

American National Standard

*for Outdoor Power Equipment –
Portable, Handheld,
Internal Combustion Engine-Powered
Cut-Off Machines –
Safety and Environmental
Requirements*

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American National Standard
for Outdoor Power Equipment –

Portable, Handheld,
Internal Combustion Engine-Powered
Cut-Off Machines –
Safety and Environmental Requirements

Sponsor

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American National Standard

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Foreword (This foreword is not part of American National Standard ANSI/OPEI B175.4-2018.)

This standard revises ANSI/OPEI B175.4-2013, *American National Standard for Outdoor Power Equipment - Portable, Handheld, Internal-Combustion-Engine-Driven Cut-Off Machines - Safety Requirements*.

The B175.4 Standards Development Committee developed this standard. The Committee is comprised of several organizations and individuals that evaluate or manufacture these products and accessories.

This standard covers maximum wheel diameters up to 16 inches.

A summary of the principal changes included in this standard is as follows:

- Figures were harmonized with ISO;
- Front handle and rear handle dimensional requirements clauses were removed, as these are adequately covered in 4.2.1, Table 1, and Figures 4 - 8;
- Throttle control lockout performance requirements were added;
- Fuel test procedures that are common across OPEI B175 product standards were moved from the body of the standard to Annex A;
- Fuel tank structural integrity test procedures were further clarified;
- Excessive fuel heating performance requirements were added;
- Heat protection test procedures were added;
- Minimum flange dimensions (Tables 2 and 3) were updated to reflect nominal wheel diameters;
- The maximum operator ear sound pressure level was reduced from 90 to 85 dB(A) to harmonize with other OPEI B175 standards;
- Sound measurement procedures in Annexes B and C were updated to reflect the most recent IEC standard, 61762-1.

Consensus for this standard was achieved by the use of the Canvass Method.

There are seven annexes in this standard. Annexes A - F are normative and are considered part of the standard. Annex G is informative and is not considered part of the standard.

Suggestions for improvements of this standard are welcome. They should be sent to the Outdoor Power Equipment Institute, 1605 King Street, 3rd Floor, Alexandria, VA 22314.

The following entities, recognized as having interest in the standardization of safety requirements for cut-off machines, were contacted prior to the approval of this revised standard. Inclusion in this list does not necessarily imply that the organization concurred with the submittal of the proposal to ANSI:

Mr. Terry Ditsch - User

Mr. Dan Murrar - User

Mr. Pat O'Brien - Concrete Sawing & Drilling Association - User

Mr. Vinny Mago - American Rental Association - User

Mr. Dag Garskog - Husqvarna - Producer

Mr. Sebastian Hanussek - Andreas Stihl Ag & Co - Producer

Ms. Stephanie Thompson - Hitachi Koki USA Limited - Producer

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Ms. Nicolette Weeks - Underwriters Laboratories, Inc. - General Interest

Mr. Ralph Gonzales - USDA Forest Service, San Dimas - General Interest

Mr. Joe Harding - Power Tool Institute - General Interest

American National Standard
for Outdoor Power Equipment –

Portable, Handheld, Internal Combustion Engine–Powered Cut-Off Machines – Safety and Environmental Requirements

1. Scope and purpose

This standard applies to portable, handheld, internal combustion engine-powered machines, which use a rotating cut-off (abrasive) wheel that is center-mounted on and driven by a spindle shaft, and designed for cutting construction materials such as asphalt, concrete, stone, and metal.

The requirements in this standard apply to machines using up to 16 in (400 mm) nominal cut-off wheels. If the machine is designed for larger than 16 in (400 mm) nominal cut-off wheels, the requirements of this standard shall be considered. The requirements listed may apply to machines designed for larger cut-off wheels.

Cut-off wheel design and safety specifications are not included in this standard.

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.

“ANSI/OPEI B175.4-2018” and “ANSI B175.4-2018” may be used interchangeably wherever referenced or required in this standard.

1.1. Purpose

This standard establishes safety and environmental requirements to reduce the risk of injury associated with the use of portable, handheld, internal combustion engine-powered machines using a rotating cut-off (abrasive) wheel.

2. Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this American National Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ANSI B7.1-2017, *Safety requirements for the use, care, and protection of abrasive wheels*

ANSI Z87.1-2015, *Practice for occupational and educational eye and face protection*

ANSI/UL 969-2017, *Marking and labelling systems*

IEC 61672-1:2013, *Electroacoustics – Sound level meters – Part 1: Specifications*

ISO 5349-1: 2012, *Mechanical vibration – Measurement and evaluation of human exposure to hand-transmitted vibration – Part 1: General requirements*

ISO 7293: 1997, *Forestry machinery – Portable chain-saws – Engine performance and fuel consumption*

SAE J184-1998, *Qualifying a sound data acquisition system*

SAE J335 -2012, *Multi-position small engine exhaust system fire ignition suppression*

U.S. Department of Agriculture Forest Service, *Standard for Spark Arresters for Internal Combustion Engines 5100-1*

ISO 1431-1:2004, *Rubber, vulcanized or thermoplastic -- Resistance to ozone cracking – Part 1: Static and dynamic strain testing*

3. Definitions

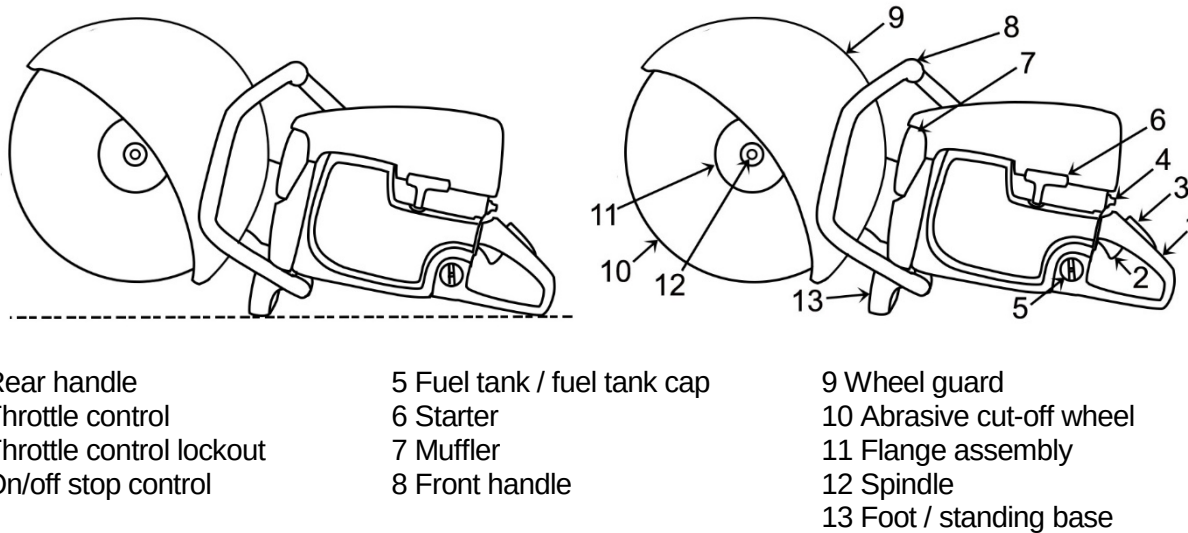


Figure 1 – Typical cut-off machine

3.1. Abrasive cut-off wheel

An abrasive wheel designed to be used on portable, handheld, cut-off machines with dimensions and provisions as given in this standard.

Speeds of abrasive cut-off wheel(s) used on portable, handheld, cut-off machines in this standard shall correspond to Clause 7 of ANSI B7.1, *Special Speeds*, for wheel speeds exceeding 80 m/s (15748 fpm).

NOTE – Tests in this standard should be conducted with wheels that comply with ANSI B7.1 unless otherwise noted.

3.2. Arbor hole

The center hole of the cut-off wheel used for mounting the wheel on the machine spindle.

3.3. Blotter

Compressible discs or washers usually of blotting paper stock, plastic, cardboard or gasket material, used between the cut-off wheel and flanges when mounting.

3.4. Choke control

A control that is used to enrich the carburetor fuel/air mixture to aid starting.

3.5. Clutch

A device for connecting and disconnecting a driven member to and from a rotating source of power.

3.6. Flange assembly

A device provided to clamp and drive the cut-off wheel.

3.7. Flange contact surface

The area between the inner and the outer lines on the flange, which forms the minimal radial width of the bearing surface between the flanges and the cut-off wheel. (Refer to “r” in Figure 15.)

3.8. Gyroscopic forces

Forces that can be caused by the rapid spinning of the cut-off wheel that result in opposition to directional change of the cut-off machine.

3.9. Handle

A device designed to facilitate control of the machine in all operating positions foreseen by the manufacturer.

3.9.1. Front handle

Handle located nearest to the cut-off wheel.

3.9.2. Rear handle

Handle located furthest away from the cut-off wheel.

