to the static state;

d) Sufficient time between on/off cycles is allowed to prevent damage to the engine and blade stop means.

If the blade engagement means fails to engage, adjustment of the engagement means is allowed in order to continue the test, as long as the blade stop time has not exceeded 5 seconds. No adjustment of the blade stopping means is allowed.

23.2.3 The requirements of 23.2.2 do not apply to an operator-presence means that stops the blade(s) by stopping the engine; however, the requirements of 23.2.2 do apply to the blade engagement drive.

23.3 Controls – attachments

23.3.1 Machine engine powered (motor powered) attachments

23.3.1.1 An attachment drive clutch control, when mounted on the attachment and not a part of the machine, shall be in a location convenient to the operator. It shall be clearly identified. General direction for engagement shall be forward or upward, or both, and for disengagement, rearward or downward, or both. A durable label shall identify both positions.

23.3.1.2 Interlocks shall meet the requirements of 16.2.2.3.

23.3.2 Attachment with auxiliary engine or electric motor

An attachment with auxiliary engine or electric motor shall comply with the requirements in 16.1.2, 16.1.3, and 16.2.2.3.

A non-rigidly mounted attachment with an auxiliary engine with a rope starter shall have a labeled designated area for stabilizing the attachment when starting the engine.

24 Specific requirements – Ride-on rotary mowers and mower attachments

24.1 Blade enclosure

24.1.1 General

The mower blade shall be enclosed except on the bottom, and the enclosure shall extend a minimum of 3 mm (0.12 in) below the lowest cutting point of the blade in the lowest blade position, including tolerance, except for the discharge openings and other such openings as described in 24.1.2. Any extension of the walls of the blade enclosure not meeting this requirement shall be considered as part of the discharge opening. All parts of the enclosure shall comply with the tests given in 24.3.5, 24.3.7, and 24.3.8.

24.1.2 Front blade enclosure (see Figure 8)

The highest points of all openings in the blade enclosure, front, except discharge openings, shall be limited by a vertical angle of opening of 15° and a maximum distance of 32 mm (1.25 in) above the horizontal plane of the blade in the lowest blade position. The vertical angle of opening (See Figure 8) is the angle formed in a vertical plane between the horizontal plane and an unobstructed line tangent to the blade tip circle extending, in the direction of rotation, to a vertical extremity of the opening. For a multi-blade mower, this vertical angle is to be determined for each blade.

24.1.3 Discharge openings

The discharge openings shall be so placed or guarded that grass or debris will not discharge directly into the operator zone as shown in Figure 9. The tangential extension of the walls of the discharge chute shall not intersect the operator zone when the mower is set at any height of cut. No tangential line in the plane of the blade tip circle shall intersect the operator zone without first contacting the blade enclosure or guard.

24.1.4 Other openings

Openings in the surface of the blade enclosure are permitted in accordance with the following:

a) Openings in the top surface of the blade enclosure are permitted.

b) Openings in the side of the blade enclosure shall:

- Not exceed a total number of 10;
- Not exceed 10.5 mm (.413 inches) square.

These openings shall not allow a direct line of sight between the operator's zone (see Figure 9) and any portion of the blade(s) before and after testing in accordance with 24.3.5 (Structural integrity test) and 24.3.7 (Thrown object test).

24.1.5 Safety message

A safety pictorial warning of blade contact shall be placed on the mower at or near each discharge opening. The warning may be placed on the discharge chute extension or deflector if it automatically returns to the guarded position after any movement from that position. If a signal word is used, it shall be DANGER. The warning shall conform to the requirements of ANSI Z535.4, ISO 11684, or CPSC 1205. Use of multiple safety symbols/signal words is permissible. Use of ONLY single-color molded in warning is not permissible.

24.2 Guards and grass catchers

Any guards required for the mower to meet the discharge opening requirements shall pass the test given in 24.3.5. If either guard or grass catcher is so required, the mower shall comply with the following requirements:

a) Warning instructions shall be affixed to the mower near the discharge opening conveying the message that the mower shall not be operated without either the entire grass catcher or the guard in place. Such instructions shall be easily legible to a person of normal vision and height standing upright 610 mm (24 in) away from the machine and adjacent to the sign;

b) The grass catcher or the guard shall be shipped and sold as part of the mower.

24.3 Performance tests

24.3.1 General test requirements

Unless otherwise specified, all test conditions shall be as follows:

a) The mower attachment shall be mounted on the machine, except in the tests given in 24.3.5 and 24.3.6, where it may be mounted separately on a suitable test fixture;

b) The mower shall rest on a horizontal surface;

c) The mower shall be operated at the mower manufacturer's specified maximum engine (motor) speed, which is the fastest speed that the mower manufacturer intends the engine (motor) to run with the blades engaged, taking into account all tolerances;

d) Resilient restraints may be used to keep the mower in position during tests;

e) The outside of the cardboard should be protected by 50 mm x 200 mm (2 in x 8 in) boards or similar protection to ensure the safety of the operators.

24.3.2 Impact test

24.3.2.1 Test procedure

Completely encircle the mower at the time of test by a wall of 159 kg (350 lbm) double-wall cardboard resting on the floor. The wall shall be approximately 610 mm (24 in) from the blade tip circle with a minimum height of 610 mm (24 in) above the horizontal plane of the blade tip circle.

Position the mower over an SAE 1117 free cutting steel rod, 25 mm (1 in) in diameter, which has been placed into a test fixture as shown in Figure 4. The blades shall be adjusted to the cutting height closest to 50 mm (2 in) and shall be so positioned that when the rod is injected into the rotating blade, the blade will strike the exposed portion of the rod within 50 mm (2 in) of the tip of the blade. The rod shall be injected once into the path of the blade. The test shall be conducted once for each blade assembly of the mower. A new mower may be used for each test.

24.3.2.2 Test acceptance

Failure for this test shall be any of the following:

a) Target penetration by any part of the mower;

b) Breakage of the blade;

c) Detachment of the blade from the lawnmower.

Breakage of the shearing device, or chipping of the blade cutting edge, is not considered a test failure.

NOTE: This test does not require that the machine be suitable for use after the test.

24.3.3 Unbalance test

24.3.3.1 Test procedure

Completely encircle the mower at the time of test with a wall of 159 kg (350 lbm) double-wall cardboard resting on the floor. The wall shall be approximately 610 mm (24 in) from the blade tip circle with a minimum height of 610 mm (24 in) above the horizontal plane of the blade tip circle.

A blade unbalance in gram-meters (inch-ounces), as determined by the formula:

$24L^3$ = g-m of unbalance ($L^3/1855$ = in-oz of unbalance)

shall be created by removing or adding material until the desired unbalance is obtained. Dimension *L* is the diameter of the blade tip circle in meters (inches). The mower shall be run in this unbalanced condition for an uninterrupted period of 1 hour or until the unit fails structurally as a result of this test, whichever comes first. The test shall be conducted for

each blade assembly of the mower. It is permissible to test all blade assemblies of a multi-spindle mower simultaneously. A new mower may be used for each test.

The unbalance value given above is the total unbalance for each spindle of the mower regardless of the number of blades on each spindle. The unbalance is calculated based on the longest blade on each spindle and applies to the same blade.

24.3.3.2 Test acceptance

Failure for this test shall be the loss of any part from the unit or the failure of any component.

24.3.4 Blade security test

This test shall be conducted on blade assemblies in which the blade is driven by friction such as clamping the blade against or between its driving members.

24.3.4.1 Test procedure

a) Apply a torque to the blade or blade retaining device to the value specified by the manufacturer; if no torque value is specified, the test shall be conducted in an "as received" condition;

b) Lock the blade shaft against rotation during the test;

c) Conduct the test once for each blade attachment design;

d) Perform this test successively on all blade fasteners and on any blade or blade support that can be made to rotate relative to the shaft;

e) Apply a torque to the blade in the direction of normal rotation until the component under test turns relative to the shaft, or until a torque limit of 68 Nm (50 ft lbf) is reached. If the blade or blade-retaining device turns relative to the shaft, it shall be turned in the same direction 15 revolutions or until the torque applied reaches the 68 Nm (50 ft lbf) limit. The blade shall also be turned in the opposite direction 15 revolutions or until the torque applied reaches the 68 Nm (50 ft lbf) limit;

f) As an alternative test method, the blade and blade drive retaining means may be removed from the mower and tested on a similar shaft or on a fixture that approximates the blade mounting.

24.3.4.2 Test acceptance

To pass this test:

a) The blade or blade support retaining means shall show no evidence of failure;

b) The initial fastener torque shall remain unchanged in both directions after the 68 Nm (50 ft lbf) of torque has been obtained and shall not have changed more than +10% at the end of 15 revolutions.

24.3.5 Structural integrity test – Blade enclosure and guards

24.3.5.1 Test requirements (see Figure 11)

The mower or mower attachment shall be equipped with a 19 mm (0.75 in) plywood panel, which shall be faced with a steel plate of at least 16 gage thickness, or a single steel plate with a minimum of 4 mm (0.150 in) thickness, for wear resistance, parallel to and 16 mm (0.63 in) below the horizontal plane of the blade. The panel shall extend a minimum of 25 mm (1 in) beyond the blade tip circle at the discharge openings. An air inlet hole shall be provided that is concentric with each blade tip circle with an approximate maximum diameter as shown in Table 5. On mulching mowers only, the concentric air inlet opening of the mower support fixture may be increased to a diameter up to 80% of the blade tip circle (BTC), provided a minimum of 25 mm (1 in) is maintained between the edge of the injection opening periphery and the edge of the concentric air inlet opening. The opening between the lower edge of the blade enclosure and the panel shall be closed, except at the discharge openings. The holes in the test panel for the introduction of the test material

should be approximately 25 mm (1 in) in diameter and generally equally spaced from the primary hole, which shall be located 45° from a radial line drawn through A, the center point of the discharge opening, in a direction opposite to the blade rotation, as shown in Figure 11. The angular location of the other holes may be varied slightly to avoid interference with the structural components or the test equipment. The test material shall be injected with sufficient energy that it will rise a minimum of 13 mm (0.5 in) and a maximum of 300 mm (12 in), if unobstructed, above the horizontal plane of the blade. Spring, air, or other assists may be used to ensure proper introduction of the test material.

Table 5 – Air inlet hole for structural integrity test for ride-on rotary mowers and mower attachments

Mower type	Air inlet diameter
Non-Mulching	0.3 x BTC
Mulching	0.8 x BTC

24.3.5.2 Test procedure

a) Introduce, in an upward vertical direction, 100 hardened steel balls (minimum Rockwell C scale 45), 13 mm (0.5 in) in diameter, one at a time through two or more equally spaced holes for each blade. The balls shall be divided in approximately equal numbers among the holes;

b) Conduct the test one time for each blade assembly;

c) A new blade enclosure or mower attachment may be used for each blade of multi-blade mowers.

24.3.5.3 Test acceptance

Failure for this test shall be any of the following:

a) Penetration of more than one half of the ball through any surface of the blade enclosure;

b) Breaking off or bending of any part of the blade enclosure, guard, or grass catcher being tested that would not allow the mower to comply with 24.3.7 (Thrown object test) or 24.3.8 (Probe test);

c) Creation of any opening that does not comply with 24.1.4 (Other openings).

NOTE: Balls that escape around the edge of hinged discharge covers are not considered to be penetration of the deck housing.

24.3.6 Structural integrity tests – Grass catcher

A grass catcher provided by the mower manufacturer for use with a mower shall be tested in accordance with 24.3.6.1. A grass catcher that is designed for use on more than one type of mower shall be tested for each application.

24.3.6.1 Test procedure

a) Use the mower test requirements and procedures of 24.3.5.1 and 24.3.5.2 with a grass catcher mounted on the mower;

b) Provide a bystander target, as shown in Figure 11(f) (i), for each test. If the target is less than 450 mm (18 in) from any part of the grass catcher, the target may be revised at the location to maintain a maximum separation of 405 mm (18 in). For multi-blade mowers, this test need be performed only for the blade(s) nearest the discharge openings;

c) Close any opening between the bottom panel and the lower edge of the grass catcher;

d) The structural integrity test shall be performed prior to the thrown object test and shall be performed for each discharge opening for which a grass catcher is provided by the mower manufacturer. The structural integrity and thrown objects tests shall be performed with the same catcher and mower;

e) A new mower or mower attachment may be used for each set of the following tests:

1) The ball test shall be performed prior to the nail test and shall be performed for each discharge opening for which a grass catcher is provided by the mower manufacturer;

2) The nail test shall be performed identically to the ball test, except that it shall consist of the upward vertical introduction of 200 sixpenny steel common nails, 51 mm (2 in) long, in accordance with ASTM F1667, one at a time, headfirst. The test shall be performed with the same catcher and mower used for the ball test.

24.3.6.2 Test acceptance

Failure for this test shall consist of evidence of any of the following:

a) Penetration of the bystander target;

b) Any opening of a zipper, bag seam, or other components;

c) Dislodging of the grass catcher from its adapter or falling from its operating position.

24.3.7 Thrown object test

24.3.7.1 Test equipment

24.3.7.1.1 Enclosure

The test enclosure shall be constructed, generally as shown in Figure 5(a). Variations to accommodate different mower types and configurations are shown in Figures 5(d) to 5(f).

The target panels shall consist of 8 cardboard areas, each 900 mm (35.4 in) high, perpendicular to the base so as to form an octagon. In order to facilitate the counting of hits, the panel supports should be designed to allow sliding in and out of at least one target panel.

The cardboard shall be tested immediately before and after the thrown object test by utilizing the fixture shown in Figure 5(g). The cardboard shall be cut into test samples of 150 mm (6 in) square. Position the cardboard squares centered on the bottom plate of the test fixture. Squares may be secured at the edges by tape or adhesive. Cover with the top plate. Make sure the center holes in the steel plates are aligned and that the cardboard is flattened by the steel top plate. Raise the penetrator to the recommended height and allow the penetrator to fall on the cardboard samples. Repeat five times.

When dropped from 300 mm (12 in), the spherical end of the penetrator shall not penetrate completely through the test samples more than two out of five drops. When dropped from 400 mm (16 in), the spherical end of the penetrator shall penetrate completely through the test sample in at least four out of five drops. If the penetrator penetrates the cardboard more than the allotted number of times permitted by the acceptance criteria when dropped 300 mm (12 in), add sufficient sheets of Kraft paper to the target face of the cardboard in order to meet penetration requirements. Kraft paper should be the same type utilized for the pedestrian-controlled mower operator target.

The target panels shall generally be located perpendicular to a radial line extending 750 mm ± 50 mm (30 in ± 2 in) from the blade tip circle of single

spindle mowers, or to the nearest blade tip circle of multi-spindle mowers, as shown in Figure 5(d) to Figure 5(f). If the target panel interferes with a part of the mower such as a grass catcher, handle or wheel, the target shall be moved back to avoid such interference. For multi-spindle, mid-mounted center rear discharge mowers, the target should be located 380 mm (15 in) from the chute deflector.

The target shall be divided into elevation zones by horizontal lines as indicated in Figure 5(a). The lower elevation zone is defined by the area between the base and the 300 mm (12 in) line. The middle elevation zone is defined by the area between the 300 mm (12 in) and 450 mm (18 in) lines. The top elevation zone is defined by the area above the 450 mm (18 in) line to the top of the 900 mm (35.4 in) target.

24.3.7.1.2 Base

The test enclosure shall consist of a test fixture base of 19 mm (0.75 in) plywood covered with 500 mm (20 in) squares of coconut matting nailed to the plywood with nails spaced as shown in Figure 5(h) and Figure 5(i). The coconut matting shall have approximately 19 mm (0.75 in) high fibers embedded in a PVC base weighing approximately 7000 g/m^3 (1.43 lbm/ft^3). The minimum base size shall be 1500 mm (60 in) larger than the cutting width and 1500 mm (60 in) larger than the distance between the forward edge of the leading blade tip circle and the rear edge of the trailing blade tip circle shown in Figure 5(e) and Figure 5(f).

24.3.7.1.3 Target composition

A single target panel may be any of the following [see Figure 5(j)] that meets the penetration tests:

a) A single sheet of corrugated cardboard;

b) A single sheet of corrugated cardboard with sufficient sheets of appropriate Kraft paper added in front of the target face;

c) Two sheets of corrugated cardboard stacked together.

The cardboard construction may have two or three liners and have one or two flutes.

The sheet(s) of Kraft paper, which may be added to the face of the corrugated cardboard targets below 900 mm (35.4 in), may be any weight that allows them to meet the penetration requirements.

24.3.7.2 Five hundred projectiles consisting of 6.35 mm (0.25 inch) diameter steel balls (45 Rockwell C hardness minimum) shall be used.

24.3.7.3 Injection points shall be provided at the 12 o'clock position as shown in Figure 5(d) to Figure 5(f) and located at 25 mm ± 5 mm (1 in ± 0.25 in) inside the blade tip circle for the injection of projectiles. An injection point shall be provided for each blade of a multi-spindle mower.

The injection tube outlets shall be fixed and flush with the upper surface of the coconut matting [see Figure 5(i)] and the system shall be so arranged that the ball may be injected with variable velocity. The ball injection mechanism shall ensure consistent free rise heights within a range of 100 mm (4 in).

Adjust the velocity with which the ball is ejected so that the ball rises not less than 30 mm (1.25 in) above the surface of the coconut matting and within an angle of 10° of the vertical axis.

24.3.7.4 Test method

The test shall be conducted for each blade assembly. New blades shall be used for each test (500 projectiles) unless the blade is not damaged by projectile impact. New blades shall be used for the thrown object test if the deck/blade assembly has undergone the structural integrity test.

The mower blades shall be adjusted to a 30 mm (1.25 in) cut height or the next higher cutting position when set on a hard level surface. Machines with a maximum height setting of 30 mm (1.25 in) or less shall be set at their maximum height setting.

With the mower in place, the blade cutting height adjusted, and the engine operating at the manufacturer's specified maximum engine speed, allow balls one at a time into the mower. Increase the velocity of the ball in small increments until the mower blade hits each ball. This procedure is intended to ensure that the ball rise height is as low as possible and yet ensures regular blade impact with the ball. Start the test when this minimum velocity is established. Chipped or damaged balls shall be replaced.

Inject 500 projectiles into each injection point for each test. On multi-spindle mowers, the test shall be run for each spindle with the results evaluated for each test.

During any of the tests, in the event of excessive hits at a localized area, it may be necessary to repair or replace the target before continuing with the tests. Balls remaining within the test fixture (or on the test surface) may be removed at the option of the tester to minimize ricochet hits.

If a retest is required, a new blade shall be used for each test of 500 projectiles unless the blade is not damaged by impact with the projectiles.

Count and record hits. Projectiles that hit and damage the centerline of the target zone height line shall be scored with the target zone below that line.

24.3.7.5 Test acceptance

24.3.7.5.1 General

A test (500 projectiles) shall be run on each spindle. On multi-spindle mowers, the total hits for each spindle shall be added together and divided by the number of spindles to obtain an average number of hits, which is used for test acceptance.

24.3.7.5.2 Discharge mowers

For discharge mowers, there shall be no more than an average of 45 hits between the base and the 450 mm (18 in) line (lower and middle elevation zones) of which not more than six may be above the 300 mm (12 in) line (middle elevation zone). There shall be no hits above the 450 mm (18 in) line (top elevation zone).

24.3.7.5.3 All other mowers

For all other mowers, there shall be no more than an average of 30 hits between the base and the 450 mm (18 in) line (lower and middle elevation zones) of which not more than six may hit the target above the 300 mm (12 in) line (middle elevation zone). There shall be no hits above the 450 mm (18 in) line (top elevation zone) in accordance with Table 6. The average hits in any zone shall not exceed the number noted.

Table 6 – Average hits in any zone

Target Zone	Discharge Mowers	All Other Mowers
Total 0 – 450 mm (0 – 18 in)	45	30
300 > 450 mm (12 > 18 in)	6	6
450 > 900 mm (18 > 35.4 in)	0	0

24.3.7.5.4 Additional testing

In the event of a test failure, the same machine may be tested two more times or two additional machines may be tested. If the same machine or either of the additional machines fails a test, the model is considered not to be in compliance with the thrown objects requirement of this standard.

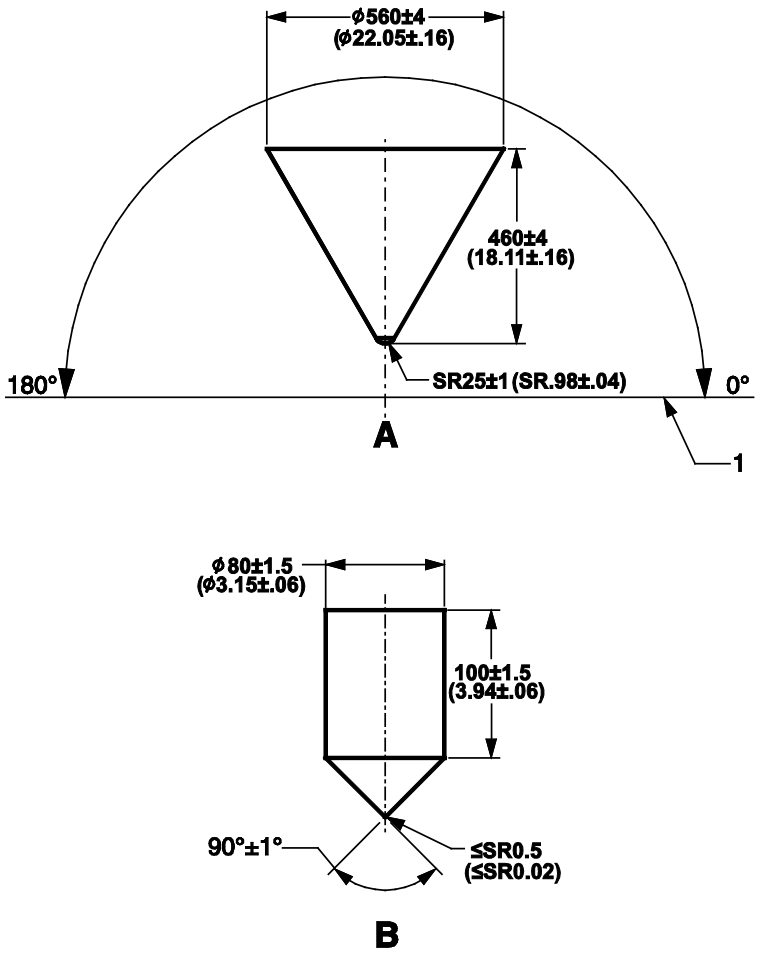
24.3.8 Probe test – Discharge openings

The blade enclosure shall be so designed and constructed that, with guards or deflectors, or both, securely fastened in the operating position and the mower support members in contact with the supporting surface, a probe, as shown in Figure 10(a), shall not enter the path of the blade assemblies when inserted as far as possible into the discharge openings at any point with a horizontal force of 20 N (4.5 lbf) or until the blade enclosure lifts from the original position, whichever occurs first. For purposes of the foot probe test, discharge chute deflectors are considered to be part of the blade enclosure. The probe shall be held in a vertical plane and rotated horizontally and vertically at a maximum of 15° each side of the centerline, as shown in Figure 10(b), (c), and shall be tested in all positions within those rotation limits. A portion of the foot probe shall always remain on the test surface. Tests shall be made with the blades in the highest and lowest cutting positions. If the blade path height is different at different blade speeds, the test shall be so conducted as to include the two blade height extremes. The test shall be conducted under static conditions. Components of mowers or machines, or both (such as wheels, frames, and other components), may be considered as part of the blade enclosure for the purposes of this test.

24.4 Blade speed

The maximum tip speed of any blade shall not be greater than 5791 m/min (19000 ft/min).

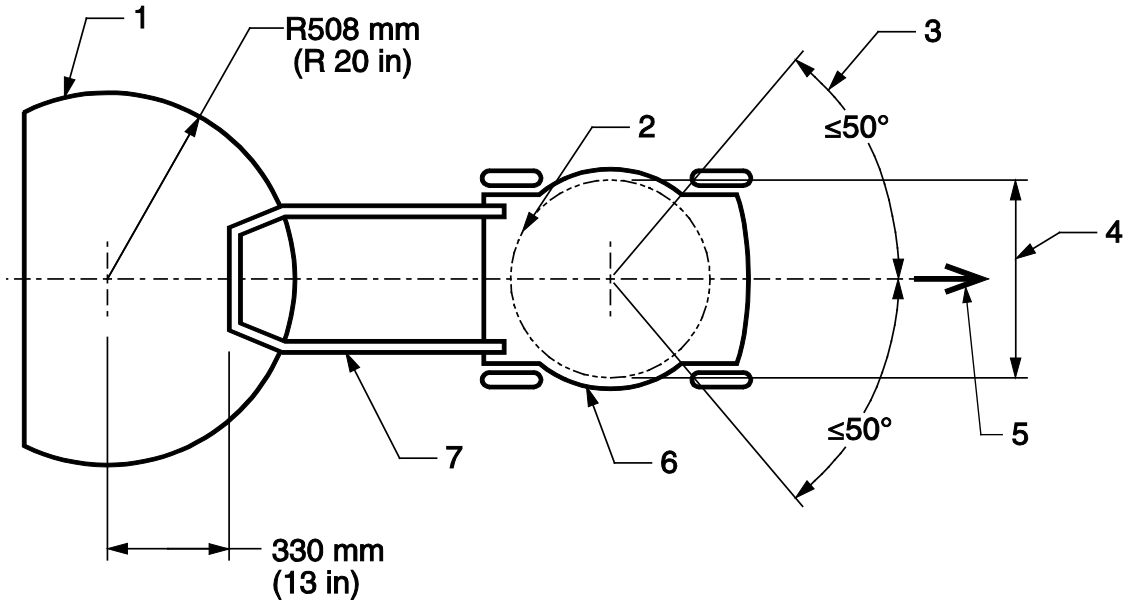
Dimensions in millimeters (inches)



Key:

1 Horizontal plane

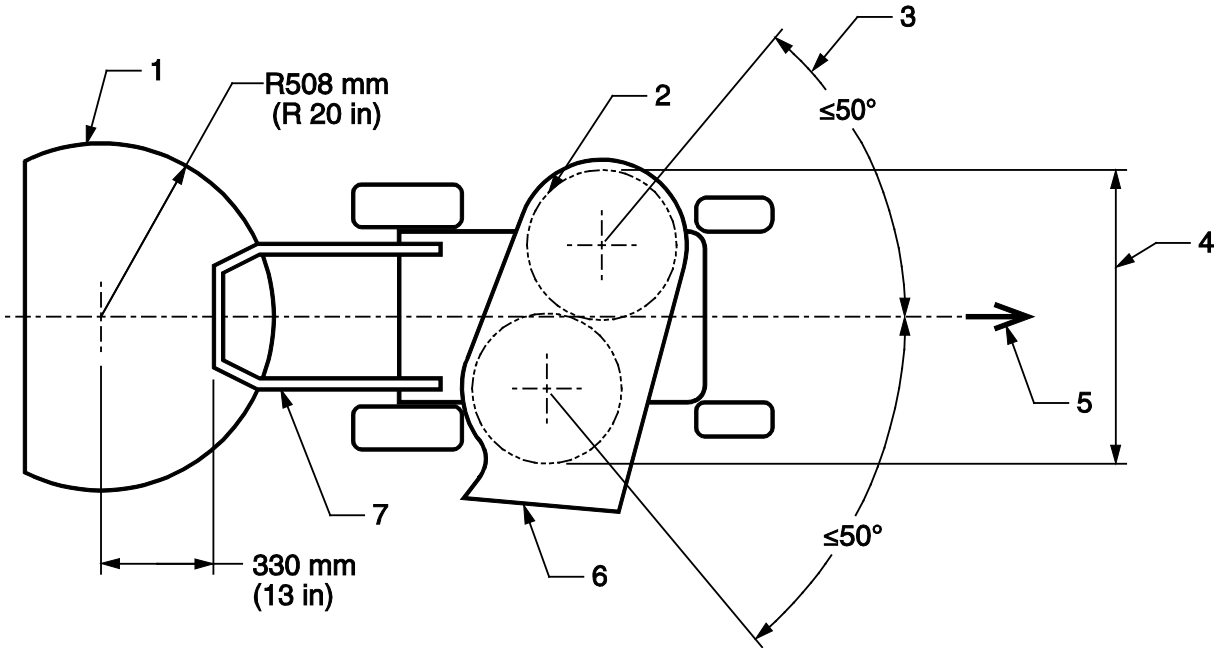
Figure 1 – Test cones for the determination of hot parts accessibility



Key:

1 Operator zone
2 Blade tip circle
3 Limits of blade enclosure, front
4 Width of cut
5 Direction of travel
6 Blade enclosure
7 Handle, against upstop

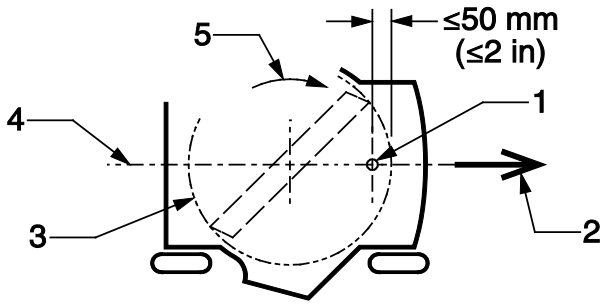
Figure 2 – Single-spindle pedestrian-controlled mower



Key:

1 Operator zone
2 Blade tip circle
3 Limits of blade enclosure, front
4 Width of cut
5 Direction of travel
6 Blade enclosure
7 Handle, against upstop

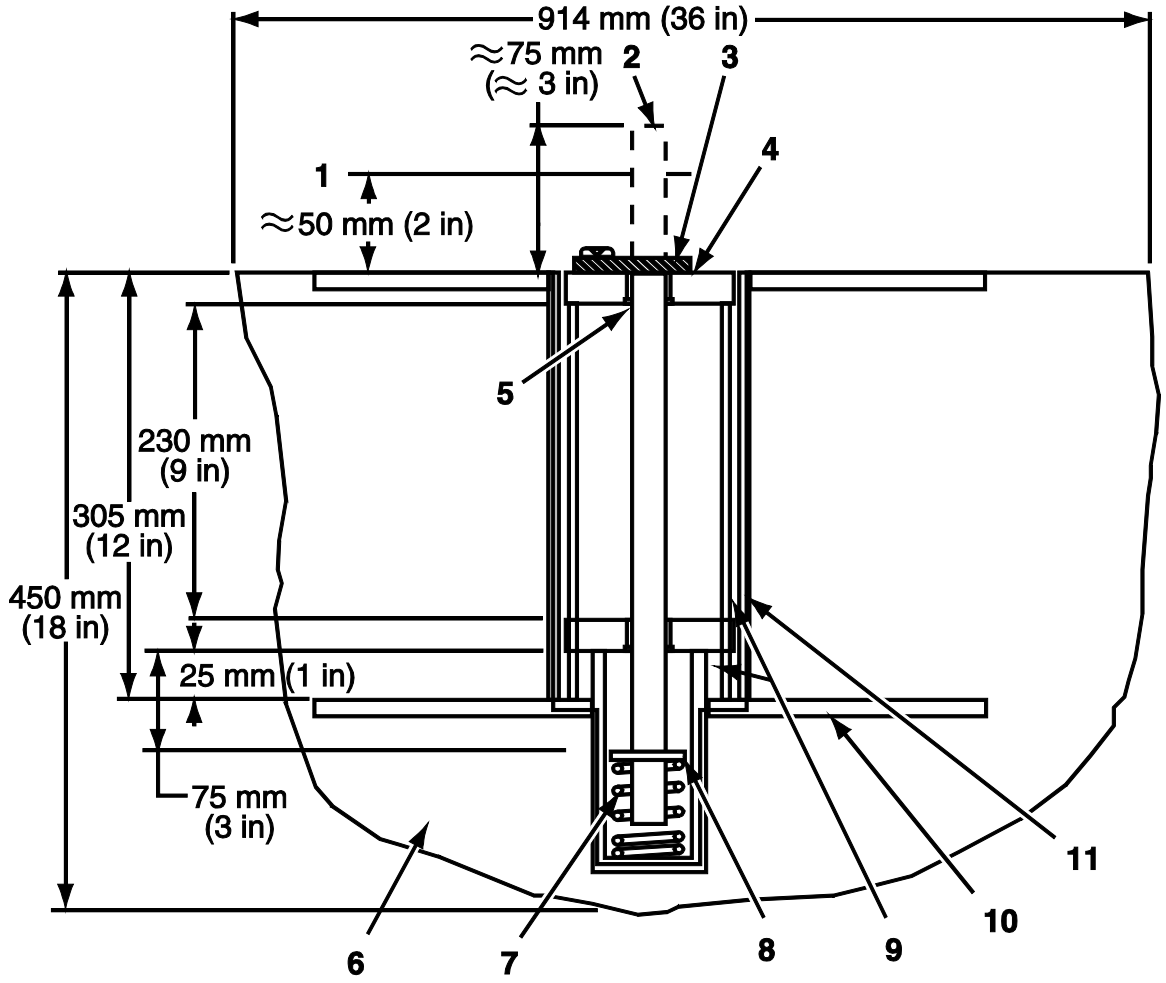
Figure 3 – Multi-spindle pedestrian-controlled mower



Key:

1 Steel rod (see Figure 4b)
2 Direction of travel
3 Blade tip circle
4 Centerline
5 Direction of blade rotation

Figure 4(a) – Impact test fixture, schematic plan view



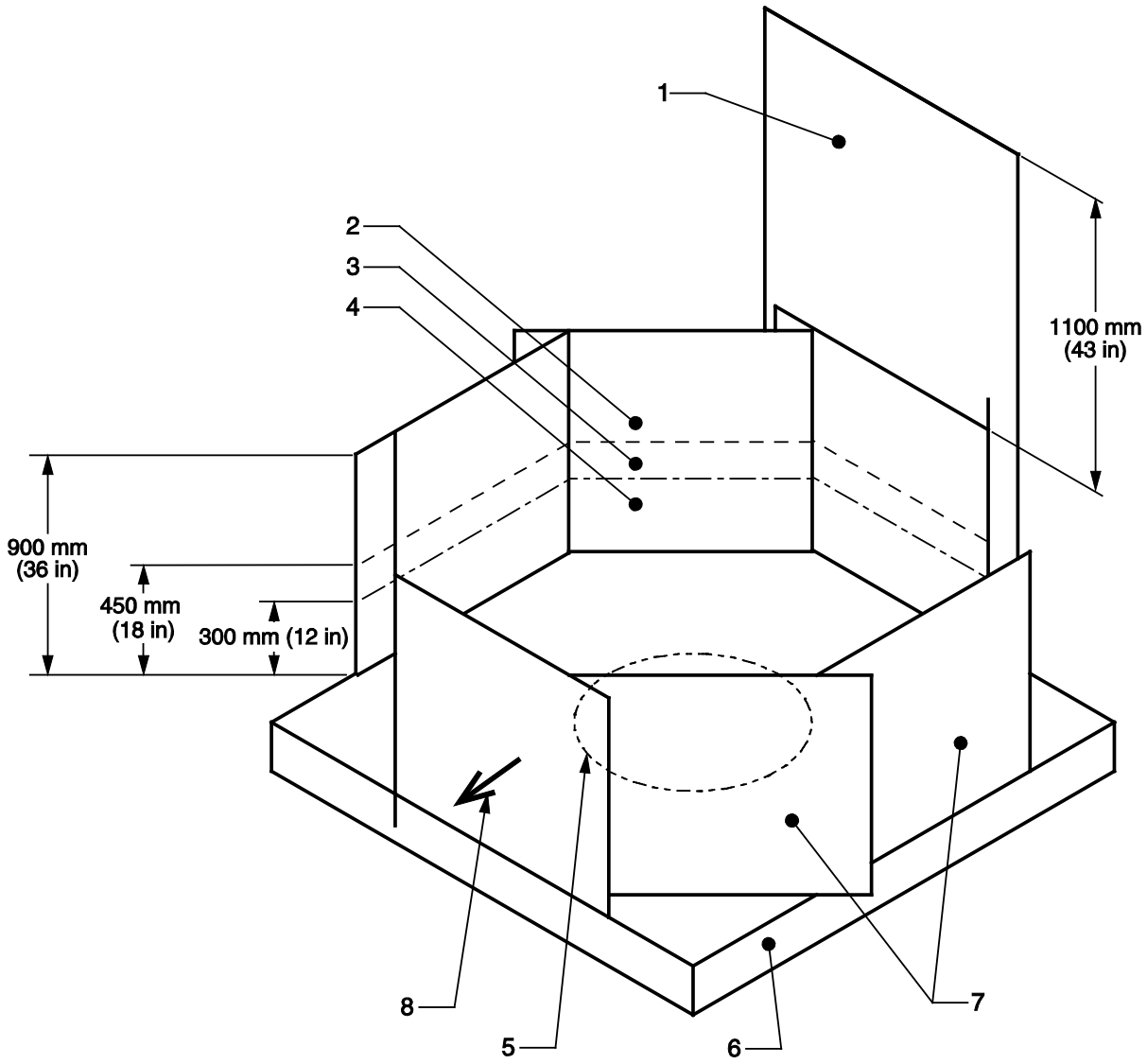
Key:

1 Blade height
2 25.4 mm (1 in) diameter, SAE 1117 free-cutting steel rod, released position
3 Remote control actuating lever
4 25.4 mm (1 in) thick, 1045 or 1086, etc. 28.6 mm (1.12 in) diameter hole in center. Heat treat to 350-450 Brinell hardness test. Parts must fit in inner diameter of standard (101.6 mm (4 in)) pipe with 1.52 to 3.05 mm (0.06 – 0.12 in) clearance. Identical parts both ends.
5 Chamfer, 3 mm x 45° (0.12 in x 45°)
6 Concrete
7 Compression spring, specifications, for reference only:

Free length:	165.1 mm (6.5 in)
Wire diameter:	2.794 mm (0.110 in)
Coils:	0.078 coil/mm (2 coils/in)
Mean diameter:	31.75 mm (1.25 in)
Spring rate:	2.28 N/mm (13 lbf/in)

8 Pin or washer
9 76.2 mm (3 in) standard pipe
10 12.7 mm (0.5 in) plate (2 places)
11 101.6 mm x 304.8 mm (4 in x 12 in) standard pipe

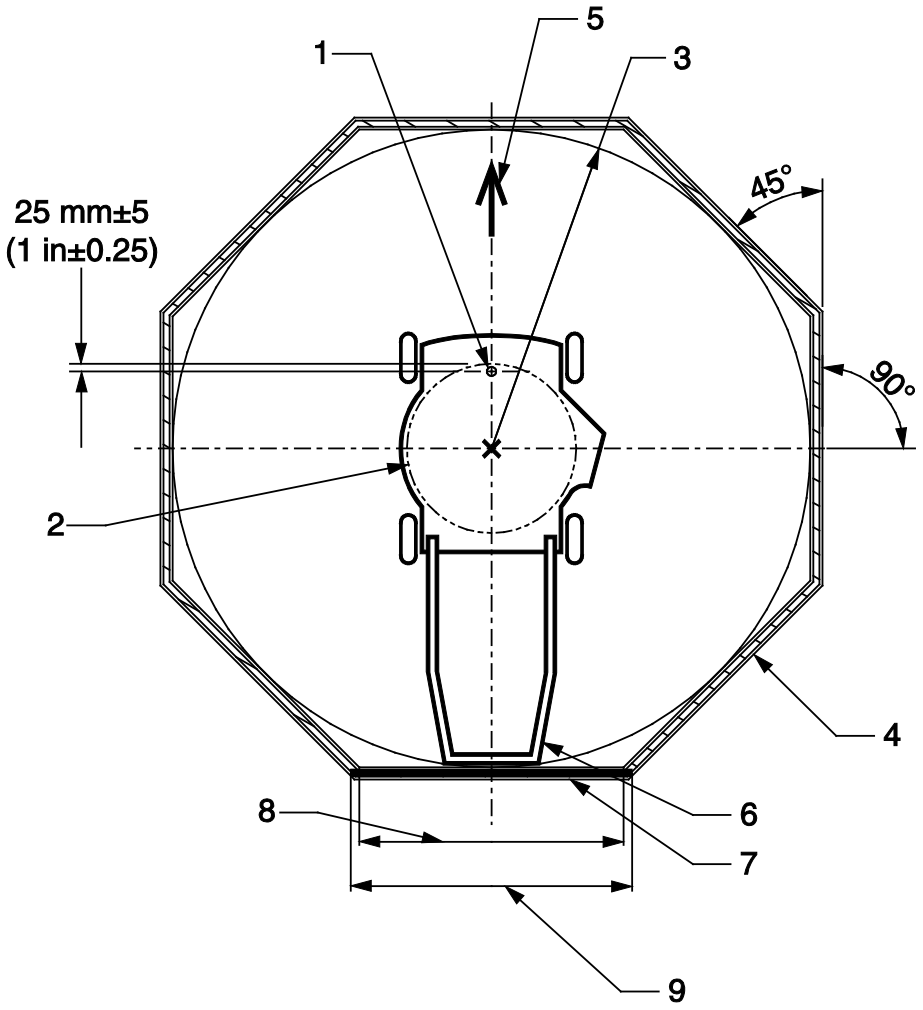
Figure 4(b) – Impact test fixture, test arrangement



Key:

1 Top operator target area (single thickness Kraft paper target panel for pedestrian lawnmowers only)
2 Top target area
3 Middle target area
4 Lower target area
5 Removable area
6 Base (see B71.1 Figure 5i; B71.4 Figure 11i)
7 Eight cardboard target panels with flutes vertical (see B71.1 Figure 5(j))
8 Machine front

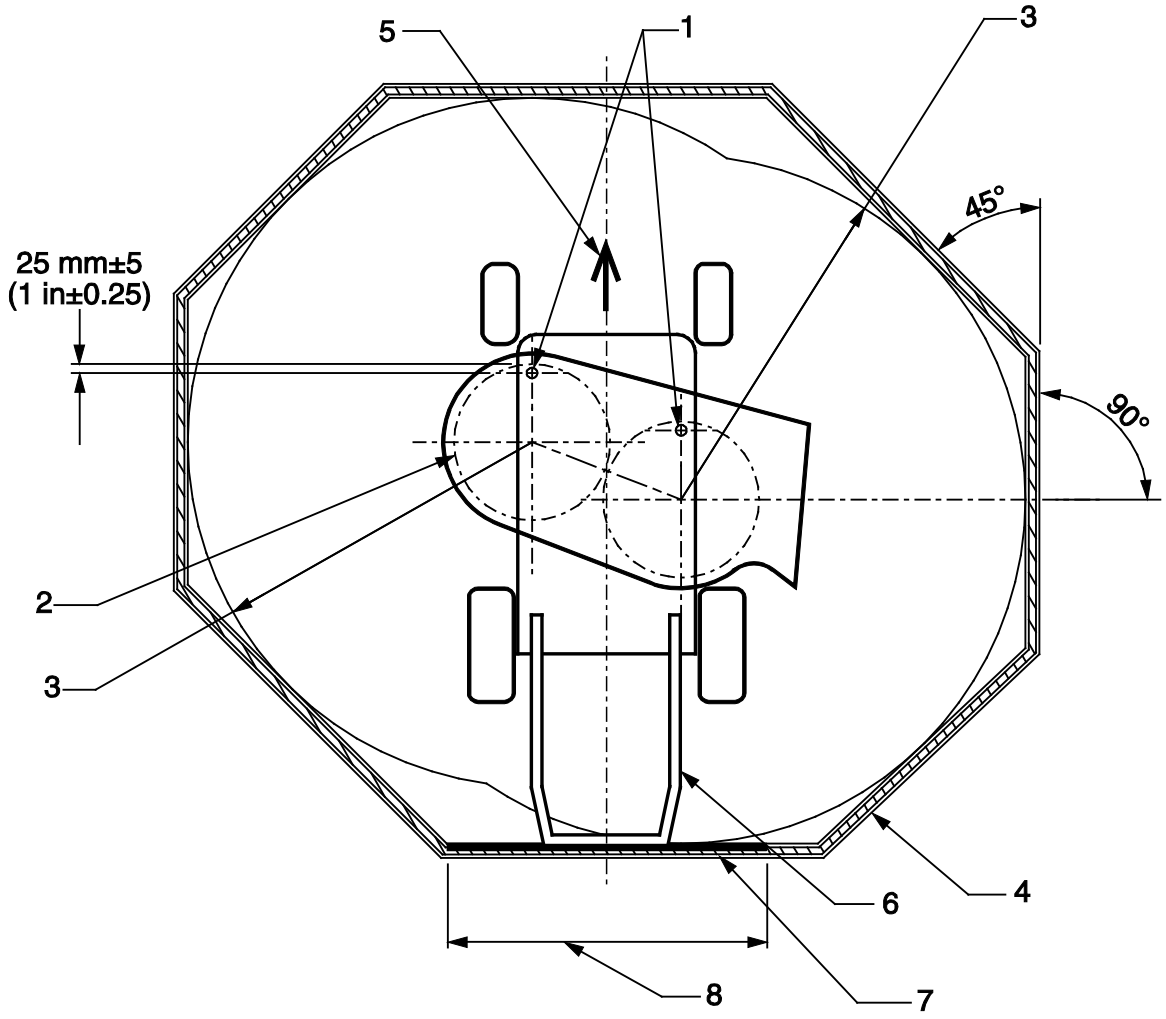
Figure 5(a) – Test enclosure, general layout



Key:

1 Injection point
2 Blade tip circle
3 $R = 750\ \text{mm} + \frac{BTC}{2} \pm 50\ (R = 30\ \text{in} + \frac{BTC}{2} \pm 2)$ **where BTC = blade tip circle. If interference occurs between machine and target panels, move target panels just to clear.**
4 Typical target, 900 mm (35.4 in) high
5 Machine front
6 Handle, against upper stop
7 Upper operator target area, above lower cardboard target panel, 900 mm (35.4 in) to 2000 mm (79 in) (Kraft paper)
8 Width of cardboard target panel
9 Width of upper operator target. Refer to Section 10.3.7.1.1

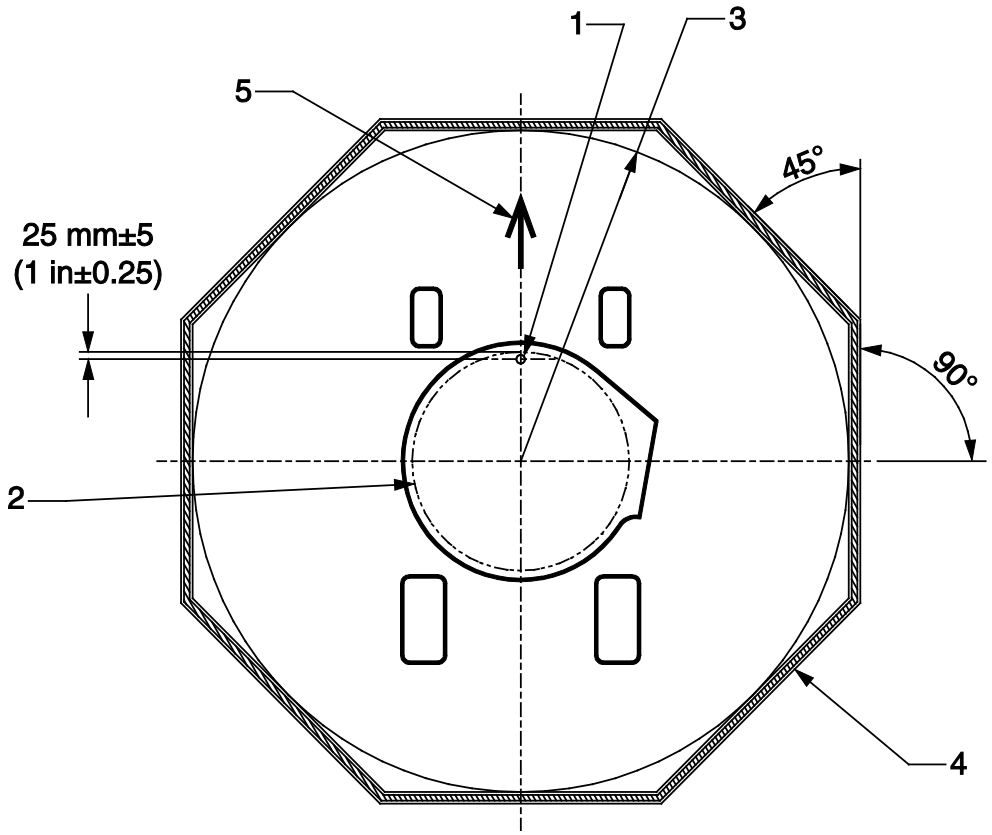
Figure 5(b) – Single-spindle pedestrian-controlled mower – test enclosure



Key:

1 Injection points (1 per spindle)
2 Blade tip circle
3 $R = 750\ \text{mm} + \frac{BTC}{2} \pm 50\ (R = 30\ \text{in} + \frac{BTC}{2} \pm 2)$ **where BTC = blade tip circle. If interference occurs between machine and target panels, move target panels just to clear.**
4 Typical target, 900 mm (35.4 in) high
5 Machine front
6 Handle, against upper stop
7 Upper operator target area, above lower cardboard target panel, 900 mm (35.4 in) to 2000 mm (79 in) (Kraft paper)
8 Width of upper operator target. Refer to Section 10.3.7.1.1

Figure 5(c) - Multi-spindle pedestrian-controlled mower – test enclosure

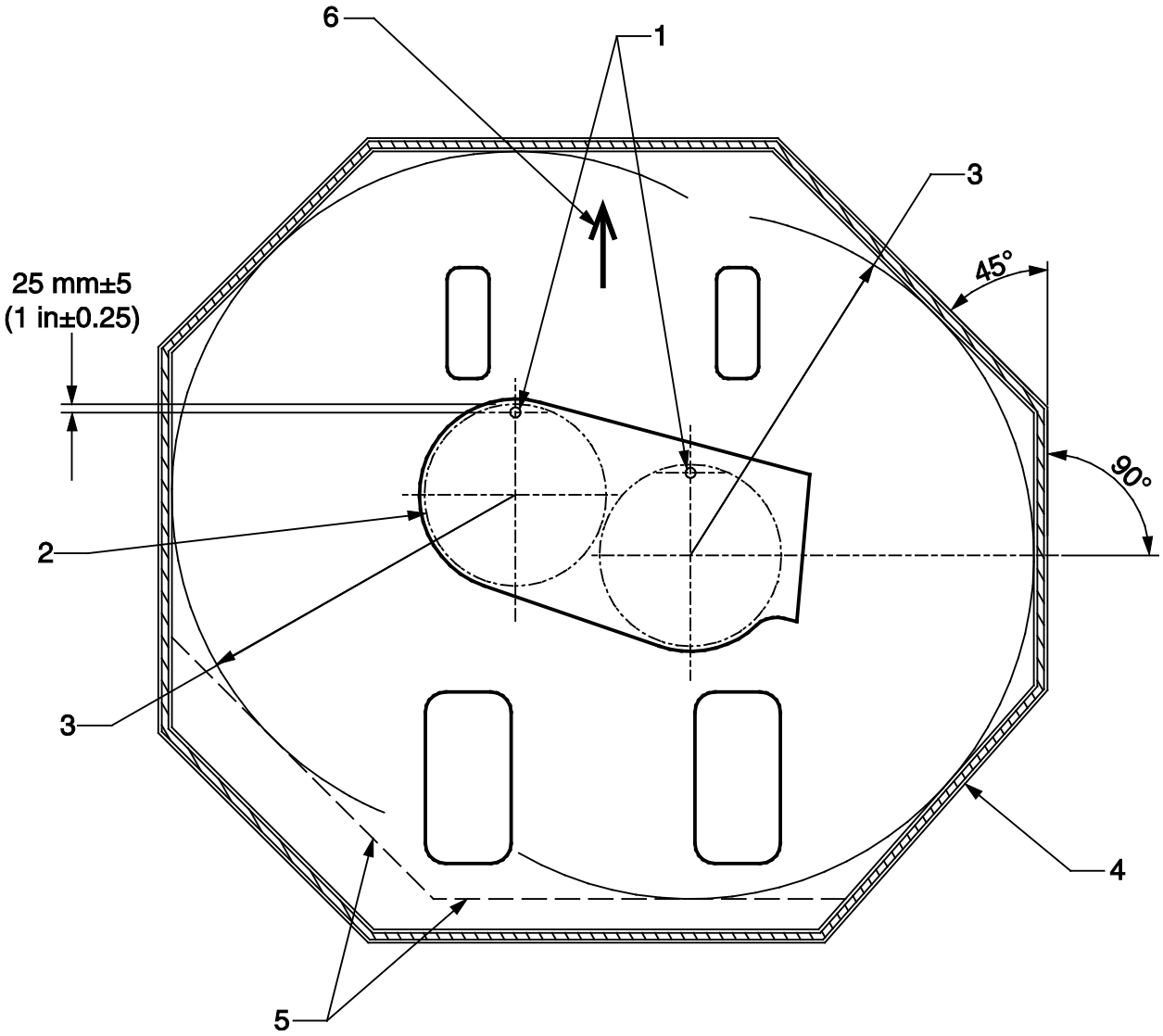


Key:

1 Injection point
2 Blade tip circle
3 $R = 750\,\text{mm} + \frac{BTC}{2} \pm 50\ (R = 30\,\text{in} + \frac{BTC}{2} \pm 2)$ **where BTC = blade tip circle. If interference occurs between machine and target panels, move target panels just to clear.**
4 Eight target panels, 900 mm (35.4 in) high
5 Machine front

Figure 5(d) – Single-spindle ride-on mower - test enclosure

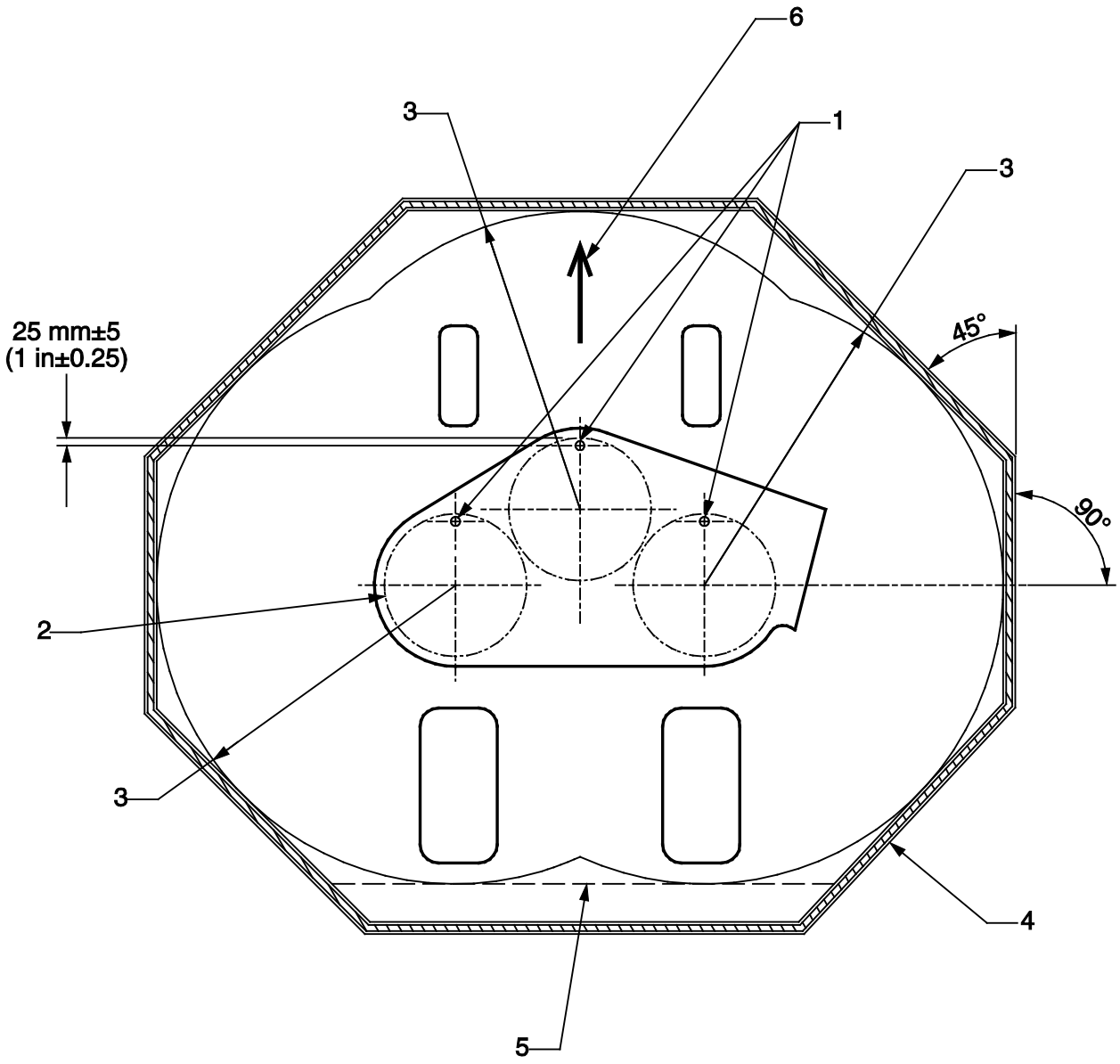
.



Key:

1 Injection points (1 per spindle)
2 Blade tip circle
3 $R = 750\,\text{mm} + \frac{BTC}{2} \pm 50\ (R = 30\,\text{in} + \frac{BTC}{2} \pm 2)$ **where BTC = cutting means tip circle. If interference occurs between machine and target panels, move target panels just to clear.**
4 Eight target panels, 900 mm (35.4 in) high
5 Clearance between target panels and machine
6 Machine front

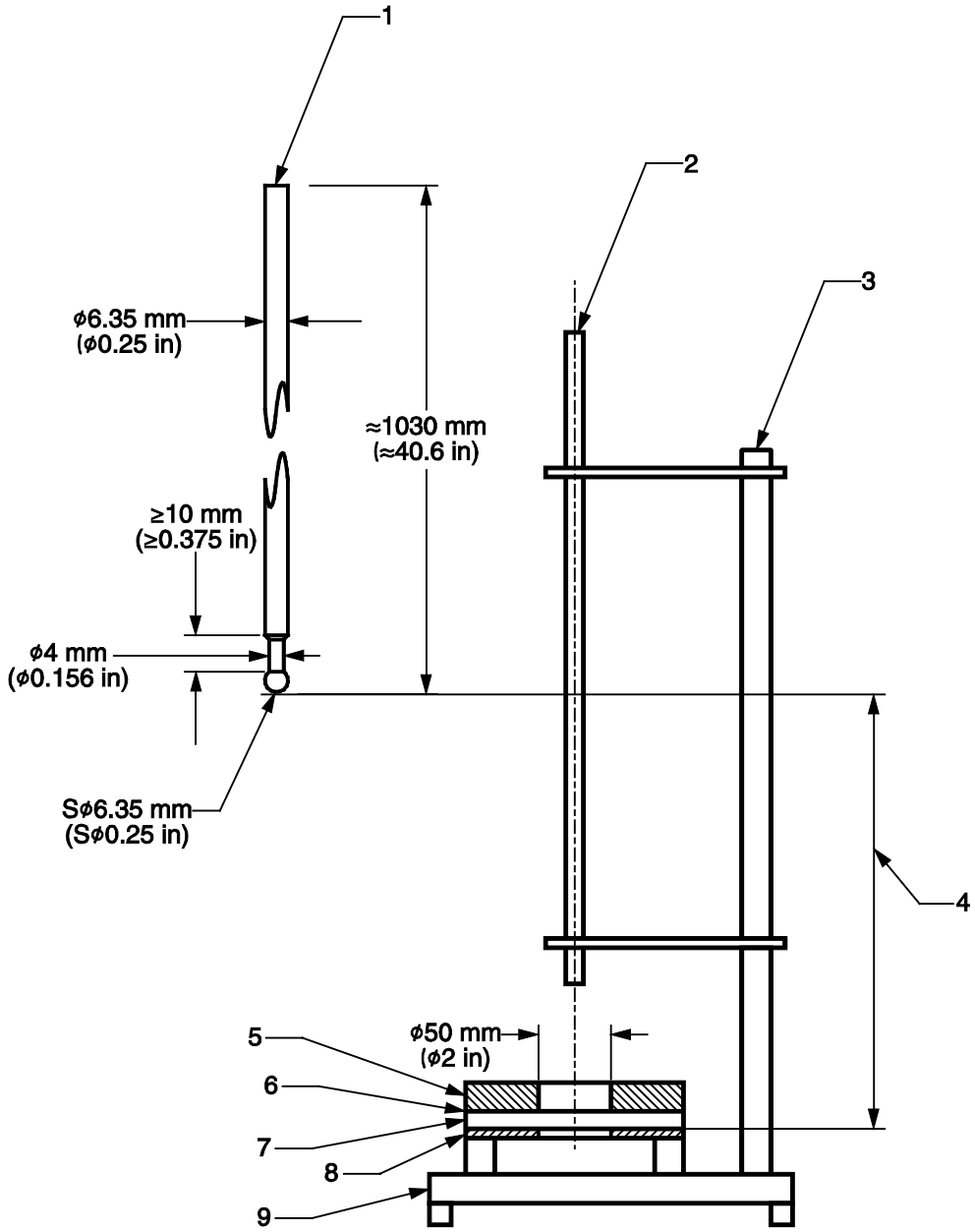
Figure 5(e) – Two spindle ride-on mower - test enclosure



Key:

1 Injection points (1 per spindle)
2 Blade tip circle
3 $R = 750\,\text{mm} + \frac{BTC}{2} \pm 50\ (R = 30\,\text{in} + \frac{BTC}{2} \pm 2)$ **where BTC = cutting means tip circle. If interference occurs between machine and target panels, move target panels just to clear.**
4 Eight target panels, 900 mm (35.4 in) high
5 Clearance between target panels and machine
6 Machine front

Figure 5(f) – Three spindle ride-on mower - test enclosure



Key:

1 **Penetrator: mass 0.25 kg (0.55 lbm)**
2 **Guide tube, vertical ± 2°**
3 **Support**
4 **Drop height**
5 **20 mm X 150 mm X 150 mm (0.75 in X 6 in X 6 in), steel top plate**
6 **Add extra Kraft paper here**
7 **Cardboard sample**
8 **6.35 mm X 150 mm X 150 mm (0.25 in X 6 in X 6 in), steel bottom plate**
9 **Base plate**

(Note: figure varies in scale)

Figure 5(g) – Test fixture for corrugated cardboard penetration tests

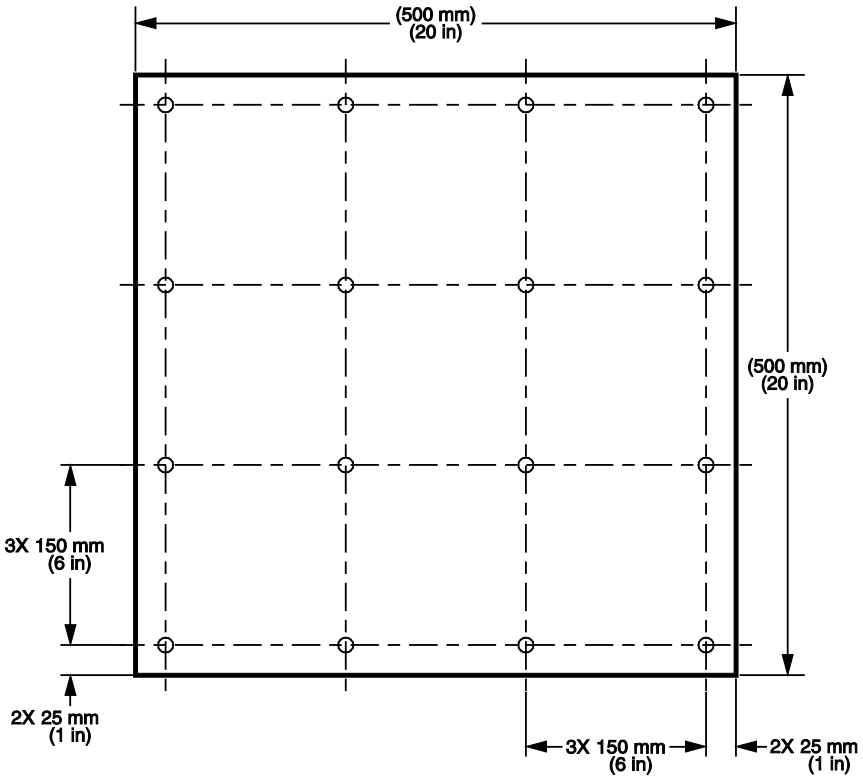
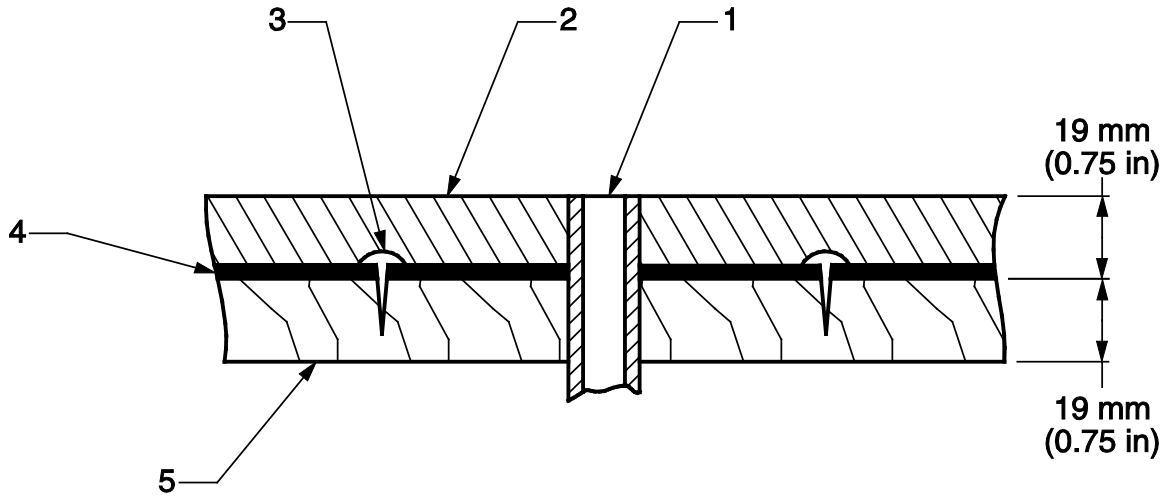


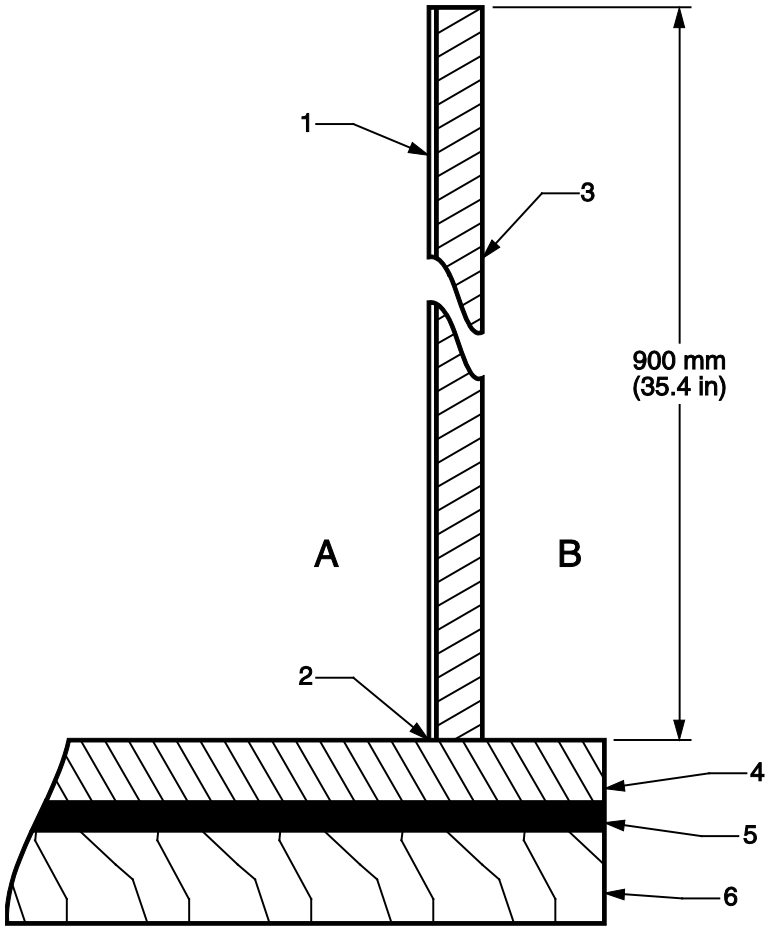
Figure 5(h) – Nail plan of test fixture base



Key:

1 Top of injection tube level with or below surface of matting
2 Coconut matting
3 Nail
4 PVC
5 Plywood base

Figure 5(i) – Thrown object test fixture – base detail



Key:

A Inside of test enclosure
B Outside of test enclosure
1 Kraft paper, used as necessary and spot glued to the inside surface of the target panels to ensure close proximity over the entire area.
2 Target panel inside edges fit snugly to base surface to prevent balls from escaping from test enclosure.
3 Target panels made of a single sheet of single or double flute corrugated cardboard with flutes running vertically.
4 Coconut matting
5 PVC base for coconut matting
6 Plywood base

Figure 5(j) – Test enclosure walls and base

Figure 6 – Safety instructions for pedestrian-controlled and ride-on mowers

IMPORTANT

Safe Practices for Pedestrian-Controlled and Ride-On Mowers

This machine is capable of amputating hands and feet and throwing objects. Failure to observe the following safety instructions could result in serious injury or death.

I. GENERAL INFORMATION

1. Read, understand, and follow instructions and warnings in this manual and on the machine, engine and attachments.
2. Only allow operators, who are responsible, trained, familiar with the instructions, and physically capable to operate the machine.
3. Do not carry passengers and keep bystanders away.
4. Do not operate the machine while under the influence of alcohol or drugs.
5. Follow the manufacturer's recommendation for wheel weights or counterweights.

II. PREPARATION BEFORE OPERATING

1. Clear the operating area of any objects which could be thrown by or interfere with operation of the machine.
2. Keep the area of operation clear of all bystanders, particularly small children. Stop the machine and attachment(s) if anyone enters the area.
3. Do not operate the machine without the entire grass catcher, discharge chute, or other safety devices in place and functioning properly. Check frequently for signs of wear or deterioration and replace as needed.
4. Wear appropriate personal protective equipment such as safety glasses, hearing protection, and footwear.

III. OPERATING

1. Only operate the engine in well ventilated areas. Exhaust gases contain carbon monoxide, a deadly poison.
2. Only operate the machine in daylight or good artificial light.
3. Avoid holes, ruts, bumps, rocks, or other hidden hazards. Uneven terrain could overturn the machine, or cause operator to lose their balance or footing.
4. Do not put hands or feet near rotating parts or under the machine. Keep clear of the discharge opening at all times.
5. Do not direct discharge material toward anyone. Avoid discharging material against a wall or obstruction. Material may ricochet back toward the operator. Stop the blade(s) when crossing gravel surfaces.
6. Do not leave a running machine unattended. Always park on level ground, disengage the attachment, set parking brake, and stop engine.
7. Do not mow in reverse unless absolutely necessary. Always look down and behind before and while backing.

IV. CHILDREN SPECIFIC

1. Tragic accidents can occur if the operator is not alert to the presence of children. Children are often attracted to the machine and the mowing activity. *Never* assume that children will remain where you last saw them.

2. Keep children out of the operating area and under the watchful care of a responsible adult other than the operator.
3. Do not carry children, even with the blade(s) shut off. Children could fall off and be seriously injured or interfere with safe machine operation. Children who have been given rides in the past could suddenly appear in the mowing area for another ride and be run over or backed over by the machine.*

V. SLOPE SPECIFIC

Slopes are a major factor related to accidents. Operation on slopes requires extra caution.

1. Travel in the manufacturer recommended direction on slopes. Use caution while operating near drop-offs.
2. Avoid mowing wet grass. (Poor footing could cause a slip and fall accident.**)
3. Do not operate machine under any condition where traction, steering, or stability is in question. Tires could slide even if the wheels are stopped.
4. Always keep the machine in gear when going down slopes. Do not coast downhill.
5. Avoid starting and stopping on slopes. Avoid making sudden changes in speed or direction. Make turns slowly and gradually.
6. Use extra care while operating machine with a grass catcher or other attachment(s). They can affect the stability of the machine.

VI. FIRE AND FUEL SPECIFIC

1. Extinguish all cigarettes, cigars, pipes and other sources of ignition.
2. Use only an approved fuel container.
3. Do not remove fuel cap or add fuel with the engine running or while hot.
4. Do not refuel indoors or in enclosed spaces.
5. Do not store the machine or fuel container, or refuel, where there is an open flame, spark, or pilot light such as on a water heater or other appliance.
6. If fuel is spilled, do not attempt to start the engine and avoid creating any source of ignition until fuel vapors have dissipated.
7. To help prevent fires: keep machine free of grass, leaves, or other debris build up; clean up oil or fuel spillage and remove any fuel soaked debris; allow machine to cool before storing.
8. Use extra care in handling gasoline and other fuels. They are flammable and vapors are explosive.

VII. HAULING

1. Use full width ramps for loading and unloading a machine for transport.

VIII. TOWING*

1. Follow the manufacturer’s recommendation for weight limits for towed equipment and towing on slopes.*

IX. ROPS*

1. The ROPS is an integral and effective safety device. Do not remove or alter the ROPS.*
2. Keep a folding ROPS in the raised and locked position and use the seat belt when operating the machine.*
3. Lower a folding ROPS temporarily only when absolutely necessary. Do not wear the seat belt when folded down. There is no rollover protection when a folding ROPS is in the down position.*

4. Replace a damaged ROPS. Do not repair or alter.*

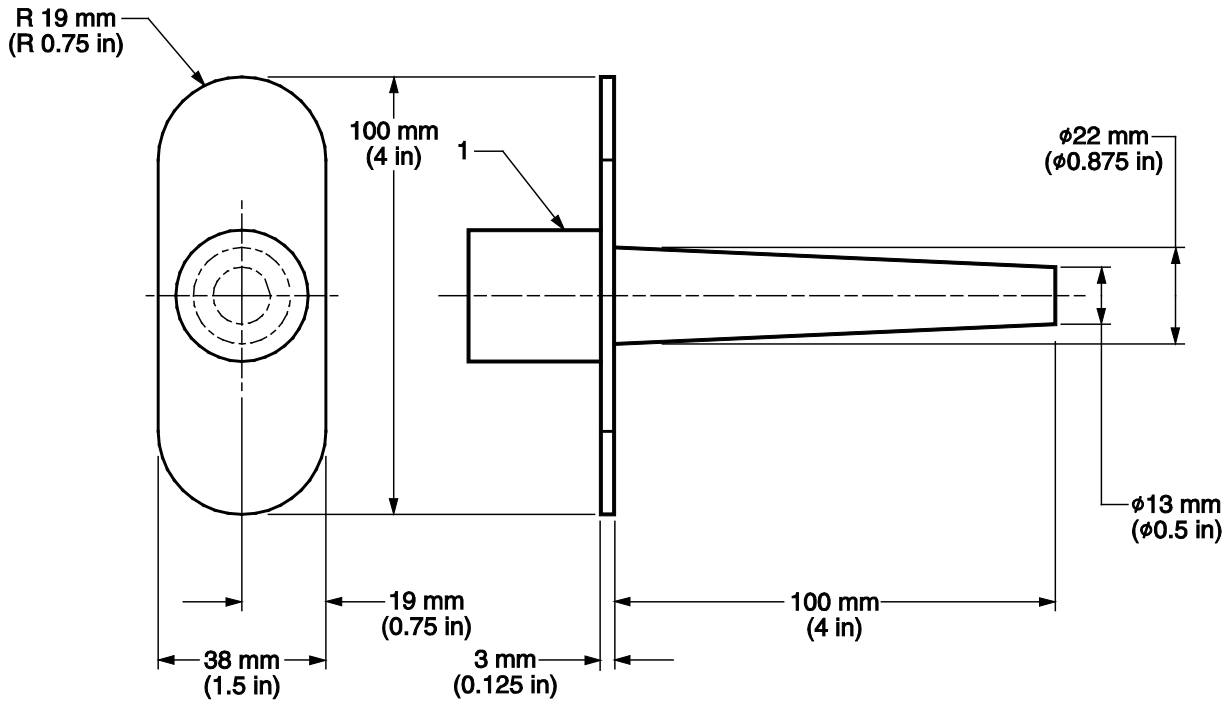
X. SERVICE

1. Keep machine in good working order. Replace worn or damaged parts.
2. Use caution when servicing blades. Wrap the blade(s) or wear gloves. Replace damaged blades. Do not repair or alter blade(s).
3. Machines with hydraulic pumps, hoses, or motors; and/or diesel injection systems:

   WARNING: Fluid escaping under pressure may have sufficient force to penetrate skin and cause serious injury. If fluid is injected into the skin, seek immediate medical attention. Keep body and hands away from pin holes or nozzles that eject fluid under high pressure. If a leak occurs, have the machine immediately serviced by a trained technician.
4. If equipped, disconnect spark plug wire(s) and the negative battery cable before making any repairs.

* Applicable to ONLY Ride-on Mowers.