3.10. Maximum depth of cut

The depth to which the cut-off wheel can enter the work piece as measured from the outside diameter of the wheel to the outside diameter of the flange. (See dimension “t” in Figure 2.)

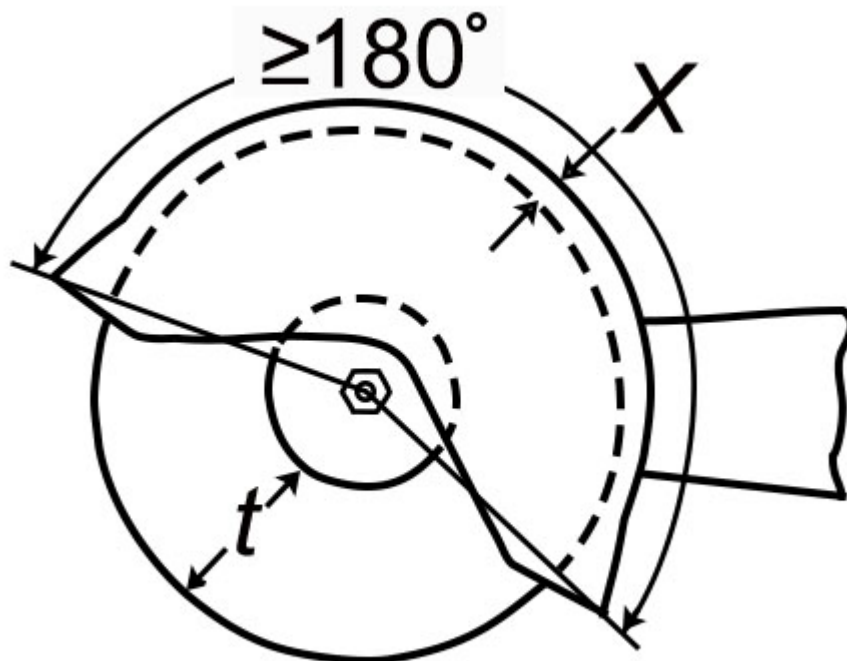


Figure 2 – Cutting equipment – Depth of cut

3.11. May

Indicates a permissive condition.

3.12. Muffler

Device for reducing engine exhaust noise and directing the exhaust gases.

3.13. On/off or stop control

A control that allows the engine to run or causes the engine to stop.

3.14. Operating/cutting position(s)

The operating cutting position relative to the cut-off machine, as defined by the manufacturer in the operator's manual. Figure 3 depicts one of the typical cutting positions and the plane of the cut-off wheel.

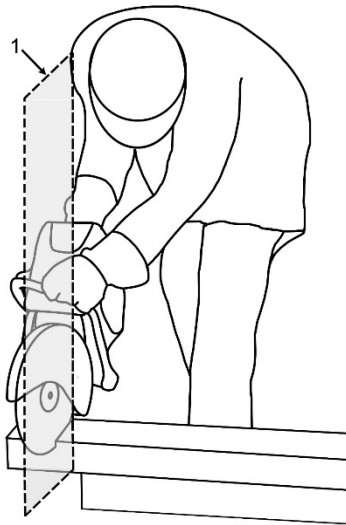


Figure 3 – A typical operating/cutting position

3.15. Primer/Purger

A device in the fuel system for supplying extra fuel or evacuating air to aid starting.

3.16. Reactive forces

If the spinning cut-off wheel is slowed or stopped by frictional contact with any solid object, including the work piece, or if it is pinched or bound in the cut, reactive forces are generated in a direction opposite to that in which the wheel is moving at the point of contact. Subclauses 3.16.1, 3.16.2, and 3.16.3, which further describe these reactions, are based on an abrasive cut-off wheel rotation with the top of the wheel rotating away from the operator.

3.16.1. Rotational forces and kickback

If the spinning cut-off wheel is slowed or stopped by frictional contact with any solid object in its upper quadrant, the wheel may attempt to move back and up towards the operator. If it is abruptly slowed or stopped by a pinch or binding in the upper quadrant, the wheel may be thrown back and up towards the operator in a rotational kickback motion.

3.16.2. Climbing

If the spinning cut-off wheel is slowed or stopped by frictional contact with any solid object or by a pinch or binding at the front of the wheel, the wheel may attempt to climb the object being cut (climbing).

3.16.3. Pull-away

If the spinning cut-off wheel is slowed or stopped by frictional contact with any solid object or by a pinch or binding at the bottom of the wheel, the wheel may attempt to pull away from the operator (pull-away).