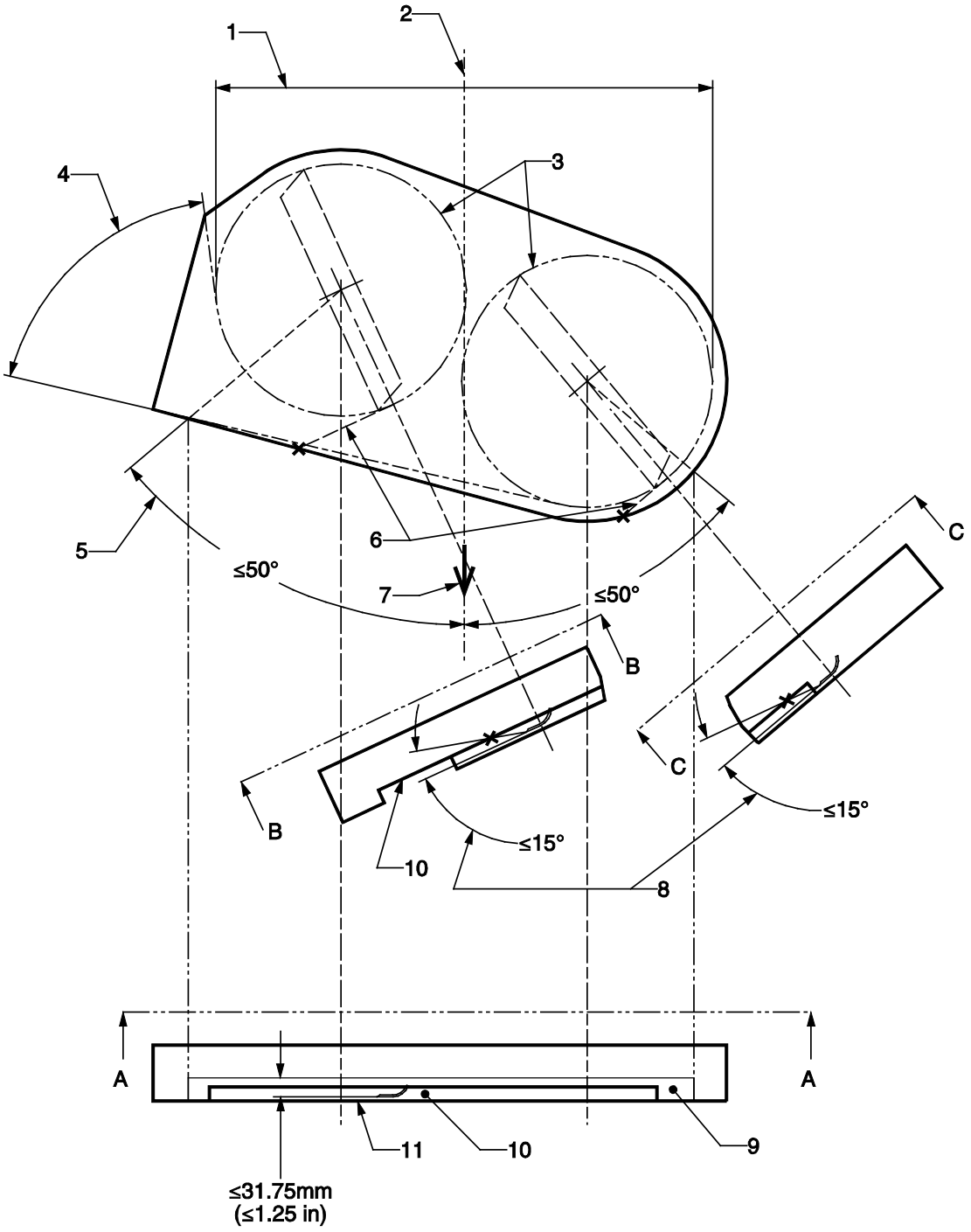
** Applicable to ONLY Pedestrian-Controlled Mowers.



Key:

1 Suitable handle, optional

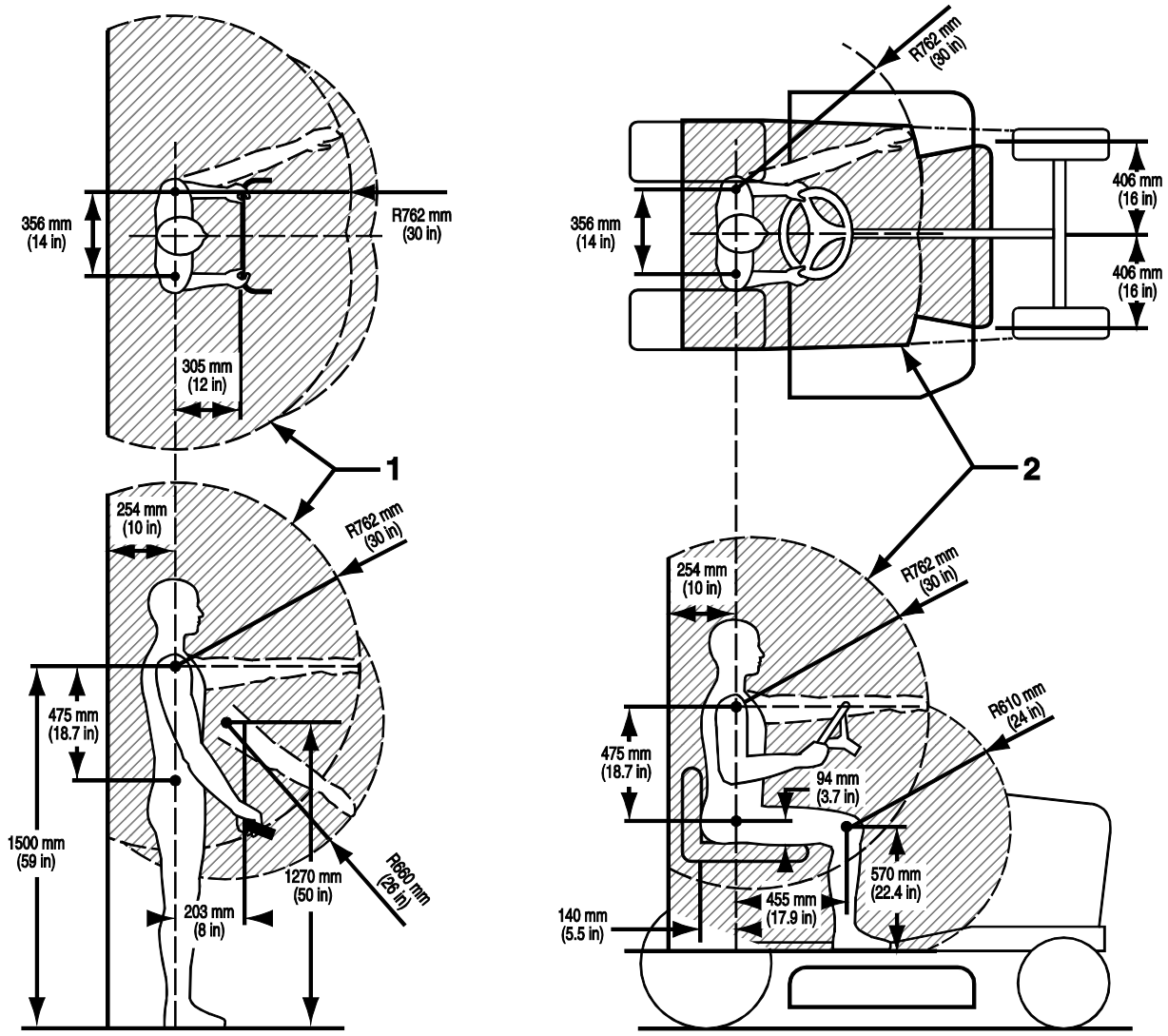
Figure 7 – Finger probe



Key:

1	Width of cut	5	Limits of blade enclosure, front	9	Maximum permissible blade opening, front
2	Machine centerline	6	Tangent line from blade tip circle to blade enclosure	10	Opening, blade enclosure, front, limited by opening angle
3	Blade tip circle	7	Direction of travel		
4	Horizontal Angle of discharge opening	8	Vertical angle of opening, each blade	11	Lower edge of blade enclosure

Figure 8 – Characteristic dimensions for a blade enclosure



Key:

1 Operator zone for standing operator
2 Operator zone for seated operator

Figure 9 – Operator zones for 95th percentile man

NOTES

1 The operator zone, illustrated in Figure 9, is the area into which the extremities of a 95th percentile male can reach from the normal operating position.

2 On riding units, the zone is established with the seat in the rearward adjustment position. A 102 mm (4 in) forward adjustment will approximate the position of a 5th percentile male or a 50th percentile female.

3 On pedestrian-controlled units, the lowest forward zone is the area into which a 5th percentile male or a 50th percentile female can reach when against the handle barrier. This zone can also be reached by a 95th percentile male leaning forward against the handle barrier.

4 All barriers within the operator zone will reduce the zone by the space occupied and protected by the barrier.

5 The operator zone includes the maximum range of all frequently used operator control movement but is not intended to represent preferred operator control positions.

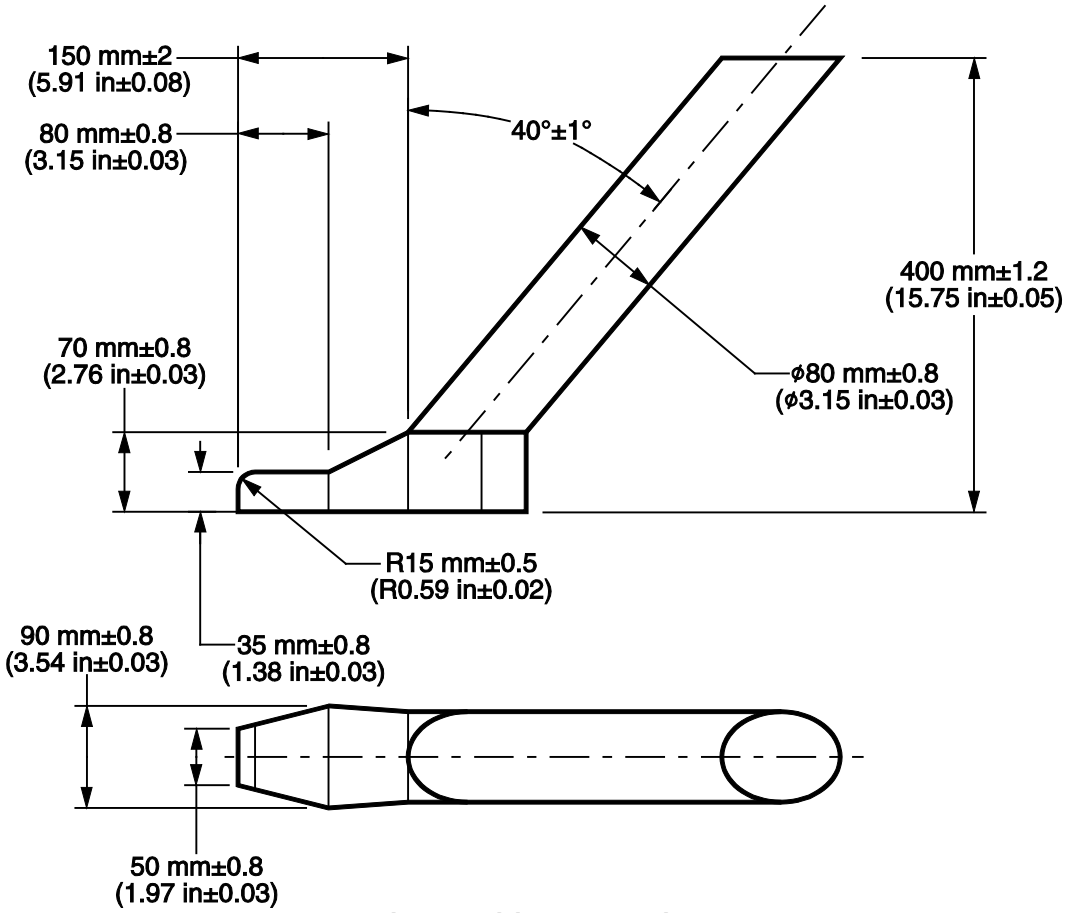
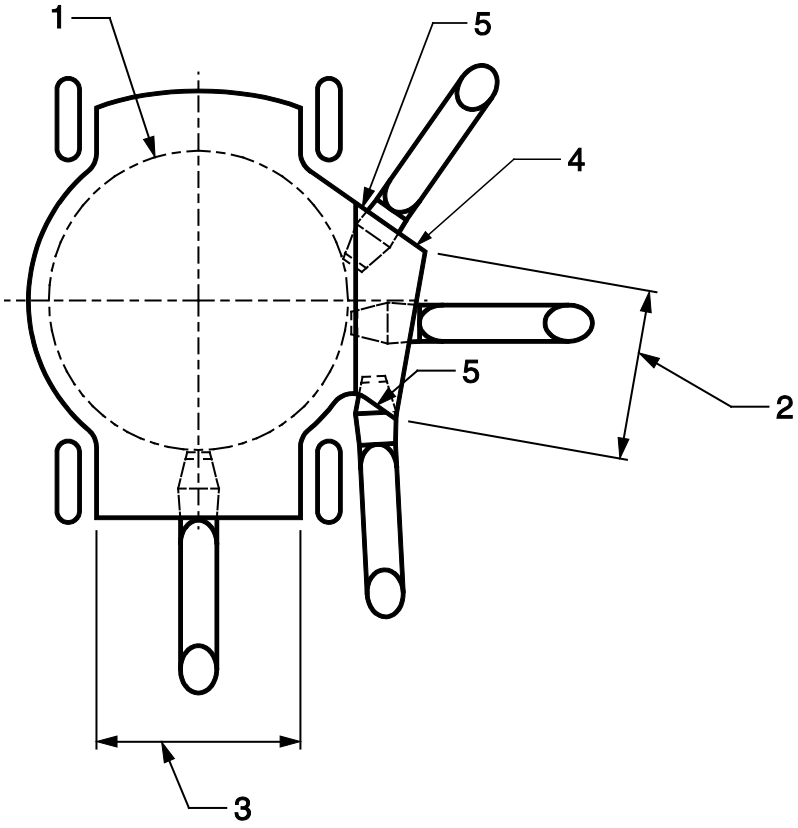


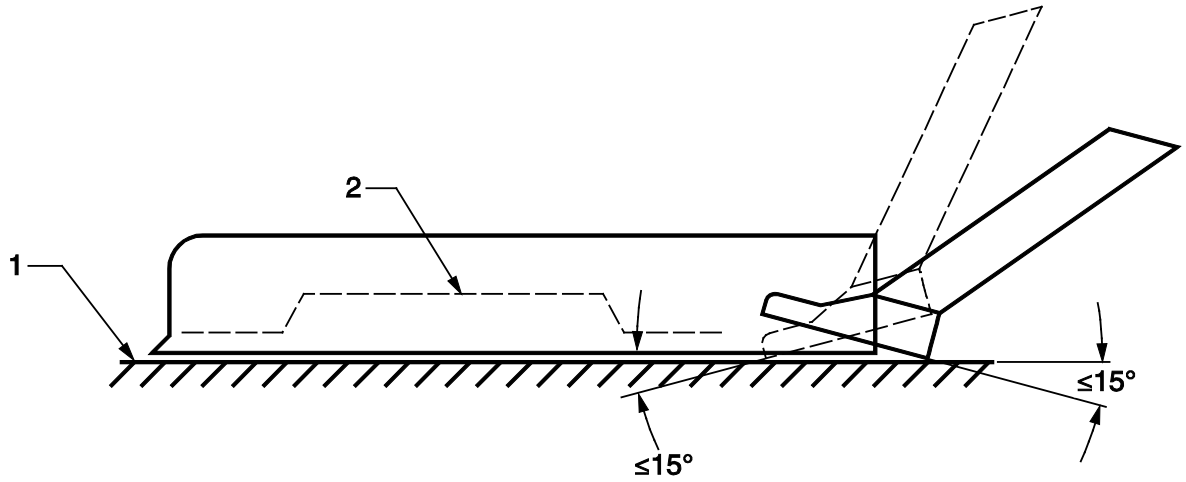
Figure 10(a) – Foot probe



Key:

1 Blade tip circle
2 Area to be probed (discharge opening)
3 Area to be probed (pedestrian-controlled mowers, part of machine facing operator zone)
4 Discharge chute
5 Probe sides of discharge chute if less than 3 mm (0.12 in) below plane of blade tip circle

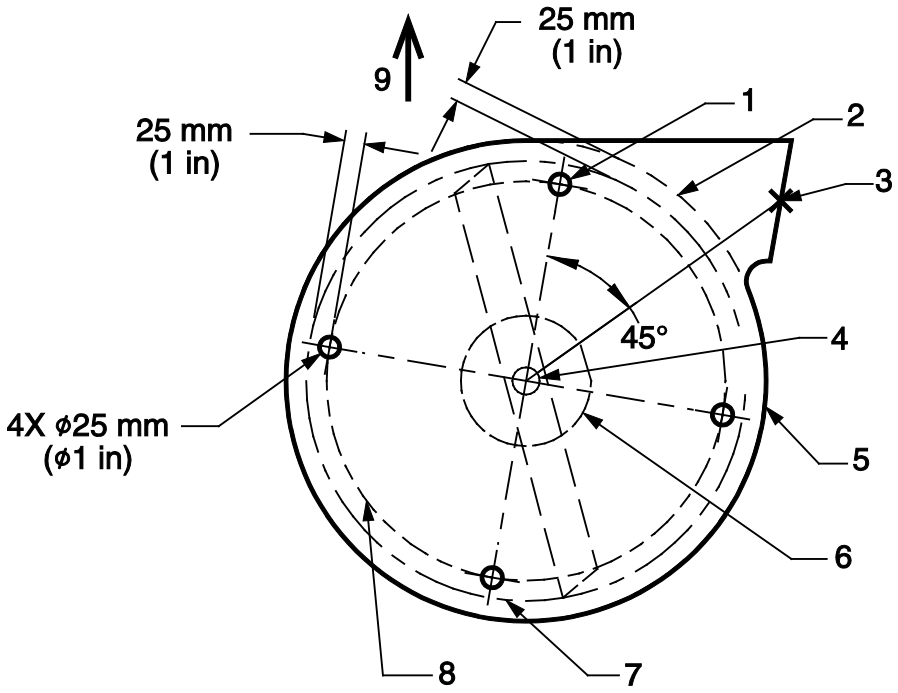
Figure 10(b) – Foot probe, schematic plan view



Key:

1 Ground level
2 Blade

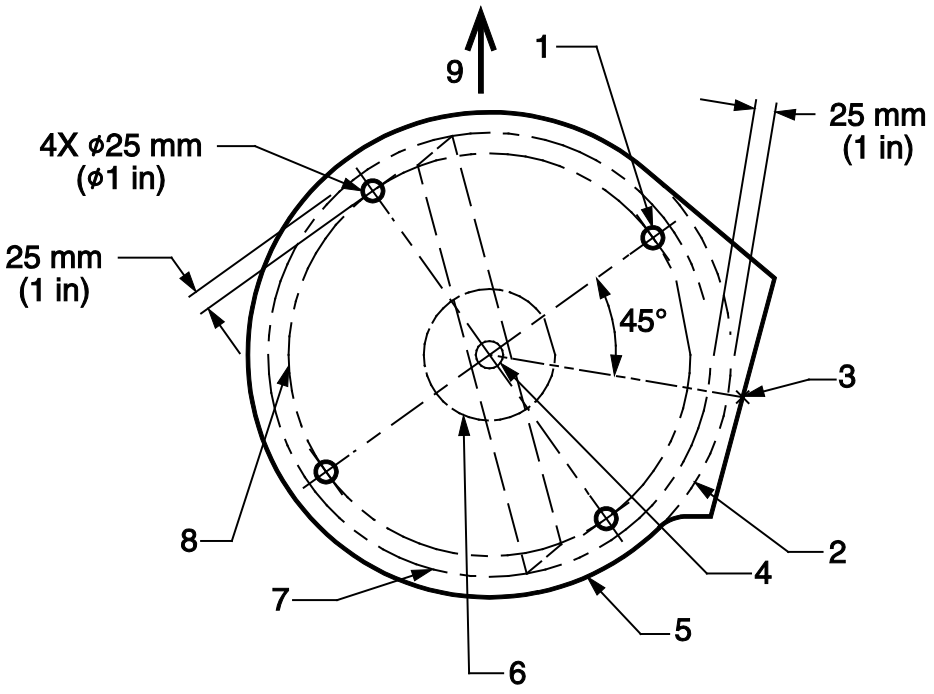
Figure 10(c) – Side view of a foot probe for a rotary mower



Key:

1 Primary injection hole
2 Edge of panel for structural integrity test
3 Center of discharge opening
4 Blade axis
5 Blade enclosure
6 Center air hole
7 Blade tip circle
8 Centerline of 25 mm (1 in) holes
9 Machine front

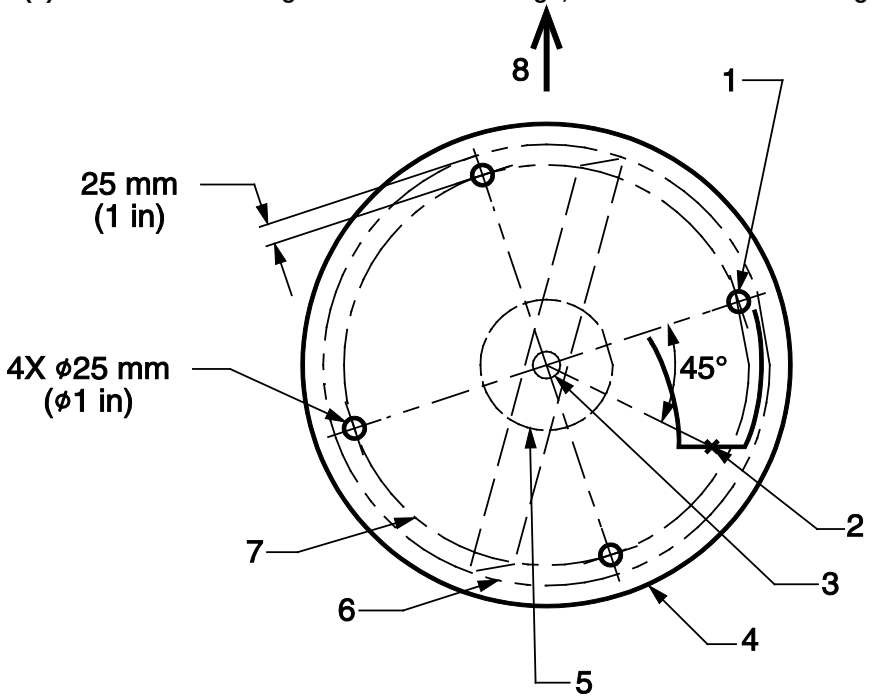
Figure 11(a) – Plan view of a single-blade front discharge, fixture for structural integrity test



Key:

1	Primary injection hole	6	Center air hole
2	Edge of panel for structural integrity test	7	Blade tip circle
3	Center of discharge opening	8	Centerline of 25 mm (1 in) holes
4	Blade axis	9	Machine front
5	Blade enclosure		

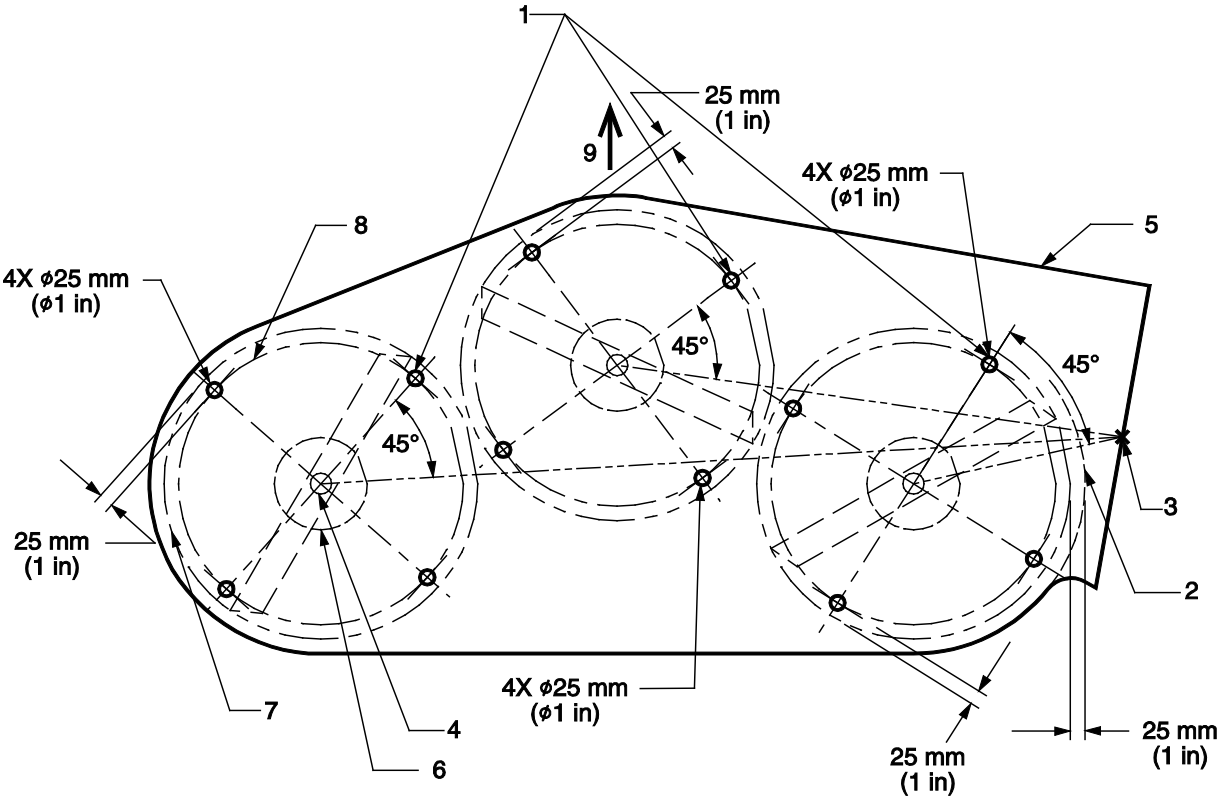
Figure 11(b) – Plan view of a single-blade side discharge, fixture for structural integrity test



Key:

1	Primary injection hole	5	Center air hole
2	Center of discharge opening	6	Blade tip circle
3	Blade axis	7	Centerline of 25 mm (1 in) holes
4	Blade enclosure	8	Machine front

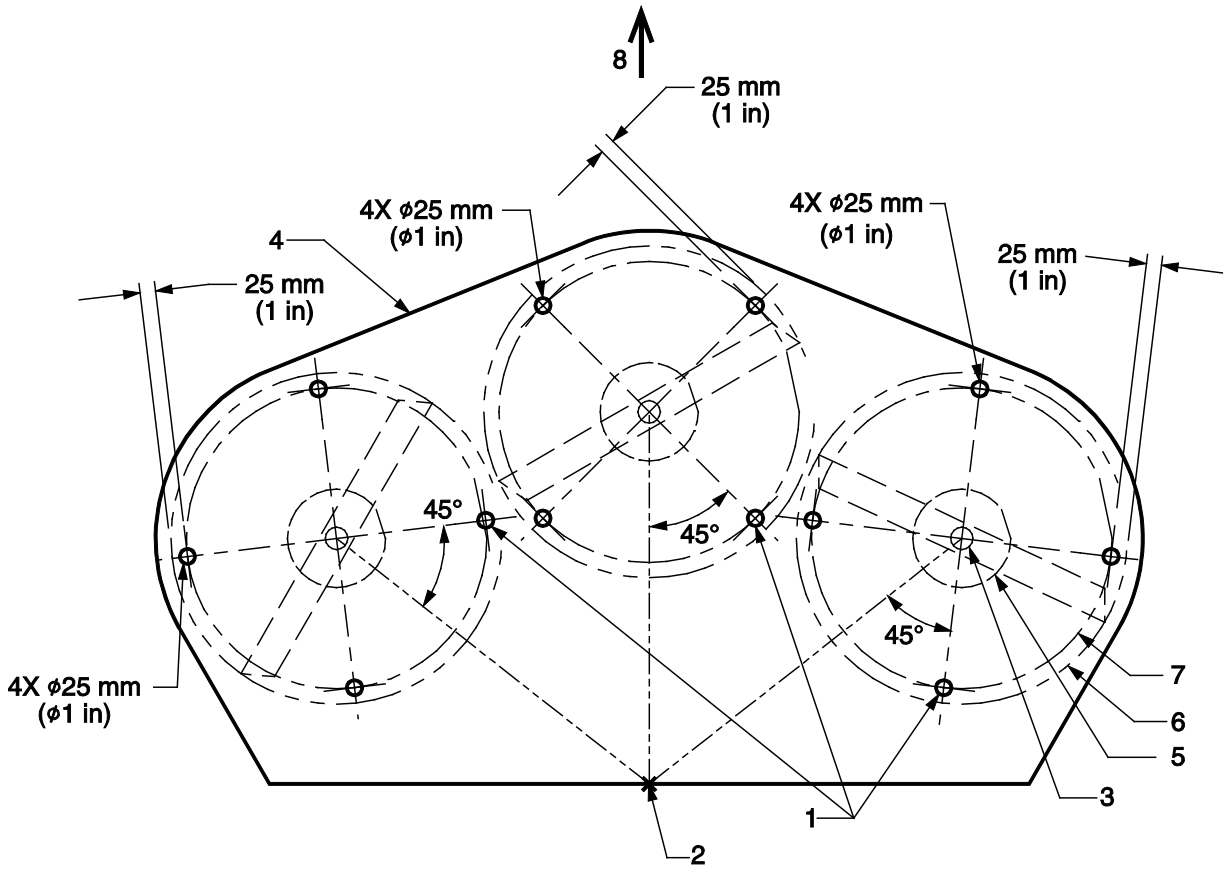
Figure 11(c) – Plan view of a single-blade top discharge, fixture for structural integrity test



Key:

1 Primary injection hole
2 Edge of panel for structural integrity test
3 Center of discharge opening
4 Blade axis
5 Blade enclosure
6 Center air hole
7 Blade tip circle
8 Centerline of 25 mm (1 in) holes
9 Machine front

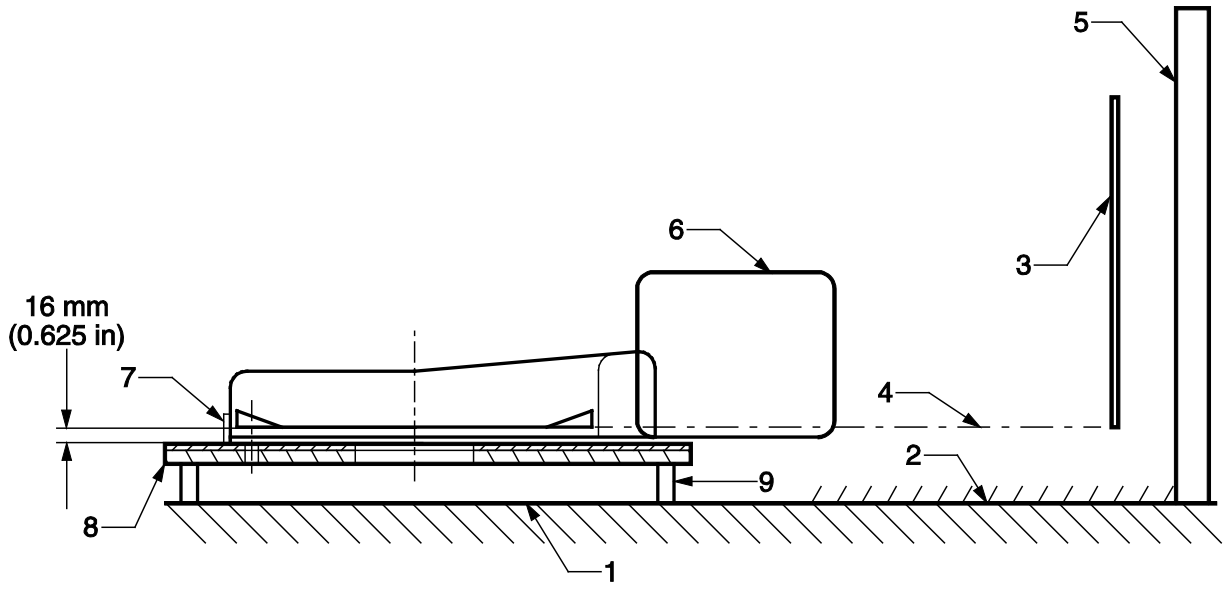
Figure 11(d) – Plan view of a multi-blade side discharge, fixture for structural integrity test



Key:

1 Primary injection hole
2 Center of discharge opening
3 Blade axis
4 Blade enclosure
5 Center air hole
6 Blade tip circle
7 Centerline of 25 mm (1 in) holes
8 Machine front

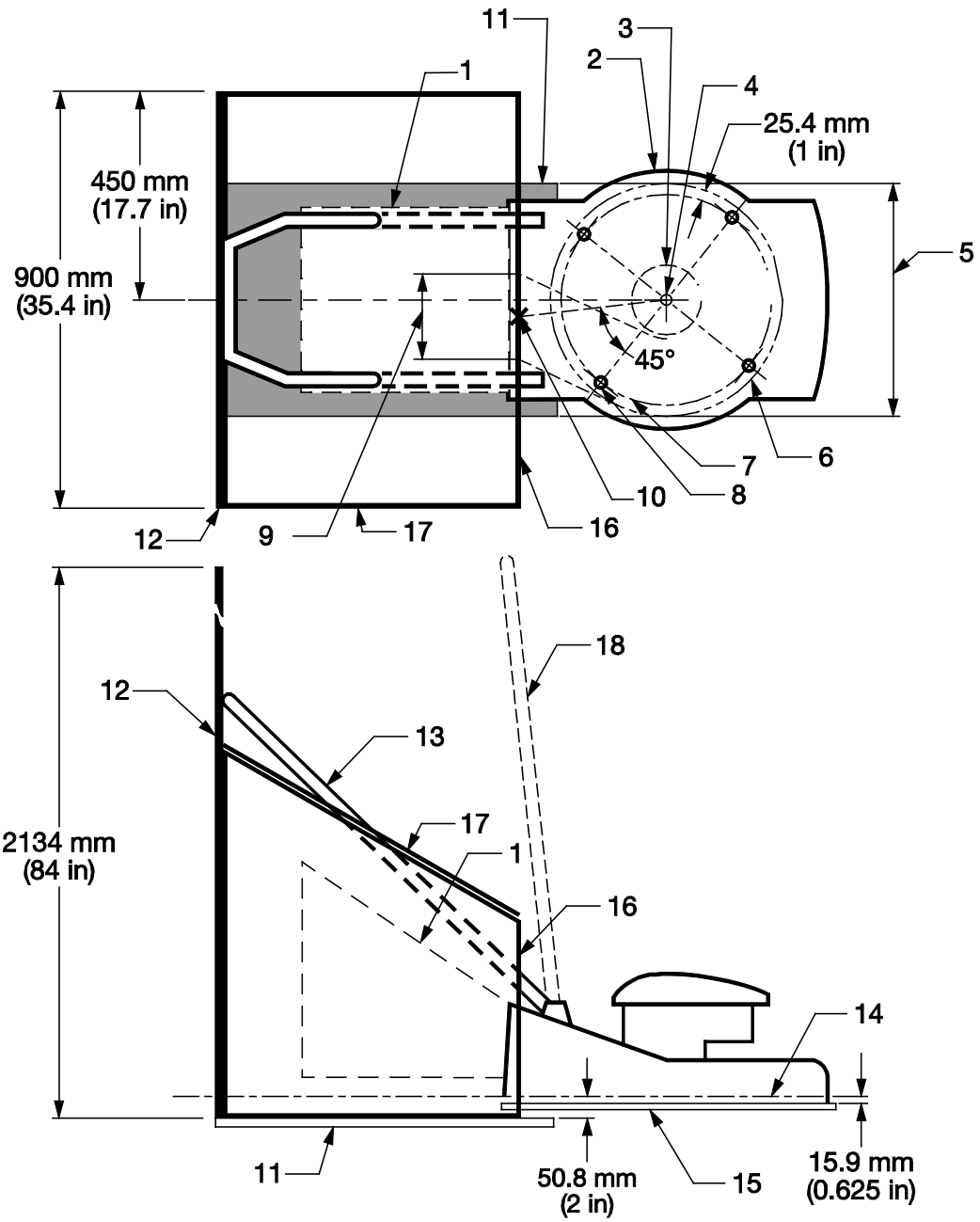
Figure 11(e) – Plan view of a multi-blade rear discharge, fixture for structural integrity test



Key:

1 Ground plane
2 Optional material to prevent ricochet (sand, insulation, etc.)
3 Target material
4 Bottom edge of target, aligned with blade cutting plane
5 Secondary wall
6 Grass catcher
7 Extend blade enclosure to base (except discharge opening)
8 Test panel
9 Supports

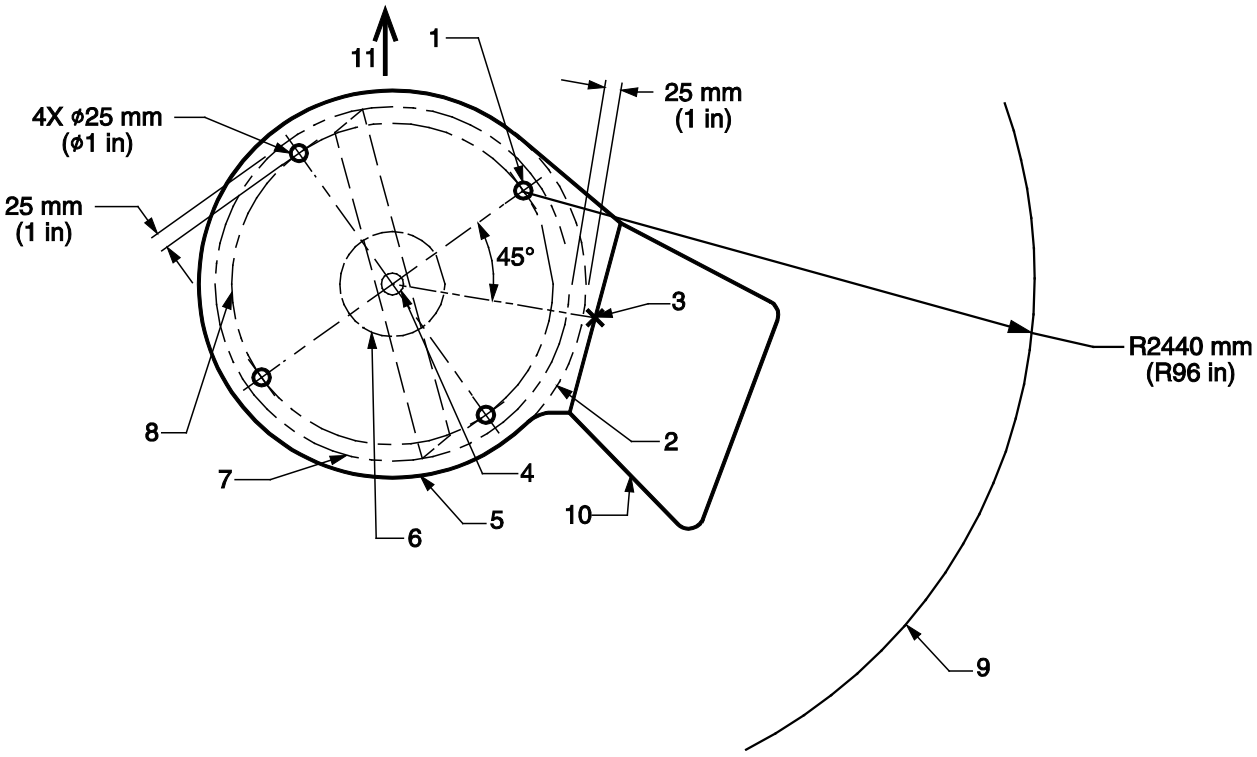
Figure 11(f) – Test arrangement with grass catcher



Key:

1 Grass catcher
2 Blade enclosure
3 Center air hole
4 Blade axis
5 Width of cut
6 Blade tip circle
7 Centerline of injection port holes
8 Primary injection hole
9 Discharge opening
10 Center of discharge opening
11 Artificial turf reflective surface
(19 mm (0.75 in) pile depth covering 19 mm (0.75 in) plywood)
12 Operator zone target
13 Handle, against upstop, to place operator zone target
14 Blade plane
15 Test panel
16 Bystander target, each side
17 Bystander target, top surface of grass catcher
18 Handle, optional position

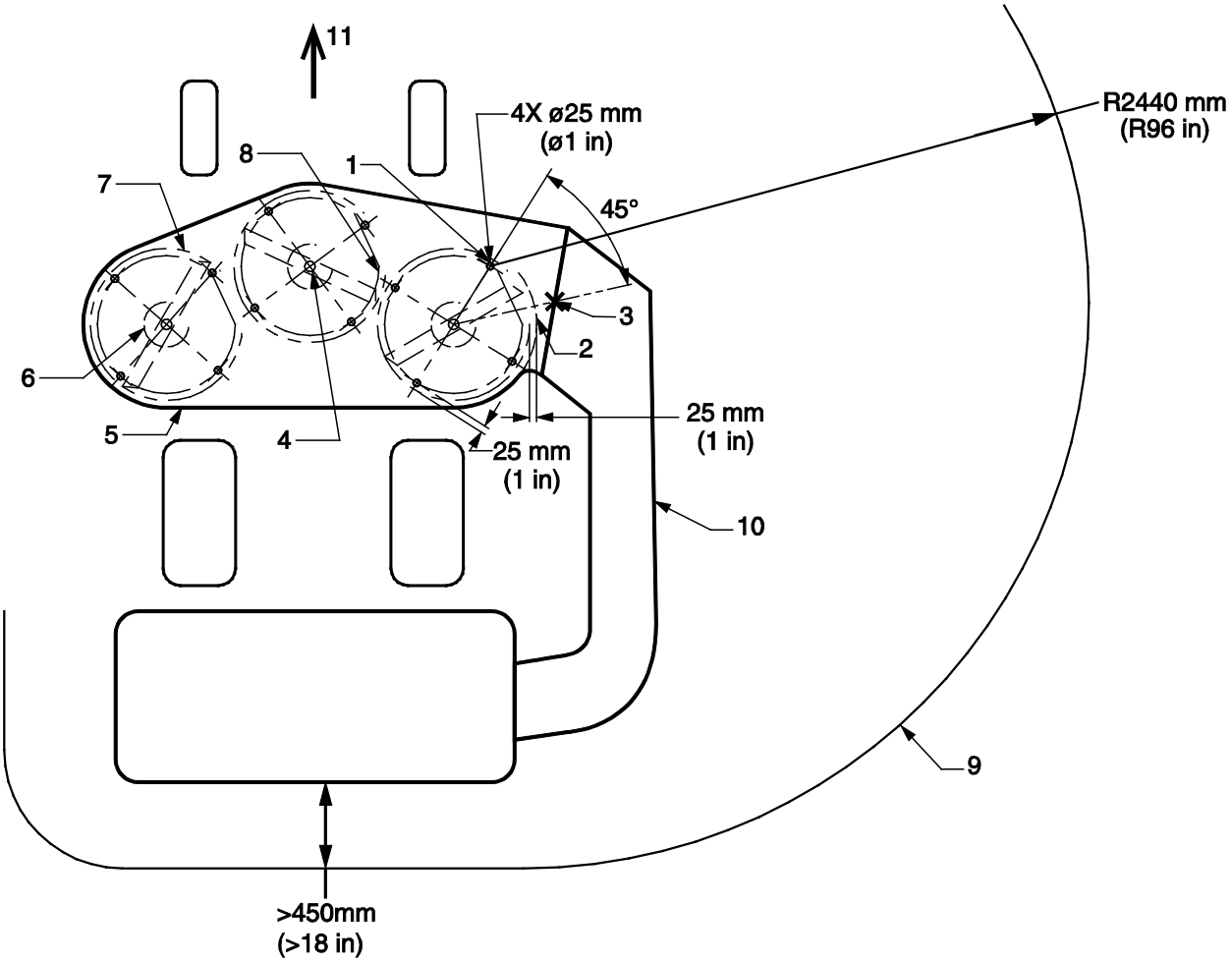
Figure 11(g) – Views of rear discharge pedestrian-controlled mower with grass catcher



Key:

1 Primary injection hole
2 Edge of panel for structural integrity test
3 Center of discharge opening
4 Blade axis
5 Blade enclosure
6 Center air hole
7 Blade tip circle
8 Centerline of 25 mm (1 in) holes
9 Target material
10 Grass catcher
11 Machine front

Figure 11(h) – Plan view of arrangement for lawn mower with side discharge grass catcher



Key:

1 Primary injection hole
2 Edge of panel for structural integrity test
3 Center of discharge opening
4 Blade axis
5 Blade enclosure
6 Center air hole
7 Blade tip circle
8 Centerline of 25 mm (1 in) holes
9 Target material
10 Grass catcher
11 Machine front

Figure 11(i) – Plan view of arrangement for ride-on lawn mower with grass catcher

Annex A

(Informative)

Rationale

This annex gives the rationale behind the various requirements of the standard. The clause numbers correspond to those in the body of the standard.

A.1 Scope

The purpose of the scope is to establish the coverage and limitations of the standard, in view of the different conditions of use of power lawn mowers and products used by consumers. Sulkies, flails, sickle bar mowers and pedestrian-controlled tractor units are excluded because they are generally used commercially. Complete coverage of electrical requirements is not included in order to avoid unnecessary duplication of or conflict with requirements of other standards. The manufacturer of after-market parts and accessories is responsible to ensure standard compliance.

Requirements for CPSC compliant pedestrian-controlled mowers are included in Annex C and are not repeated in this standard. Requirements for pedestrian-controlled mowers that are out of scope for CPSC have been added.

A.2 Normative references

Listed references have been referred to in the text and constitute provisions of this standard where applicable.

A.3 Definitions

The purpose of each definition is to establish the meaning of words or phrases to express the intent of the drafters.

A.3.36 95th percentile man

The normal operating position and the operator zone (Figure 9) are based on Dreyfuss anthropometric data. The figures have been simplified to provide relatively straightforward dimensional layouts covering the full range of the 95th percentile male population and to include the 50th percentile of the female population. Deviations from the anthropometric body dimensions are offset by the flexibility of the human body under actual operating conditions. The normal operating position is in the operator zone and is the actual body position of the operator when operating the machine. This specific space is occupied by the operator 100% of the time when the machine is in use. The operator zone is a larger space that represents the maximum space into which the extremities of the operator can reach in the normal operating position. This significantly larger space is intended to identify the maximum range for the operator controls and is zoned to be protected from intrusion by mowing components. Within this zone, the operators are to be protected against inadvertent contact with potential hazards, such as hot surfaces and rotating drive components.

The operator zone was compared to operator zones in other safety standards (ANSI/OPEI B71.4, ANSI/OPEI B71.3, SAE J898, and CPSC 16/CFR Part 1205) and appears to be representative of the space allocation needed for this complex equipment. The operator zone is a combination of a hazard zone and operator control location. Not all areas of the operator zone represent locations that are convenient to the operator as required for control locations. The objective of the operator zone is to identify the maximum space that should be covered by the operator safety considerations; a total zone is not intended to represent preferred operator control locations. Control locations within the operator zone are considered design requirements outside the scope of this standard.

Part II: Pedestrian-controlled mowers

A.4 Controls

A.4.1 Control identification

Those controls relating to the safe operation of the machine are required to be identified by a durable label to provide for rapid control location by the user and to maximize the probability of proper control usage.

A.4.2 Shutoff control device

This subclause provides for user controlled engine stop/start device, requiring manual, intentional activation to reduce the probability of inadvertent starting.

A.4.3 Handle-mounted engine speed controls

This subclause is intended to promote safety by setting forth the uniform operator environments and control movements with which users are generally familiar because of other commonly used consumer products. It specifies the direction of operation of engine speed control to help provide the expected response. Forward and rearward are determined with respect to the operator in the normal mowing position.

A.4.4 Self-propelled mowers

This subclause, which specifies the direction of operation and location of wheel drive controls, contributes to uniform operator environment and locates the operator's feet away from the blade. Operator-presence controls may move in any direction because disengagement is automatic when the operator is removed from the normal mowing position.

A.5 Guards and shields

A.5.1 Power drives

This subclause requires the shielding of moving parts to prevent exposure to the operator when in the positions indicated. The principles of Guarded by Location set forth in 17.1.2(c) apply when the operator is in the normal operating position and actuates the OPC in a normal manner.

A.5.2 Hot surfaces

This subclause requires the shielding of hot surfaces to minimize the possibility of thermal burns when the operator is in the positions indicated. CPSC accident analysis also indicates the possibility of muffler contact by the operator or bystander after parking and shutdown, which has been considered. Test probes, test procedures and maximum temperature requirements have been harmonized with ISO 5395.

A.5.3 Fuel ignition protection

This subclause is provided to minimize the possibility of fire hazard from the ignition of fuel spilled in the muffler outlet area.

A.5.4 Attachment of guards and shields

This subclause is provided to maximize the probability that guards or shields will be replaced following routine maintenance, due to ease of assembly/disassembly.

A.6 Servicing

These subclause are included to minimize the potential for contact with hazardous components during servicing of the machine.

A.7 Electrical requirements

A.7.1 General

These subclauses are included to provide recommendations and guidelines for design of electrical systems to minimize electrical hazards in those areas that would not normally be covered by other standards.

A.7.3 Low voltage battery powered circuits (not including magneto-grounding circuits)

A.7.3.1 Insulated cables

This subclause requires insulation protection for wiring assemblies to prevent damage by hot surfaces, moving parts, or sharp edges, and to minimize the possibility of resultant fire or electrical hazards.

A.7.3.2 Battery installation

This subclause requires that the battery compartment be vented to minimize the possibility of an accumulation of hydrogen gas and the resultant explosion hazard.

A.7.3.3 Overload protection

This subclause requires that overload protection devices be provided to minimize the possibility of a fire hazard.

A.7.3.4 Terminals and non-insulated electrical parts

This subclause requires protection against short-circuiting during normal operations to minimize the possibilities of a fire hazard.

A.8 Label durability requirements

This clause describes the requirements that labeling shall meet in order to provide the permanency of safety information to the operator.

A.9 General requirements – Blade rotation warning

This clause requires warnings of blade rotation (when it is not obvious from sound) to minimize the possibility of injury from inadvertent contact with a moving blade.

A.10 Specific requirements – Rotary mowers

A.10.1 Blade enclosure

A.10.1.1 General

This subclause provides a design requirement to minimize the possibility of injury from inadvertent contact with a moving blade.

A.10.1.2 Front blade enclosure

This subclause provides requirements for the design of the front blade enclosure for minimizing the possibility of injury from inadvertent contact with a moving blade, while maintaining a low mower push effort and adequate grass cutting quality.

A.10.1.3 Discharge openings

This subclause prohibits a direct line of sight between the blade tip circle and the operator zone to minimize the possibility of operator injury from material exiting the discharge opening by direct path from the blade to the operator zone.

A.10.1.4 Other openings

This subclause allows holes, such as for tooling, draining, mounting, and air venting, in the top surface of the blade enclosure, as long as the holes are shielded from the operator by their location.

A.10.2 Protective guards

A.10.2.1 Guards and grass catchers

This subclause defines the requirements for structural integrity and guarding to be met by the discharge opening guards or grass catchers to minimize the possibility that degradation or a lack

of appropriate instructions may cause operator injury due to material that may be discharged directly to the operator zone.

A.10.2.2 Rear protective guard (Trailing shield)

This subclause requires that protection be provided at the rear of a pedestrian-controlled mower to minimize the possibility that material will be discharged from beneath the blade enclosure into the operator zone. Blade contact in the rear of the mower is addressed by the foot probe requirement of the CPSC. A performance test is provided to establish the integrity of any shielding and mounting hardware used to meet this requirement. This requirement is not intended to provide protection for slip and fall incidents.

A.10.3 Performance tests

This subclause defines the test conditions, procedures, and failure criteria for a series of tests designed to minimize the possibility of injury to operators or bystanders from blade failure, structural failure of the mower or grass catcher, thrown objects, or inadvertent contact of a foot with the mowing blade.

A.10.3.1 General test requirements

This subclause establishes the uniform test conditions to be used.

A.10.3.2 Impact test

This subclause defines the requirements to be met to duplicate one of the most severe operating conditions encountered by mowers in use – that is, contact with an unyielding object.

A.10.3.3 Unbalance test

This subclause defines the requirements to be met to minimize the possibility of failure of the mower if an unbalanced blade is present, possibly due to impact with objects during mowing. For multi-spindle units, because of the larger mower mass and smaller blade mass than for single spindle units, simultaneous testing of unbalanced blades may be conducted.

A.10.3.4 Blade security test

This subclause defines the test procedures and requirements to minimize the possibility that the blade retaining means loosen due to impact or fail due to over tightening.

A.10.3.5 Structural integrity test – Blade enclosure and guards

This subclause defines the requirements to be met to minimize the possibility of structural failure of the blade enclosure, blade, or guards due to repeated severe impacts. This test is to identify breakage or permanent distortion of components that would cause the mower to fail the thrown object test. Balls that escape with minimum velocity from around the edge of a cover are not considered to be structural failure unless this causes the unit to fail the thrown object test.

A.10.3.6 Structural integrity tests – Grass catcher

This subclause defines the requirements to be met to minimize the possibility of structural failure of the grass catcher materials and mounting hardware. Inasmuch as the geometry of each individual mower affects the discharge pattern of projectiles, grass catchers are tested on each mower for which the mower manufacturer specifies usage.

A.10.3.7 Thrown object test

This subclause defines the requirements to be met to minimize the possibility of injury to the operator and bystander from thrown objects. Limitations are placed on the number of projectiles permitted to hit representative targets. This test procedure has been harmonized with international standards. For the purpose of determining thrown object test conformity on a given blade enclosure assembly used on a group of similar mower configurations, the manufacturer selects the specific configuration that represents the entire group. A new blade(s) shall be used for each test, unless the blade is not damaged by the projectile impact. A new blade could enhance the repeatability of the test.

A.10.4 Starting arrangement

This subclause defines a design requirement to ensure that the operator is not required to stand in front of the discharge opening to start the mower to minimize the possibility of injury from material thrown from the blades during start up.

A.10.5 Mower stabilization

The requirements in this subclause pertain to a mower with a rope starter located more than 610 mm (24 in) from the top of the mower handle. In such a case, a labeled stabilization area on the mower for operating the rope starter is needed to keep the mower from tipping and minimize the possibility of the operator's feet inadvertently contacting the blade.

A.10.6 Blade speed

This subclause specifies a design requirement intended to minimize the possibility of a hazard from thrown objects.

A.10.7 Handle structure

A.10.7.1 Fastening

This subclause is provided to minimize the possibility of unintentional uncoupling of the handle, which may cause loss of control of the mower.

A.10.7.2 Operating positions

This subclause is provided to minimize the possibility of inadvertent contact of the operator's foot and the rotating blade by requiring a positive up stop on the handle to maintain the distance between the operator and the rotating blade.

A.10.7.2.2 Handle storage position

This subclause provides for operation of handle storage position, if provided.

A.10.7.3 Handle structure test

This subclause provides test and acceptance requirements to minimize the possibility of the handle uncoupling from the mower during use. This subclause provides a performance test for determining the structural adequacy of the handle and handle fastening means to maintain the operating positions described in 10.7.2.

A.11 Specific requirements – Reel mowers

A.11.1 Blade stopping time

This subclause requires a maximum blade stopping time to minimize the possibility of injury from inadvertent contact with a moving blade.

A.11.2 Handle structure See A.10.7.3.

A.11.3 Self-propelled (SP) interlock

This subclause contributes to a safe and uniform operating environment by keeping the operator away from rotating reel blades when starting the machine.

A.12 Safety messages – Pedestrian-controlled mowers

Both “on-product” and “owner manual” safety messages/instructions are required. Expanded safety instructions in the owner's manual are supplied because not all safety messages/instructions can be located on the equipment. It is not intended that the examples given be all inclusive. The instructions provided should be tailored to the specific mower design.

A.12.1 On-product labeling

This subclause requires the durable labeling of the mower to provide the operator with a constant reminder of safety precautions to avoid frequently encountered hazards. Furthermore, these safety precautions are identified with the appropriate signal word, safety alert symbol or hazard pictorial (as identified by ANSI Z535.4 or ISO 11684) to ensure a consistent and appropriate hazard level designation for safety messages.

These labeling requirements are intended to allow the manufacturer some latitude in selecting the method of warning multicultural users of hazards inherent in the use of the machine. They also promote harmonization with global mower standards.

A.12.2 Safety instructions

Instructions for the safe operation of the mower shall be supplied with the equipment to maximize the possibility that these instructions will reach the operator. It is not intended that the examples given be all inclusive. The instructions provided should be tailored to the specific mower design and the manufacturer's recommendations for its use. These instructions may vary from manufacturer to manufacturer as long as the basic hazards identified in the instructions are addressed.

A.13 Requirements – Mowers which meet the exclusions of CPSC 1205.1 (c) (pedestrian-controlled machines ≥ 200 lbm, ≥ 8 hp and ≥ 30 in width of cut)

These requirements are provided for large mowers that are excluded from CPSC requirements. These mowers may be similar to commercial mowers covered by ANSI/OPEI B71.4, depending on the intended market.

A.13.1 Machine identification

This label provides machine and manufacturer identification to facilitate service parts acquisition by the consumer. The durability requirement provides the permanence of the identification.

A.13.3 Safety label

This requirement is harmonized with 24.1.5. This label identifies the blade as a hazard area.

A.13.4 Blade stop

This requirement is harmonized with 23.2. It sets a maximum blade stopping time when the blade is disengaged or disconnected and when the operator-presence is actuated to minimize the possibility of inadvertent blade contact.

A.14 Additional requirements – Mowers not subject to CPSC 1205 regulation (pedestrian-controlled machines ≤ 200 lbm, ≤ 8 hp, ≤ 30 in width of cut)

This clause provides requirements for mowers that would typically be subject to the CPSC 1205 regulation but are in markets outside of the United States of America and would not be under the jurisdiction of the U.S. Consumer Product Safety Commission.

Part III: Ride-on mowers

A.15 Machine identification

This clause provides machine and manufacturer identification to facilitate service parts acquisition by the consumer. The durability requirement provides the permanence of the identification.

A.16 Controls

A.16.1 General requirements

A.16.1.1 Control identification

Those controls relating to the safe operation of the unit are required to be identified by a durable label to provide for rapid control location by the user and to maximize the probability of proper control usage.

A.16.1.2 Shutoff control device

This subclause provides for a user controlled engine stop/start device – requiring manual, intentional activation to reduce the probability of inadvertent starting.

A.16.1.3 Hand control

This subclause is intended to promote safety by setting forth uniform operator environments and control movements with which users are generally familiar because of other commonly used consumer products. It specifies the direction of operation of the engine speed control to help provide the expected response. Forward and rearward are determined with respect to the operator in the normal mowing position.

A.16.2 Ride-on mowers

A.16.2.1 General requirements

A.16.2.1.1 This subclause specifies the presence of a key switch or similar device to prevent the unauthorized use of riding units to which children may be attracted.

A.16.2.1.2 This subclause is provided to minimize the possibility of loss of operator control of the mower.

A.16.2.1.3 This subclause specifies the characteristics of directional controls with or without speed control to minimize the possibility of loss of operator control by inadvertent changes or abrupt changes, or both, in the direction of travel.

The note in this subclause applies to the lever-steer mowers. Free movement of the levers enhances safe operation of the lever-steer mowers. Retarding such movement may create a hazard by hindering quick application of the brake or steering controls and causing operator fatigue.

A.16.2.1.4 In ANSI B71.1-1972, a requirement was added that all riding units shall be equipped with a means to disconnect the blades from the power source. In ANSI B71.1-1980 and B71.1-1984, this statement was not included. This requirement was reinstated in ANSI/OPEI B71.1-1986, because there are other requirements relative to blade control that would require a disengaging means in the mower drive.

A.16.2.1.5 Analysis of Consumer Product Safety Commission (NEISS) in depth investigation reports indicates that an operator-presence control is an effective means of addressing certain types of blade contact injuries. These are the injuries in which the operator deliberately leaves the normal operating position without first disengaging power to the mower blades, or without stopping the engine in accordance with the safety instructions, or both. Operator-presence controls are not intended to protect the operator from sudden access to the blades, as would occur because of jumping or falling from the machine.

A.16.2.1.6 This requirement is intended to address unintentional machine movement when the operator leaves the normal operating position. It is not intended to address operator fall when mounting or dismounting the machine or kick-into-gear incidents. This requirement does not allow the machine traction drive to be operational when the operator is out of the normal operating position.

A.16.2.1.7 There has been concern from the human factors standpoint that operator-presence systems can become objectionable and subject to bypassing that could result in decreased safety; therefore, the test angles are greater than those that are normally recommended for safe operation. This section requires that the operator-presence control be operable when the operator shifts his position in the seat. Position shift can occur from fatigue or slope operation.

A.16.2.1.7.1 The operator is required to maintain continuous action of the control while being able to shift body position without inadvertently triggering the control means. By placing the machine on the 15° test surface, angled both to the right and to the left, the manufacturer can demonstrate that the approximate

5th percentile adult operator can operate the critical controls of the machine on a slope.

A.16.2.1.7.2 There are two test procedures when the operator position sensor described in 16.2.1.5 is a seat sensor. The rationales for these procedures are as follows:

a) *Rationale for procedure 1*. During operation of the machine on a slope, the normal tendency of the operator is to lean into the slope as well as shift the seating position toward the uphill side of the seat. There is concern that this action could cause premature shutdown of the mower; resulting in an irritation to the operator. Leaning into the slope and shifting the operator's mass toward the uphill side will improve stability. It is believed that the SIP measuring device described in ANSI/SAE J1163 will demonstrate the adequacy of a seat sensor when operating across slopes. The 15° tilt in each direction is intentionally in excess of reasonable, safe mowing across slopes to reduce nuisance shutoff of the blade drive. Some operator positions, such as seats with armrests, may not allow tilting the SIP measuring device 15°.

b) *Rationale for procedure 2*. Procedure 2 provides for a 5^{th} percentile female to replace the fixture described in procedure 1. Procedure 1 uses a SIP fixture with a mass of 28 to 30 kg (62 to 66 lbm), which approximates the torso and head mass of a 5^{th} percentile female. Procedure 2 allows for a manufacturer to replace the fixture with a 5^{th} percentile test subject, if available. Certain seat designs used by some manufacturers do not readily conform to the rigid SIP fixture, and it has been demonstrated that those seats do conform to the human operator. Therefore, the human operator alternative has been developed.

A.16.2.1.8 This requirement is intended to reduce the possibility of inadvertent blade contact at the rear of the machine by removing power from the mower blade(s) during reverse operation, by increasing the operator’s awareness of reverse operation, and by encouraging the operator to find alternate ways to mow instead of in the reverse direction. It is not intended to replace the operator’s responsibility to keep children out of the mowing area and to look carefully behind the machine before and while backing. The addition of a tolerance was added to allow for manufacturing variability.

The provision for a temporary override recognizes the need to sometimes operate the machine or an attachment in the reverse direction. Some machine types are excluded based on the location of the mower which provides greater visibility during rear travel or maneuverability characteristics of the machine which limit reverse use.

A.16.2.1.9 This subclause allows for stationary operation to allow for gardening attachments such as log splitters and generators, which require stationary operation.

A.16.2.2 Clutch controls

A.16.2.2.1 Traction clutch and/or neutral-return

This subclause specifies the method and the direction of operation of various types of traction clutch or neutral-return controls to contribute to a uniform operator environment and minimize the possibility of operator error in an emergency. Specifications for service brake override and combination brake/clutch pedal operation are included for the same reason.

A.16.2.2.2 Attachment drive (power takeoff) controls when part of the machine

This subclause specifies the labeling and direction of operation of attachment controls to provide a uniform operator environment and usage.

A.16.2.2.3 Start interlock

This requirement is to minimize the possibility of inadvertent operation of the attachment when starting the power source by requiring a deliberate additional action by the operator to start the mower attachment.

A.16.2.3 Brake controls

A.16.2.3.1 Service brakes

This subclause specifies the methods and the direction of operation of service brakes to provide a uniform operator environment and to minimize the possibility of operator error in an emergency.

A.16.2.3.2 Parking brake

This subclause specifies the labeling, the location, and the direction of operation of parking brakes to provide a readily understandable and usable system for the operator of the mower.

A.16.2.4 Foot-operated engine (motor) speed control

This subclause specifies the methods and the direction of operation of foot-operated engine (motor) speed controls to provide a uniform operator environment and to minimize the possibility of operator error in an emergency.

A.16.2.5 Traction speed control

This subclause specifies the methods and the direction of operation of traction speed controls to provide a uniform operator environment and minimize the possibility of operator error in an emergency.

A16.2.5.6 This subclause sets a requirement for interlocks to minimize the possibility of inadvertently starting the machine engine with the traction drive engaged, thus resulting in unexpected machine movement.

A.16.2.6 Steering control

This subclause specifies the types and the direction of operation of steering controls to provide a uniform operator motion with an expected response throughout the entire range of motion.

A.16.2.6.3 Tiller bar steering

This subclause specifically prohibits tiller bar steering which can suddenly move the operator’s center of gravity and may be associated with loss of control.

A.16.2.7 Lift controls for attachments

This subclause specifies the labeling location and direction of operation of attachment lift controls to provide a uniform operator environment.

A.16.2.7.4 This requirement is consistent with human factors and lifting a mower deck using leg power.

A.16.2.7.5 This requirement is included to minimize the possibility of unauthorized raising and thus potential injury from dropping a heavy attachment.

A.17 Guards and shields

A.17.1 Power drives

This subclause requires the shielding of moving parts to prevent exposure to the operator when in the positions indicated.

A.17.1.2 Guarded by location

The principles of “guarded by location” set forth in 17.1.2(c) apply when the operator is in the normal operating position and actuates the OPC in a normal manner.

A.17.2 Hot surfaces

This subclause requires the shielding of hot exhaust component surfaces to minimize the possibility of thermal burns when the operator is in the positions indicated. CPSC accident analysis also indicates the possibility of muffler contact by the operator or bystander after parking and shutdown, which has been considered.

A.17.3 Fuel ignition protection

This suclause is provided to minimize the possibility of a fire hazard from the ignition of fuel spilled in the muffler outlet area.

A.17.4 Attachment of guards and shields

This suclause is provided to maximize the probability that guards or shields will be replaced following routine maintenance, due to ease of assembly/disassembly.

A.18 Servicing

These subclauses are included to minimize the potential for contact with hazardous components during servicing of the machine.

A.19 Electrical requirements

A.19.1 General

These subclauses are included to provide recommendations and guidelines for design of electrical systems to minimize electrical hazards in those areas that would not normally be covered by other standards.

A.19.3 Low voltage battery powered circuits (not including magneto grounding circuits)

A.19.3.1 Insulated cables

This subclause requires insulation protection for wiring assemblies to prevent damage by hot surfaces, moving parts, or sharp edges, and to minimize the possibility of resultant fire or electrical hazards.

A.19.3.2 Battery installation

This subclause requires that the battery compartment be vented to minimize the possibility of an accumulation of hydrogen gas and the resultant explosion hazard.

A.19.3.3 Overload protection

This subclause requires that overload protection devices be provided to minimize the possibility of a fire hazard.

A.19.3.4 Terminals and non-insulated electrical parts

This subclause requires protection against short circuiting during normal operations to minimize the possibilities of a fire hazard.

A.20 Label durability requirements

This subclause describes the requirements that labeling shall meet in order to provide the permanency of safety information to the operator

A.21 Requirements – Ride-on mowers

A.21.1 General requirements

A.21.1.1 Slip resistant surface

This subclause requires use of the slip resistant surface to minimize the possibility of operator injury.

A.21.1.2 Seat support

This subclause requires a minimum seat back height of 115 mm (4.5 in) to provide operator support during acceleration, braking, and when traveling upslope.

A.21.1.3 Roll over protective structure (ROPS)

This subclause provides criteria for the use of roll over protective structures. This requirement is harmonized with ANSI B71.4.

A.21.2 Stability tests

This subclause establishes minimum requirements for stability of ride-on mowers.

A.21.2.2 Static stability tests

These requirements establish an operator/machine center of gravity location that provides for a safe machine design when the machine is operated in accordance with the manufacturer's instructions. These tests are conducted with a 91 kg (200 lbm) static test mass to eliminate any influence of a human operator who would instinctively lean to a position that would reduce the test effectiveness. Lift off of the unit is the time when the lift off gauge can be pulled from or moved under the last uphill tire with a force of 9 N (2 lbf) or less; assures uniform testing procedure. The requirement considers lift off of the last uphill tire to address machines that might have non-pivoting axles or other geometry that affects the tipping point.

A.21.2.3 Dynamic turn stability tests

This requirement assesses the dynamic relationship between the operator/machine center of gravity, maximum machine ground speed, minimum turn diameter, and dynamic tire response. This test is conducted with a 91 kg (200 lbm) male operator. Operator lean is restricted to a maximum of 10 degrees to minimize operator influence of the test results. The outrigger provides for the safety of the operator and can be utilized to determine test acceptance. Lever-steer machines are exempt as they are typically “zero-turn radius”, so there is no tipping during turning.

A.21.2.4 Sudden traction control test

This requirement assesses the dynamic relationship between the operator/machine center of gravity, maximum machine acceleration, and dynamic tire response with the seat adjusted in the worst-case condition. This test is conducted with a 91 kg (200 lbm) operator. Operator lean is restricted to a maximum of 10 degrees to minimize operator influence of test results. This requirement allows a positive stop which will prevent the machine from tipping over.

The Sudden Traction Dynamic test is based on the potential for the operator’s foot to slip off a clutch pedal and cause sudden engagement.

A.21.3 Braking requirements

A.21.3.1 General requirements

This subclause is provided to establish that the ride-on mower configuration with the minimum stopping ability is tested.

A.21.3.2 Service brake system

This subclause establishes the ride-on mower service brake test requirements and the maximum allowable stopping distance for the maximum machine velocity with a pedal force that represents an operator with less than average strength. The pedal force requirement is intended to minimize the possibility of any operator loss of brake control but is not intended to be the maximum pedal force for greatest machine braking capability.

A.21.3.2.2 Durability test

This subclause stipulates a minimum duty cycle for the service brake system. Brake system wear and/or maladjustment can be a contributing factor in brake related accidents. This section addresses the issue by establishing a minimum durability requirement without adjustment. The durability certification test is performed on a new machine in a laboratory environment. Machines with hydrostatic drives or with combined lever-steer and brake controls are exempt from the test durability requirement. This test requirement is intended for wheel brakes not integral with the drive system.

A21.3.2.3 Proof load test

This subclause establishes a minimum structural requirement for the service brake system to ensure integrity under extreme load conditions.

A.21.3.3 Parking brake system

This subclause requires a means to hold a ride-on mower on a slope without assistance from the engine. This section is intended to minimize the possibility of a hazard to the operator or bystander from unintentional movement of the machine and from premature wear of the parking brake which might render it less effective.

A.21.4 Attachment drive clutch

This subclause defines a design requirement providing for starting or transport of the machine without rotation of the blades to minimize the possibility of inadvertent blade contact or injury from thrown material.

A.22 Safety messages – Ride-on mowers

Both “on-product” and “owner manual” safety messages/instructions are required. Expanded safety instructions in the operator’s manual are supplied because all safety messages/instructions cannot be located on the equipment. It is not intended that the examples given be all inclusive. The instructions provided should be tailored to the specific mower design.

A.22.1 On-product labeling

This subclause requires the durable labeling of the mower to provide the operator with a constant reminder of safety precautions to avoid frequently encountered hazards. Furthermore, these safety precautions are identified with the appropriate signal word, safety alert symbol or hazard pictorial (as defined by ANSI Z535.4 or ISO 11684) to ensure a consistent and appropriate hazard level designation for safety messages.

These labeling requirements are intended to allow the manufacturer some latitude in selecting the method of warning multicultural users of hazards inherent in the use of the machine. They also promote harmonization with global mower standards.

A.22.2 Safety instructions

Instructions for the safe operation of the mower shall be supplied with the equipment to maximize the possibility that these instructions will reach the operator. It is not intended that the examples

given be all inclusive. The instructions provided should be tailored to the specific mower design and the manufacturer's recommendations for its use. These instructions may vary from manufacturer to manufacturer as long as the basic hazards identified in the instructions are addressed.

A.23 General requirements – Ride-on rotary and reel mowers

A.23.1 Blade rotation warning

This subclause requires warnings of blade rotation (when it is not obvious from sound) to minimize the possibility of injury from inadvertent contact with a moving blade.

A.23.2 Blade stopping time

This requirement specifies the maximum blade stopping time when the blade is disengaged or disconnected and when the operator-presence means is actuated. Analysis of accident data has verified that this requirement provides operator protection for voluntary controlled dismount. This requirement is not applicable to voluntary uncontrolled and involuntary dismounts. The durability certification test is performed on a new machine in a laboratory environment.

A.23.2.1 The durability test is not applicable to those OPC systems that stop the blades by stopping the engine. Engine kill blade stop times may increase somewhat with machine use because of engine wear. Increases in blade stop times during the life of the machine will not adversely affect safety because the transitory engine noise warns the operator.

A.23.3 Controls – attachments

A.23.3.1 Machine engine powered (motor powered) attachments

The labeling and direction of operation for attachment controls to provide for a uniform operator environment is specified in 23.3.1.1. The requirement for interlocks in 23.3.1.2 is to minimize the possibility of inadvertent operation of the attachment when starting the power source by requiring a deliberate additional action by the operator to start the mower attachment.

A.23.3.2 Attachment with auxiliary engine or electric motor

This subclause defines requirements to be met to minimize the possibility of operator injury by setting forth the same uniform operator environment as with the main machine. A powered attachment with its own engine should meet the requirements for the main machine in terms of engine shutoff device (16.1.2), control retard (16.1.3) and starter interlock (16.2.2.3). This section also requires a labeled stabilization area of the attachment for operating a recoil starter to minimize the possibility of operator injury.

A.24 Specific requirements – Ride-on rotary mowers and mower attachments

A.24.1 Blade enclosure

A.24.1.1 General

This subclause provides a design requirement to minimize the possibility of injury from inadvertent contact with a moving blade.

A.24.1.2 Front blade enclosure

This subclause provides requirements for the design of the front blade enclosure for minimizing the possibility of injury from inadvertent contact with a moving blade while maintaining adequate grass cutting quality.

A.24.1.3 Discharge openings

This subclause prohibits a direct line of sight between the blade tip circle and the operator zone to minimize the possibility of operator injury from material exiting the discharge opening by direct path from the blade to the operator zone.

A.24.1.4 Other openings

This subclause allows holes, such as for tooling, draining, mounting, and air venting, in the top surface of the blade enclosure, as long as the holes are shielded from the operator by their location.

A.24.1.5 Safety message

This subclause requires a warning to the operator of the potentially hazardous blade contact area of the mower to minimize the possibility of injury from inadvertent contact with a moving blade.

A.24.2 Guards and grass catchers

This subclause defines the requirements for structural integrity and guarding to be met by the discharge opening guards or grass catchers to minimize the possibility that degradation or a lack of appropriate instructions may cause operator injury due to material that may be discharged directly to the operator zone.

A.24.3 Performance tests

This subclause defines the test conditions, procedures, and failure criteria for a series of tests designed to minimize the possibility of injury to operators or bystanders from blade failure, structural failure of the mower or grass catcher, thrown objects, or inadvertent contact of a foot with the mowing blade.

A.24.3.1 General test requirements

This subclause establishes the uniform test conditions to be used.

A.24.3.2 Impact test

This subclause defines the requirements to be met to duplicate one of the most severe operating conditions encountered by mowers in use – that is, contact with an unyielding object.

A.24.3.3 Unbalance test

This subclause defines the requirements to be met to minimize the possibility of failure of the mower if an unbalanced blade is present, possibly due to impact with objects during mowing. For multi-spindle units, because of the larger mower mass and smaller blade mass than for single spindle units, simultaneous testing of unbalanced blades may be conducted.

A.24.3.4 Blade security test

This subclause defines the test procedure and requirements to minimize the possibility that the blade retaining means loosen due to impact or fail due to over tightening.

A.24.3.5 Structural integrity test – Blade enclosure and guards

This subclause defines the requirements to be met to minimize the possibility of structural failure of the blade enclosure, blade, and guards due to repeated severe impacts. This test is to identify breakage or permanent distortion of components that would cause the mower to fail the thrown object test. Balls that escape with minimum velocity from around the edge of a cover are not considered to be structural failure unless this causes the unit to fail the thrown object test.

A.24.3.6 Structural integrity tests – Grass catcher

This subclause defines the requirements to be met to minimize the possibility of structural failure of the grass catcher materials and mounting hardware. Inasmuch as the geometry of each individual mower affects the discharge pattern of projectiles, grass catchers are tested on each mower for which the mower manufacturer specifies usage.

A.24.3.7 Thrown object test

This subclause defines the requirements to be met to minimize the possibility of injury to the operator and bystander from thrown objects. Limitations are placed on the number of projectiles permitted to hit representative targets. This test procedure has been harmonized with international standards. For the purpose of determining thrown object test conformity on a given blade enclosure assembly used on a group of similar mower configurations, the manufacturer selects the specific configuration that represents the entire group. A new blade(s) shall be used for each test unless the blade is not damaged by the projectile impact. A new blade may enhance the repeatability of the test.

A.24.3.8 Probe test – Discharge openings

This subclause defines the requirements to be met to minimize the possibility of inadvertent blade contact at the discharge opening.

A.24.4 Blade speed

This subclause specifies a design requirement intended to minimize the possibility of a hazard from thrown objects.

Annex B

(Informative)

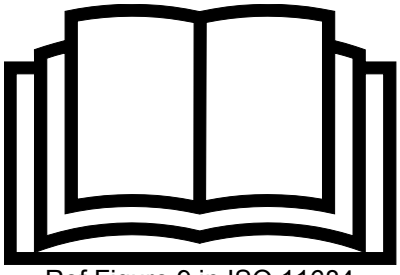
Pictorials

This annex provides safety pictorials that may be used to convey on-product safety information. The following pictorials are consistent with ISO 11684. The basic format is to show the safety triangle with the pictorial hazard inside; then show the pictorial for hazard avoidance. The pictorials shown are suggested; however, the manufacturer may modify, combine or develop new pictorials to match the hazard pattern, machine and message, following the guidelines set out in ISO 11684.

Safety alert symbol Ref ISO 11684 Figure 7
(© ISO 11684. Permission granted by ANSI on behalf of ISO)

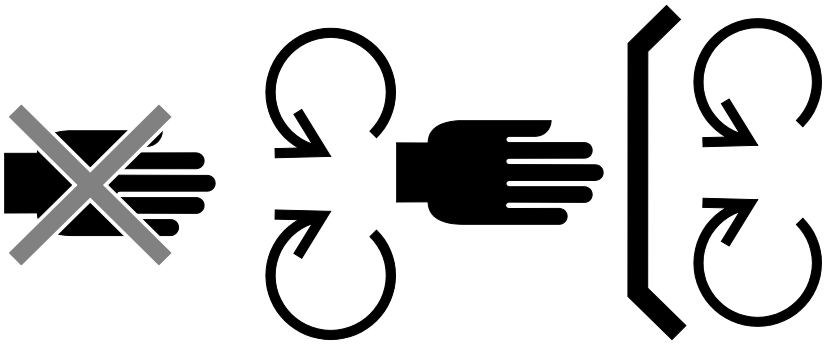
Safety pictorials

(a) Read operator's manual



Ref Figure 9 in ISO 11684
(© ISO 11684. Permission granted by ANSI on behalf of ISO)

(b) Maintain safety devices

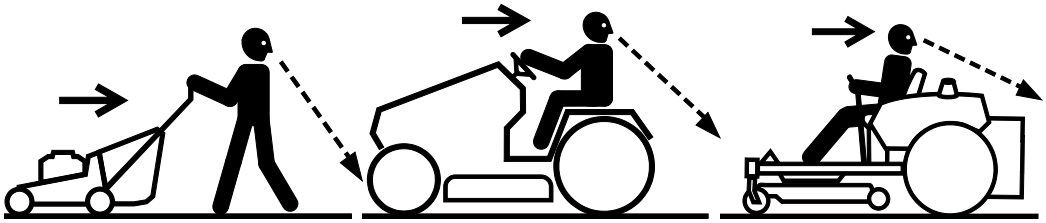


Ref: ISO 11684 B.2.11 for "Do not open or remove safety shields while engine is running." Avoidance graphic is derived from B.2.11. (© ISO. Adapted from ISO 11684. Permission granted by ANSI on behalf of ISO)

(c) Keep bystanders away

Ref: Derived from ISO 11684 Figure B.2.6 and section D.9 (communicating idea of prohibited action or hazardous location) (© ISO. Adapted from ISO 11684. Permission granted by ANSI on behalf of ISO)

(d) Look behind while backing



Ref: Derived from ISO 11684 section D.8 “Using arrows to show visual elements and machine motion.” (© ISO. Adapted from ISO 11684. Permission granted by ANSI on behalf of ISO)

(e) Steep slope hazard

Ref: Derived from ISO 11684 A.11.2
(© ISO. Adapted from ISO 11684. Permission granted by ANSI on behalf of ISO)

(f) Never carry children

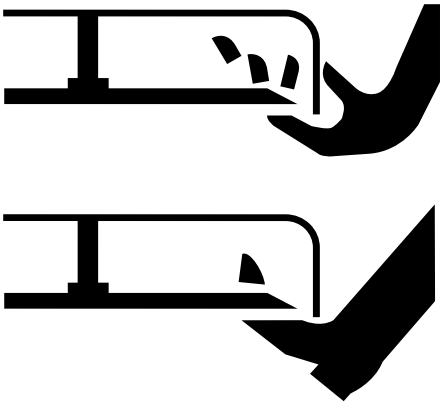
Ref: ISO 11684 A.7.12 and B.2.19
(© ISO. Adapted from ISO 11684. Permission granted by ANSI on behalf of ISO)

(f) Never carry children (continued)

Ref: ISO 11684 combination of A.7.12 and B.2.19.
(© ISO. Adapted from ISO 11684. Permission granted by ANSI on behalf of ISO)

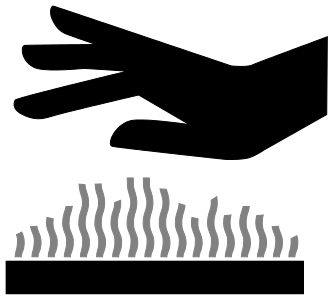
(g) Additional warning: “A safety pictorial warning of blade contact shall be placed on the mower at or near each discharge opening.” (Both figures - © ISO 11684. Permission granted by ANSI on behalf of ISO)

CPSC pedestrian-mower safety label



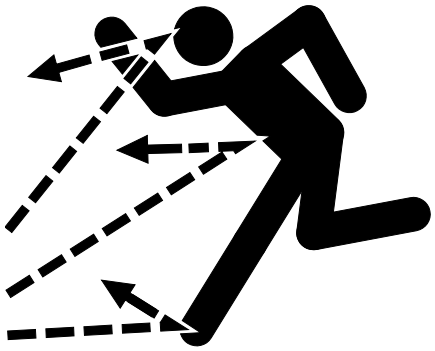
From ISO 11684 A.7.5

(h) Hot surface



Ref: ISO 11684 A.13.1

(i) Thrown objects



Ref: ISO 11684 A.9.2

Annex C

(Informative)

CPSC Requirements for Pedestrian-controlled Mowers

Please note that what follows is provided as an informative reference, and is a copy of the Consumer Product Safety Commission's requirements for pedestrian-controlled lawnmowers from the Federal Register. As such, some figures in this appendix have the same numbers as the figures in the body of ANSI/OPEI B71.1, appearing before Annex A. Please do not confuse CPSC figures having the same numbers with those appearing in ANSI/OPEI B71.1 and referred to in the body of the standard.

PART 1205—SAFETY STANDARD FOR WALK-BEHIND POWER LAWN MOWERS

Section Contents

Authority: Secs. 2, 3, 7, 9, 14, 19, Pub. L. 92–573, 86 Stat. 1207, 1208, 1212–1217, 1220, 1224; 15 U.S.C. 2051, 2052, 2056, 2058, 2063, 2068; sec. 1212, Pub. L. 97–35, 95 Stat. 357.

Source: 44 FR 10024, Feb. 15, 1979, unless otherwise noted.

§ 1205.1 Scope of the standard.

(a) *General.* This subpart A of part 1205 is a consumer product safety standard which prescribes safety requirements for certain walk-behind power lawn mowers, including labeling and performance requirements. The performance requirements of the standard apply to rotary mowers. The labeling requirements apply to both rotary and reel-type mowers. The standard is intended to reduce the risk of injury to consumers caused by contact, primarily of the foot and hand, with the rotating blade of the mower. A detailed discussion of the risk of injury and of the anticipated costs, benefits, and other factors associated with the standard is contained in §1205.8 *Findings.*

(b) *Scope.* (1) Except as provided in paragraph (c) of this section, all walk-behind rotary and reel-type power lawn mowers manufactured or imported on or after the effective date of the standard are subject to the requirements of this standard if they are "consumer products". "Walk-behind power lawn mower" is defined as a grass cutting machine with a minimum cutting width of 12 in (305 mm) that employs an engine or motor as a power source. Section 3(a)(1) of the Consumer Product Safety Act ("CPSA"), 15 U.S.C. 2052(a)(1), defines the term *consumer product* as an "article, or component part thereof, produced or distributed (i) for sale to a consumer for use in or around a permanent or temporary household or residence, a school, in recreation, or otherwise, or (ii) for the personal use, consumption or enjoyment of a consumer in or around a permanent or temporary household or residence, a school, in recreation, or

otherwise." The term does not include products that are not customarily produced or distributed for sale to, or for the use or consumption by, or enjoyment of, a consumer.

(2) It is unlawful to manufacture for sale, offer for sale, distribute in commerce, or import into the United States any product subject to this standard that is not in conformity with the standard. The Commission is not applying the standard to rental transactions or to the ultimate sale of used rental mowers by rental firms.

(c) *Exclusions* — (1) *General.* Mowers that have all three of the following characteristics are not covered by the standard:

(i) A cutting width of 30 in (762 mm) or greater,

(ii) A mass of 200 lbm (90.7 kg) or more, and

(iii) For engine powered mowers, an engine of 8 horsepower (6 kW) or more.

(2) *Reel-type mowers.* Reel-type power lawn mowers need not meet the performance requirements of the standard but they must be labeled as required by §1205.6.

§ 1205.2 Effective date.

This standard applies to all rotary walk-behind power lawn mowers manufactured after June 30, 1982, except §1205.6 *Warning labels,* applies to rotary and reel-type walk-behind power lawn mowers manufactured after December 31, 1979.

[44 FR 10024, Feb. 15, 1979, as amended 45 FR 86417, Dec. 31, 1980]

§ 1205.3 Definitions.

(a) As used in this part 1205:

(1) *Blade* means any rigid or semi rigid device or means that is intended to cut grass during mowing operations and includes all blades of a multi-bladed mower.

(2) *Blade tip circle* means the path described by the outermost point of the blade as it moves about its axis.

(3) *Crack* means a visible external fissure in a solid body caused by tensile, compressive, or shear forces.

(4) *Cutting width* means the blade tip circle diameter or, for a multi-bladed mower, the width, measured perpendicular to the forward direction, of a composite of all blade tip circles.

(5) *Deform* means any visible alteration of shape or dimension of a body caused by stresses induced by external forces.

(6) *Engine* means a power producing device which converts thermal energy from a fuel into mechanical energy.

(7) *Manual starting* means starting the mower engine with power obtained from the physical efforts of the operator.

(8) *Maximum operating speed* means the maximum revolutions per minute (rpm) obtainable by the engine or motor under the conditions of the particular test where the term is used. For an electrically powered mower, it is the speed attained when the mower is energized from a 60 Hz alternating current source that delivers a voltage no greater than 120 V and no less than 115 V at the power input to the mower, with the mower running. For a battery powered mower, it is the speed attained after the battery has been fully charged in accordance with the mower manufacturer's instructions.

(9) *Motor* means a power producing device that converts electrical energy into mechanical energy.

(10) *Normal starting means* is the primary mechanism intended to be actuated by the operator to start a mower's engine or motor (e.g., the cord mechanism of a manual start engine, the switch of an electric motor, or a power start mechanism).

(11) *Operating control zone* means the space enclosed by a cylinder with a radius of 15 in (381 mm) having a horizontal axis that is (1) perpendicular to the fore aft centerline of the mower and (2) tangent to

the rearmost part of the mower handle, extending 4 in (102 mm) beyond the outermost portion of each side of the handle (See Fig. 1).

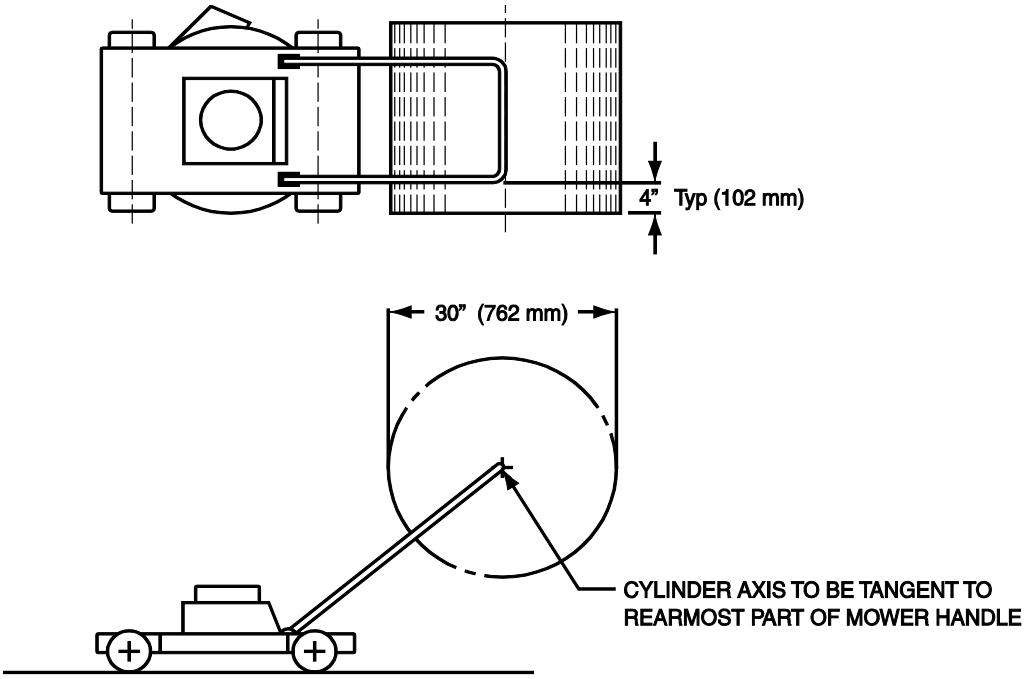


FIGURE 1 - OPERATING CONTROL ZONE

(12) *Power source* means an engine or motor.

(13) *Reel-type mower* means a lawn mower which cuts grass by rotating one or more helically formed blades about a horizontal axis to provide a shearing action with a stationary cutter bar or bed knife.

(14) *Rotary mower* means a power lawn mower in which one or more cutting blades rotate in essentially a horizontal plane about at least one vertical axis.

(15) *Separate* means to cause to have any apparent relative displacement induced by external forces.

(16) *Shield* means a part or an assembly which restricts access to a hazardous area. For the purposes of this part 1205, the blade housing is considered a shield.

(17) *Stress* means a force acting across a unit area in a solid material in resisting separation, compacting, or sliding that tends to be induced by external forces.

(18) *Top of the mower's handles* means the uppermost portion(s) of the handle that would be gripped by an operator in the normal operating position.

(19) *Walk-behind power lawn mower* means a grass cutting machine either pushed or self-propelled, with a minimum cutting width of 12 in (305 mm) that employs an engine or a motor as a power source and is normally controlled by an operator walking behind the mower.

(b) Where applicable, the definitions in section 3 of the Consumer Product Safety Act (15 U.S.C. 2052) apply to this part 1205.

[44 FR 10024, Feb. 15, 1979, as amended at 46 FR 54934, Nov. 5, 1981]

§ 1205.4 Walk-behind rotary power mower protective shields.

(a) *General requirements.* Walk-behind rotary power mowers shall meet the following requirements:

(1) When the foot probe of Fig. 2 is inserted under any point within the areas to be probed during the foot probe test of paragraph (b)(1) of this section, the shields shall prevent the foot probe from entering the path of the blade or causing any part of the mower to enter the path of the blade.

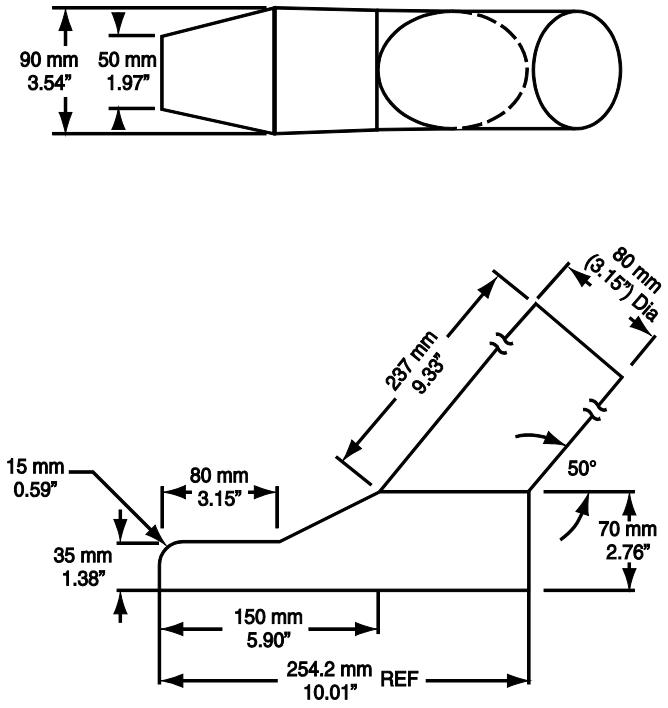


FIGURE 2 - FOOT PROBE

2) Any shield located totally or partly within the areas to be probed, as defined in paragraph (b) (1) (ii) of this section

shall not permanently separate, crack, or deform when the shield is subjected to a 50 lbf (222 N) static tensile force, uniformly distributed over not less than half the length of the shield. The force shall be applied for at least 10 seconds in the direction which produces the maximum stress on the shield. While being tested, a shield shall be attached to the mower in the manner in which it is intended to be used (This requirement does not apply to the housing)

(3) During the obstruction test of paragraph (b) (2) of this section, shields shall not:

(i) Stop the mower as a result of contact with the raised obstacle,

(ii) Enter the path of the blade, or

(iii) Cause more than one wheel at a time to be lifted from the fixture surface.

(b) Shield tests – general–(l) Foot probe test (i) The following test conditions shall be observed:

(A) The test shall be performed on a smooth level surface

(B) Pneumatic tires, when present, shall be inflated to the cold pressures recommended by the mower manufacturer

(C) The mower housing shall be adjusted to its highest setting relative to the ground

(D) The blade shall be adjusted to its lowest position relative to the blade housing.

(E) The mower shall be secured so that the mower may not move horizontally but is free to move vertically.

(ii) *Areas to be probed.* (A)(1*)* The minimum area to be probed shall include an area both 60 degrees to the right and 60 degrees to the left of the rear of the fore aft centerline of the cutting width. For single blade mowers, these angles shall be measured from a point on this fore aft centerline which is at the

center of the blade tip circle (See Fig. 3). For multi-blade mowers, these angles shall be measured from a point on the fore aft centerline of the cutting width which is one half of the cutting width forward of the rearmost point of the composite of all the blade tip circles (See Fig. 4).

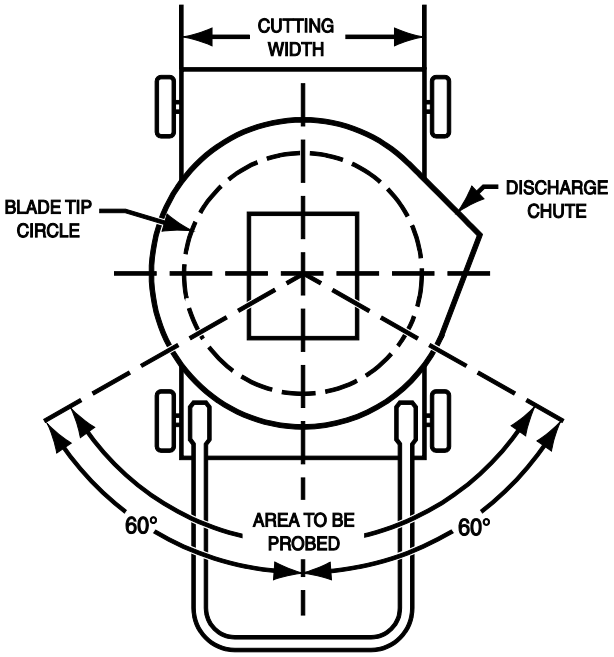


FIGURE 3 - AREA TO BE PROBED

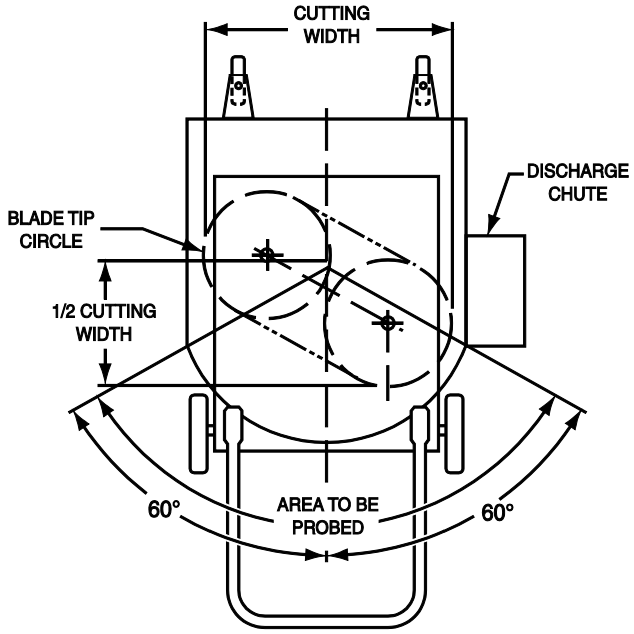


FIGURE 4 - AREA TO BE PROBED MULTI-BLADE MOWERS

(2*)* For a mower with a swing-over handle, the areas to be probed shall be determined as in paragraph (b) (1) (ii) (A) (1*)* of this section from both possible rear positions. (See Fig. 5.)

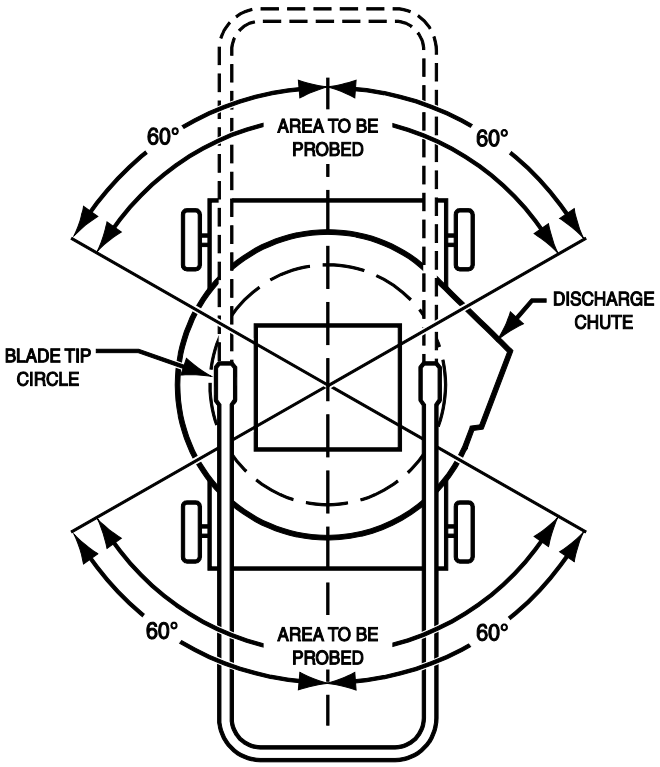


FIGURE 5 - AREA TO BE PROBED SWINGOVER HANDLE

(B) Where a 360 degree foot protective shield is required by §1205.5(a) (1) (iv) (B) or §1205.5(c), the entire periphery of the mower shall be probed (including any discharge chute comprising part of the periphery).

(iii) *Procedure.* Within the areas specified in paragraph (b) (1) (ii), the foot probe of Fig. 2 shall be inserted under the bottom edge of the blade housing and shields. During each insertion, the “sole” of the probe shall be kept in contact with the supporting surface. Insertion shall stop when the mower housing lifts or the horizontal force used to insert the probe reaches 4 lbf (17.8 N), whichever occurs first. As the foot probe is withdrawn after each insertion, the “toe” shall be pivoted upward around the “heel” as much as possible without lifting the mower.

(2) *Obstruction test.* (i) The following test conditions shall be observed:

(A) Pneumatic tires, when present, shall be inflated to the cold pressure recommended by the mower manufacturer.

(B) The mower housing shall be at its highest setting relative to the ground.

(ii) The test shall be performed on the fixture of Fig. 6, which consists of a level surface having (A) a 0.99 in (25 mm) deep depression with a 5.90 in (150 mm) radius of curvature and (B) a raised obstacle 0.60 in (15 mm) square, each extending the full width of the fixture. The depression shall be lined with a material having a surface equivalent to a 16 to 36 grit abrasive. The depression and the obstacle shall be located a sufficient distance apart so that the mower contacts only one at a time.

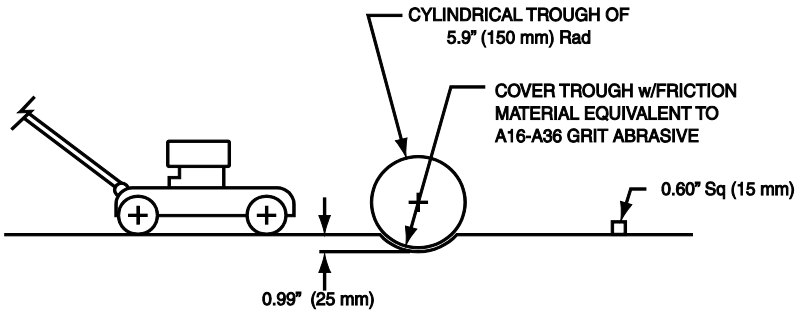


FIGURE 6 - OBSTRUCTION TEST FIXTURE

(iii) The test fixture may be relieved, only to the extent necessary, to prevent interference with any blade retaining device.

(iv) The mower shall be pushed forward and pulled rearward perpendicular to and across the depression and the raised obstacle on the fixture. The mower shall be pulled and pushed, without lifting, with a horizontal force sufficient to transit the obstruction fixture at a speed not to exceed 2.2 ft/sec (0.7 m/sec).

(c) *Movable shields* — (1) *General.* Movable shields must meet the general shield requirements of paragraph (a) of this section. In addition, movable shields which are in any of the areas to be probed defined in paragraph (b)(1)(ii) of this section and which are intended to be movable for the purpose of attaching auxiliary equipment, when deflected to their extreme open position in the manner intended by the manufacturer and released, shall either:

(i) Return automatically to a position that meets the requirements of subpart A of this part 1205 when the attached equipment is not present, or

(ii) Prevent operation of the blade(s) unless the attached equipment is present or the movable shield is returned to a position that meets the requirements of subpart A of this part 1205.

(2) *Tests.* (i) Automatic return of a movable shield shall be determined by manually deflecting the shield to its extreme open position, then releasing the shield and visually observing that it immediately returns to the closed position.

(ii) Prevention of operation of the blade(s) shall be determined, first by manually deflecting the shield to its extreme open position, then, following the appropriate manufacturer's instructions, completing the procedures necessary to operate the blade. Observe, using any safe method, that the blade(s) has been prevented from operating.

[44 FR 10024, Feb. 15, 1979, as amended at 45 FR 86417, 86418, Dec. 31, 1980; 46 FR 54934, Nov. 5, 1981; 48 FR 6328, Feb. 11, 1983]

§ 1205.5 Walk-behind rotary power mower controls.

(a) *Blade control systems* — (1) *Requirements for blade control.* A walk-behind rotary power mower shall have a blade control system that will perform the following functions:

(i) Prevent the blade from operating unless the operator actuates the control.

(ii) Require continuous contact with the control in order for the blade to continue to be driven.

(iii) Cause the blade motion in the normal direction of travel to come to a complete stop within 3.0 seconds after release of the control.

(iv) For a mower with an engine and with only manual starting controls, this blade control shall stop the blade without stopping the engine, unless:

(A) The engine starting controls for the lawn mower are located within 24 inches from the top of the mower's handles, or

(B) The mower has a protective foot shield which extends 360 degrees around the mower housing (See §1205.4 (b) (1) (ii) (B)).[1]

(2) All walk-behind rotary power mowers shall have, in addition to any blade control required by paragraph (a)(1) of this section, another means which must be manually actuated before a stopped blade can be restarted. This additional means may be either a control which is separate from the control required by paragraph (a) (1) of this section, or may be incorporated into the control required by paragraph (a) (1) of this section as a double action device requiring two distinct actions to restart the blade.

(b) *Blade stopping test* — (1) *General.* Any test method that will determine the time between the release of the blade control and the complete stop of the blade motion in the normal direction of travel may be used.

(2) *Conditions.* (i) The mower shall be operated at maximum operating speed for at least 6 minutes immediately prior to the test.

(ii) The blade must be at maximum operating speed when the blade control is released.

(c) *Starting controls location.* Walk-behind mowers with blades that begin operation when the power source starts shall have their normal starting means located within the operating control zone unless the requirements of paragraphs (a) (1) (iv) (A) or (B) of this section apply to the mowers.

[44 FR 10024, Feb. 15, 1979, as amended at 46 FR 54934, Nov. 5, 1978]

§ 1205.6 Warning label for reel-type and rotary power mowers.

(a) *General.* Walk-behind power lawn mowers shall be labeled on the blade housing or, in the absence of a blade housing, on other blade shielding or on an adjacent supporting structure or assembly, with the warning label shown in Fig. 7. The label shall be at least 3.25 in (82.5 mm) high and 4 in (102 mm) wide, and the lettering and symbol shall retain the same size relation to each other and to the label as shown in Fig. 7.

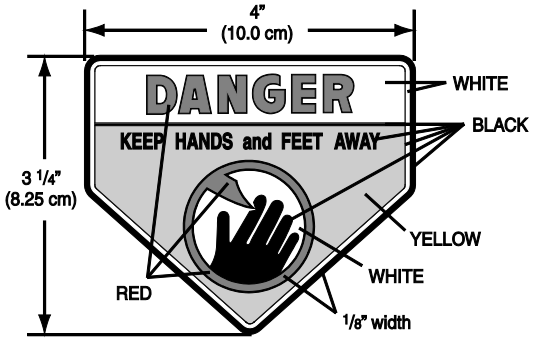


FIGURE 7

(b) *Rotary mowers.* Walk-behind rotary mowers shall have one label as shown in Fig. 7, on the blade housing. The label shall be located as close as possible to any discharge opening, or, if there is no discharge opening, in a position that is conspicuous to an operator in the normal operating position.

(c) *Reel-type mowers.* Walk-behind power reel-type mowers shall have one label as shown in Fig. 7, located as close to the center of the cutting width of the blade as possible. However, in the absence of a suitable mounting surface near the center of the cutting width, the label shall be placed on the nearest suitable mounting surface to the center of the cutting width.

[44 FR 10024, Feb. 15, 1979, as amended at 45 FR 86417, Dec. 31, 1980]

[1] Paragraphs (A) and (B) of §1205.5(a)(1)(iv), permitting mowers that stop the blade by stopping the engine but that do not have power-restart, were added to the standard as directed by Sec. 1212 of the Omnibus Budget Reconciliation Act of 1981, Pub. L. 97–35, 95 Stat. 357.

§ 1205.7 Prohibited stockpiling.

(a) *Stockpiling. Stockpiling* means manufacturing or importing a product which is the subject of a consumer product safety rule between the date of issuance of the rule and its effective date at a rate that is significantly greater than the rate at which such product was produced or imported during a base period prescribed by the Consumer Product Safety Commission.

(b) *Prohibited acts.* Stockpiling of power lawn mowers that do not comply with this subpart A of part 1205 at a rate that exceeds by 20% the rate at which the product was produced or imported during the base period described in paragraph (c) of this section is prohibited.

(c) *Base period.* The base period for power lawn mowers is, at the option of each manufacturer or importer, any period of 365 consecutive days beginning on or after September 1, 1971, and ending on or before August 31, 1978.

§ 1205.8 Findings.

(a) *General.* In order to issue a rule such as part 1205, the Consumer Product Safety Act requires the Commission to consider and make appropriate findings with respect to a number of topics. These findings are discussed below.

(b) *The degree and nature of the risk of injury part 1205 is designed to eliminate or reduce.* (1) The Commission estimates that there are approximately 77,000 injuries to consumers each year caused by contact with the blades of power lawn mowers. From 1977 data, the Commission estimates that each year there are approximately 7,300 finger amputations, 2,600 toe amputations, 2,400 avulsions (the tearing of flesh or a body part), 11,450 fractures, 51,400 lacerations, and 2,300 contusions. Among the lacerations and avulsions, 35,800 were to hands and fingers and 18,000 were to toes and feet. The estimated costs caused by these injuries are $253 million, not counting any monetary damages for pain and suffering. These injuries are caused when consumers accidentally contact the blade, either inadvertently while in the vicinity of the mower, or while intentionally performing some task which they erroneously believe will not bring their hand or foot into the path of the blade.

(2) Part 1205 is expected to eliminate or reduce the severity of about 60,000 blade contact injuries per year, or 77% of all such injuries. The Commission estimates that if all mowers had been in compliance with the standard in 1977, about 6,800 finger amputations, 1,500 toe amputations, 11,000 fractures, 1,800 avulsions, 38,400 lacerations, and several hundred contusions would not have occurred. Of the lacerations and avulsions, 28,300 were finger injuries and 9,400 were toe injuries.

(c) *Consumer products subject to the rule.* The products subject to this standard are walk-behind power mowers. Power mowers with rigid or semi-rigid rotary blades are subject to all the provisions of the standard while reel-type and rotary mowers are subject to the labeling requirements. Mowers that in combination have engines of 8 hp or greater, weigh 200 lbm or more, and have a cutting width of 30 in or more are excluded from the standard. The Commission estimates that at least 98% of the total annual market (by unit volume) for walk-behind mowers will be affected by the standard, and the Commission estimates that in 1978 this market was 5.4 million units.

(d) *Need of the public for the products subject to the rule.* The Commission finds that the public need for walk-behind power mowers, which provide a relatively quick and effective way to cut grass, is substantial. Riding mowers, lawn and garden tractors, hand reel mowers, trimmers and edgers, and sickle bar mowers also provide grass cutting services, but walk-behind power rotary mowers are by far the most commonly used devices for maintaining household lawns. There are no devices that can completely substitute for walk-behind power mowers as a group, since they have applications for which other products are not as suitable. Each type of walk-behind power mower has individual properties which meet public needs, although one type of walk-behind is often an acceptable substitute for another. The newly developed monofilament line mower is not included within the scope of the standard and could be a substitute for mowers using rigid or semi-rigid blades under some conditions.

(e) *Probable effect of the rule upon the utility of the product.* (1) The Commission finds that the probable overall effect of the standard on the utility of mowers should be to increase their utility. In the first place, consumers are likely to experience an increased sense of security from having a safer mower. A study of brake-clutch mowers conducted by the Federal Supply Service (GSA) shows that almost all users appreciated the safety features on brake-clutch mowers. In addition, by releasing the blade control and

stopping the blade, the operator can then travel over gravel or other surfaces without fear of thrown objects or of the blade striking objects that might damage the mower. Brake-clutch type mowers would also give an increase in utility by virtue of enabling the operator to use the clutch to prevent stalling when the mower bogs down in heavy grass. On the other hand, there may be some minor adverse effects on utility caused by some aspects of complying mowers. For example, in very heavy mowing conditions, there may be some difficulty in engaging the blade in a blade-clutch mower. (However, mowers that are currently on the market that are not equipped with a blade-clutch may have difficulty in starting the engine in heavy grass.) Complying mowers may require slightly more time and a few additional actions to operate. Since complying mowers may have more electrical and mechanical parts than current mowers, they may weigh more and require more maintenance than current mowers. No significant increase in mowing time is expected if a brake-clutch device is used to comply with the standard since each engagement of the blade would require only a few seconds. The amount of additional time and expense required for maintenance, if any, will be dependent on the design solution used. Such disutilities are expected to be slight and to be more than balanced by the increased sense of security consumers are likely to experience from having a safer mower.

(2) During the development of the rule, questions were raised about whether changes in the shields necessitated by the foot probe requirements would adversely affect utility by causing mowers to be hard to push in grass or to be unable to mow close to walls. At the time of issuance of this rule, mowers are available that will pass a 360° foot probe and others are available that will pass rear and side foot probing without any significant loss of utility caused by shielding. Therefore, the Commission concludes that this requirement will not adversely affect the utility of mowers. Mowers with swing-over handles, however, may be more difficult to design in this regard, since 120° at each end of the mower are subject to the foot probe requirement. However, since mowers meeting this requirement have already been built without apparent loss of utility, the Commission concludes that shielding can be designed so that there should be no loss of utility even for mowers with swing-over handles.

(3) As required by section 9(b) of the CPSA, the Commission, in considering the issues involved in issuing a power lawn mower safety standard, has considered and taken into account the special needs of elderly and handicapped persons to determine the extent to which such persons may be adversely affected by the rule. The Commission has determined that there will be no significant adverse effect on such persons as a result of this part 1205. In the first place, the rule can affect only those persons who are physically capable of using a power lawn mower. None of the rule's provisions will make it more difficult to operate a mower that complies with the standard. On the contrary, complying mowers should be easier to use because the need for manually restarting the mower will be less and because, if the mower uses a brake-clutch to comply with the blade control requirement, use of the brake-clutch can reduce the tendency of the engine to stall in heavy grass. Although a person's ability to hold a device such as a blade control for a long period of time will decline with age, the force required to hold the blade control can be made low enough that it will not be a problem during the length of time that it takes for consumers to mow a lawn.

(4) After considering the possible adverse effects on mowers that could be caused by the standard and balancing them against the increase in utility that is expected, the Commission concludes that, for a typical consumer, the increases in utility should more than offset any decreases.

(f) *Probable effect of the rule upon the cost of the product.* The Commission estimates that the retail price impact of the standard will be about $35 for the average walk-behind mower. Based on an average useful mower-life of about 8 years, the additional annual cost to the purchaser is expected to average about $4.40. The probable effect of the standard will differ on the various types of mowers within its scope. Percentage increases in price will vary from about a 7 percent increase for power-restart self-propelled mowers to about a 30 percent increase for gasoline-powered manual-start push mowers. The costs attributable to individual requirements of the standard are discussed in paragraph (i) of this section.

(g) *Probable effect of the rule upon the availability of the product.* (1) The Commission finds that the standard is not expected to have a significant impact on the availability of walk-behind rotary mowers, since domestic production capacity appears to be sufficient to handle any increased demand for safety related components or materials. Although adapting some types of power mowers to the standard may be more costly than others, the effects of the standard on the price or utility of a particular category of power mowers are not expected to cause radical shifts in demand among types of mowers. The Commission finds that all types of power mowers subject to the standard will be available, although some, such as

house current powered mowers, may increase their market shares because they can be brought into compliance with the standard at a lesser cost.

(2) Because some manufacturers may not revise their entire product line before the effective date of the standard, individual mower manufacturers may initially have less varied lines than at present, but there should be no decrease in the overall types and features of mowers available to consumers.

(h) *Alternative methods.* (1) The Commission has considered other means of achieving the objective of the standard. For example, alternatives were considered such as hand probes, “blade harmless” tests, and blade control by engine-kill but allowing manual restart. These alternatives have been rejected by the Commission as being either unfeasible or not as effective as the rule which is being issued.

(2) Similarly, the Commission has found no alternative means of achieving the objective of the standard that it believes would have fewer adverse effects on competition or that would cause less disruption or dislocation of manufacturing and other commercial practices, consistent with the public health and safety.

(i) *Unreasonable risk of injury.* (1) The determination of whether a consumer product safety rule is reasonably necessary to reduce an unreasonable risk of injury involves a balancing of the degree and nature of risk of injury addressed by the rule against the probable effect of the rule on the utility, cost, or availability of the product. The factors of utility and availability of the products, adverse effects on competition, and disruption or dislocation of manufacturing and other commercial practices have been discussed above. The following discussion concerns the relationship of anticipated injury reduction and costs for various requirements of the standard. (See the report, *Economic Impact of Blade Contact Requirements for Power Mowers,* January 1979, for a detailed analysis of the possible effects of discounting and inflation on the computation of the quantifiable benefits associated with this regulation.)

(2) The foot probe and related requirements are expected to reduce the number of blade contact injuries to the foot by 13,000 each year. It is not possible to apportion this injury reduction among the respective requirements. The cost of these requirements is estimated to be about $4.00 per mower, mostly for redesign of the shields. The shield strength requirement is similar to a requirement in the existing voluntary standard that is almost universally complied with, and should comprise only a small portion of the $4.00 retail cost increase compared to pre standard mowers that is attributable to this related group of requirements. Also, shields complying with the movable shield requirement are featured in some currently produced mowers.

(3) The foot probe and related requirements should result in a cost increase of about $22,000,000 and undiscounted injury savings of about $46,000,000, exclusive of any allowance for pain and suffering.

(4) The starting location control requirement would apply only to mowers with a power-restart capability using engine-kill to stop the blade. The cost for relocating the power-restart switch, if necessary, should be very minor, and more than offset by the elimination of a clutch, as discussed below.

(5) The requirement that the blade stop within 3 seconds of the release of the blade control is supported by (i) the requirement that those mowers that stop the blade by stopping the engine must have a power-restart (to remove the motivation to disable the blade control because of the inconvenience of manually starting the mower each time the control is released) and by (ii) the requirement for an additional control that must be actuated before the blade can resume operation (to prevent accidental starting of the blade). Together, these requirements are expected to reduce the number of blade contact injuries by 46,500 per year for an undiscounted savings in injury costs of about $165,000,000 per year, exclusive of pain and suffering.

(6) Virtually all mowers will be subjected to a cost increase of about $3 for the blade control actuating means and $1 for the second control required to restart the blade. (The $1 cost could be eliminated for power-restart engine-kill mowers that do not start when the blade control is actuated.)

(7) Also, most mowers would require a brake for the blade in order to achieve a 3 second stop time. This would add another $6.50–$8.50, depending on the type of mower. Mowers with power-restart capability could stop the blade by killing the engine and thus would not need to provide a clutch to disconnect the engine from the blade. Mowers using manual restart would have to provide a clutch or other blade disengagement devices, which would probably be combined with the brake in a unitary brake-clutch mechanism.

(8) The following are the Commission's estimates of the probable retail price increases associated with certain types of currently produced mowers that will be caused by the blade control requirements.

Type of mower	Blade control retail price increases
Electric mowers (house current or battery powered)	$15.00
Present Electric start gasoline mowers	13.00–19.50
Present Manual start gasoline mowers brake-clutch approach	32.50
Power-restart approach	29.00–39.50

(9) The weighted average retail price increase of the blade stop requirements is expected to be about $31 per mower for a total retail cost increase of $167,000,000.

(10) The foot probe and blade stop requirements of the standard will obviously not completely protect the users of mowers under all circumstances. It is still essential for consumers to be aware of the hazard of blade contact and take the proper precautions to protect themselves. It is especially important that users not become complacent with the knowledge that the mower incorporates blade contact safety requirements. Accordingly, the Commission has determined that it is desirable that mowers complying with the standard bear a label warning of the danger of blade contact. Such a requirement would result in practically no effect on the retail price of mowers since labels are very inexpensive and practically all currently produced mowers bear some type of warning label. In view of the hazard that will be associated with power mowers even after the effective date of the standard, and the low cost of the label, the Commission concludes there is an unreasonable risk of injury that can be addressed by the label requirements in this part 1205.

(j) *Conclusion.* Therefore, after considering the anticipated costs and benefits of part 1205 and the other factors discussed above, and having taken into account the special needs of elderly and handicapped persons to determine the extent to which such persons may be adversely affected by the rule, the Commission finds that part 1205 (including the effective dates) is reasonably necessary to eliminate or reduce the unreasonable risk of injury associated with walk-behind power lawn mowers and that promulgation of the rule is in the public interest.

[44 FR 10024, Feb. 15, 1979, as amended at 45 FR 86417, Dec. 31, 1980]

Subpart B—Certification

Source: 44 FR 70386, Dec. 6, 1979, unless otherwise noted.

§ 1205.30 Purpose, scope and application.

(a) *Purpose.* Section 14(a) of the Consumer Product Safety Act, 15 U.S.C. 2063(a), requires every manufacturer (including importer) and private labeler of a product which is subject to a consumer product safety standard to issue a certificate that the product conforms to the applicable standard, and to base that certificate either on a test of each product or on a “reasonable testing program.” The purpose of this subpart B of part 1205 is to establish requirements that manufacturers and importers of walk-behind rotary power lawn mowers subject to the Safety Standard for Walk-behind Power Lawn Mowers (16 CFR part 1205, subpart A), shall issue certificates of compliance in the form of specified labeling and shall keep records of the testing program on which the certificates are based.

(b) *Scope and application.* (1) The provisions of this rule apply to all rotary walk-behind power lawn mowers which are subject to the requirements of the Safety Standard for Walk-behind Power Lawn Mowers. This rule does not apply to reel-type mowers, which are subject only to the labeling requirements of the standard.

(2) As authorized by section 14(a) (2) of the act, the Commission exempts manufacturers who manufacture or import only component parts, and private labelers, from the requirement to issue certificates. (Private labelers who are also importers must still certify.)

§ 1205.31 Effective date.

Any walk-behind rotary power mower manufactured after December 31, 1981, must meet the standard and must be certified as complying with the standard in accordance with this rule.

§ 1205.32 Definitions.

In addition to the definitions set forth in section 3 of the act (15 U.S.C. 2052) and in §1205.3 of the standard, the following definitions shall apply to this subpart B of part 1205:

(a) "*Manufacturer*" means any person or firm that manufactures or imports power lawn mowers subject to this standard, and includes those that assemble power lawn mowers from parts manufactured by other firms.

(b) "*Manufactured*" means the earliest point at which the mower is in the form in which it will be sold or offered for sale to the consumer or is in the form in which it will be shipped to a distributor or retailer. In these forms, a "manufactured" mower may still require partial assembly by the consumer or the lawn mower dealer.

(c) "*Private labeler*" means an owner of a brand or trademark which is used on a power lawn mower subject to the standard and which is not the brand or trademark of the manufacturer of the mower, provided the owner of the brand or trademark has caused or authorized the mower to be so labeled and the brand or trademark of the manufacturer of such mower does not appear on the label.

(d) "*Production lot*" means a quantity of mowers from which certain mowers are selected for testing prior to certifying the lot. All mowers in a lot must be essentially identical in those design, construction, and material features which relate to the ability of a mower to comply with the standard.

(e) "*Reasonable testing program*" means any test or series of tests which are identical or equivalent to, or more stringent than, the tests defined in the standard and which are performed on one or more mowers of the production lot for the purpose of determining whether there is reasonable assurance that the mowers in that lot comply with the requirements of the standard.

§ 1205.33 Certification testing.

(a) *General.* Manufacturers and importers shall either test each individual rotary walk-behind power lawn mower (or have it tested) or shall rely upon a reasonable testing program to demonstrate compliance with the requirements of the standard.

(b) *Reasonable testing program.* (1) A reasonable testing program for rotary walk-behind power mowers is one that provides reasonable assurance that the mowers comply with the standard. Manufacturers and importers may define their own reasonable testing programs. Such reasonable testing programs may, at the option of manufacturers and importers, be conducted by an independent third party qualified to perform such testing programs.

(2) To conduct a reasonable testing program, the mowers shall be divided into production lots. Sample mowers from each production lot shall be tested in accordance with the reasonable testing program so that there is a reasonable assurance that if the mowers selected for testing meet the standard, all mowers in the lot will meet the standard. Where there is a change in parts, suppliers of parts, or production methods that could affect the ability of the mower to comply with the requirements of the standard, the manufacturer should establish a new production lot for testing.

(3) The Commission will test for compliance with the standard by using the test procedures contained in the standard. However, a manufacturer's reasonable testing program may include either tests prescribed in the standard or any other reasonable test procedures. (For example, in the shield strength test (§1205.4), the manufacturer might choose to use a force higher than the 50 lbf force specified in the standard.)

(4) If the reasonable testing program shows that a mower does not comply with one or more requirements of the standard, no mower in the production lot can be certified as complying until the non-complying mowers in the lot have been identified and destroyed or altered by repair, redesign, or use of a different material or components to the extent necessary to make them conform to the standard. The sale or

offering for sale of mowers that do not comply with the standard is a prohibited act and a violation of section 19(a) (1) of the CPSA, regardless of whether the mower has been validly certified.

§ 1205.34 Recordkeeping requirements.

(a) *General.* Every person issuing certificates of compliance for walk-behind rotary power lawn mowers subject to the standard shall maintain written records which show that the certificates are based on a test of each mower or on a reasonable testing program. The records shall be maintained for a period of at least 3 years from the date of certification of each mower or each production lot. These records shall be available to any designated officer or employee of the Commission upon request in accordance with section 16(b) of the act (15 U.S.C. 2065(b)).

(b) *Content of records.* Records shall identify the mower tested and the production lot and describe the tests the mowers have been subjected to and the results of the tests.

(c) *Format for records.* The records required to be maintained by this section may be in any appropriate form or format that clearly provides the required information.

§ 1205.35 Product certification and labeling by manufacturers.

(a) *Form of permanent label of certification.* Manufacturers (including importers) shall issue certificates of compliance for walk-behind rotary power lawn mowers manufactured after the effective date of the mower standard in the form of a label which can reasonably be expected to remain on the mower during the period the mower is capable of being used. Such labeling shall be deemed to be a “certificate” of compliance as that term is used in section 14 of the act. (15 U.S.C. 2063.)

(b) *Contents of certification label.* The certification labels required by this section shall clearly and legibly contain the following information:

(1) The statement “Meets CPSC blade safety requirements.”

(2) An identification of the production lot.

(3) The name of the person or firm issuing the certificate.

(4) The location where the product was principally assembled.

(5) The month and year the product was manufactured.

(c) *Coding.* Except for the requirements of paragraphs (b) (1) and (b) (3) of this section, all of the information required by §1205.35 may be in code, provided the person or firm issuing the certificate maintains a written record of the meaning of each symbol used in the code that will be made available to the distributor, retailer, consumer, and the Commission upon request. If a mower is manufactured for sale by a private labeler, and if the name of the private labeler is also on the certification label, the name of the manufacturer or importer issuing the certificate may also be in such a code.

(d) *Placement of label.* The label required by this section must be visible and legible to the ultimate purchaser of the lawn mower. For mowers manufactured before January 1, 1984, where the label is not visible to the consumer at the time of sale because of packaging or marketing practices, an additional label or notice, which may be temporary, stating “Meets CPSC blade safety requirements” shall also appear on the container, or, if the container is not so visible, the promotional material, used in connection with the sale of the mowers.

[44 FR 70386, Dec. 6, 1979, as amended at 49 FR 28241, July 11, 1984]

§ 1205.36 Product certification and labeling by importers.

(a) *General.* The importer of any rotary walk-behind power lawn mower subject to the standard must issue the certificate of compliance required by section 14(a) of the Act and §1205.35 of this regulation. If testing of each mower, or a reasonable testing program, meeting the requirements of this subpart B of part 1205 has been performed by or for the foreign manufacturer of the product, the importer may rely in good faith on such tests to support the certificate of compliance provided the importer is a resident of the United States or has a resident agent in the United States and the records of such tests required by §1205.34 of this part are maintained in the United States.

(b) *Responsibility of importer.* If the importer relies on tests by the foreign manufacturer to support the certificate of compliance, the importer bears the responsibility for examining the records supplied by the manufacturer to determine that the records of such tests appear to comply with §1205.34 of this part.

Annex D

(informative)

Bibliography

For additional information with respect to the products covered in this standard, please consult the following standards:

ANSI/OPEI B71.10, *American National Standard for Off-Road Ground-Supported Outdoor Power Equipment – Gasoline Fuel Systems – Performance Specifications and Test Procedures*

ISO 21299, *Powered ride-on turf care equipment – Roll-over protective structures (ROPS) – Test procedures and acceptance criteria*