3.17. Reducing bushing

See ANSI B7.1, subclause 1.2.69

3.18. Shall

Indicates a mandatory requirement.

3.19. Spark arrester

A device through which exhaust gases pass to limit the size of particle emissions.

3.20. Spark arresting muffler

A muffler that contains a spark arrester.

3.21. Speeds

3.21.1. Idle speed

Engine speed as recommended by the manufacturer, at which the engine runs reliably and the cut-off wheel does not rotate.

3.21.2. Rated speed

The engine speed where maximum power occurs as determined by the manufacturer.

3.21.3. Maximum spindle speed

Speed (rpm) at which the spindle rotates with full open throttle and no load as determined by the manufacturer.

3.21.4. Maximum rotational wheel speed

Maximum permitted speed (rpm) of a new abrasive cut-off wheel as marked on the cut-off wheel.

3.22. Spindle

Shaft of the cut-off machine, which supports, retains, and drives the cut-off wheel in connection with the flanges.

3.23. Spindle sleeve

A device used to increase the spindle shaft diameter at the contact area of the abrasive wheel for mounting an abrasive wheel with a larger diameter arbor hole.

3.24. Throttle control

A device for controlling the engine speed.

3.25. Throttle control linkage

A mechanism that transmits motion from the throttle control to the throttle control valve.

3.26. Throttle latch

A device for temporarily setting the throttle in a partially open position, to aid starting.

3.27. Throttle control lockout

A device that prevents the unintentional operation of the throttle until manually released.

3.28. Transmission cover(s)

A device or devices between the engine and the cutting equipment to prevent contact with the transmission.

3.29. Wheel radial clearance

The distance from the cut-off wheel guard to the outer edge of the cut-off wheel. (See dimension "x" in Figure 2.)

3.30. Wheel guard

A partial enclosure intended to deflect cutting debris away from the operator, as well as pieces of the cut-off wheel in the event that the wheel is broken in operation.

4. Safety requirements**4.1. Speeds**

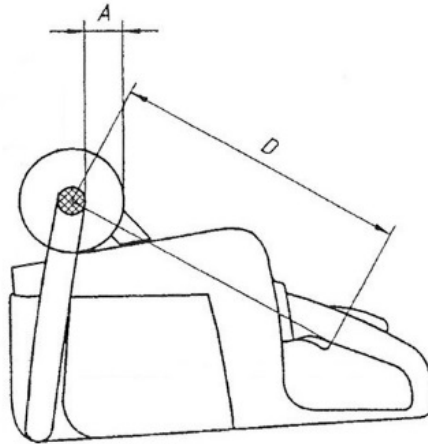
The engine speed shall be limited so that the machine will not operate in excess of maximum spindle speed as specified in the operator's manual. Engine speed limitation shall be verified by inspection and measurement. Spindle speed shall be measured at the spindle and not be calculated. Speed measurement instruments shall have a minimum accuracy of ± 3 percent.

4.2. Handles**4.2.1. Dimensional requirements**

Machines shall be designed so that they have a handle for each hand. Handles shall be designed and positioned such that they provide an unobstructed surface throughout the working area for a gloved hand operating the cut-off machine. These handles shall be designed so that they conform to the dimensions and clearances in Table 1.

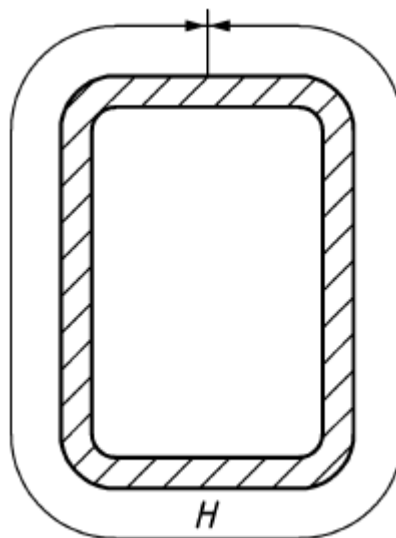
Table 1 – Handle clearance dimensions

Handles	Description	Dimension	Figure	Minimum Size
Front	Finger clearance in the grip area	A	4	35 mm (13.8 in)
Front & Rear	Perimeter of the cross-section of the handle	H	5	65 mm (25.6 in)
	Distance from the rear side of the throttle control to the center of the front handle at the top	D	4	225 mm (8.9 in)
Rear*	Finger clearance at the released throttle control	E	6	30 mm (1.2 in)
	Clearance below the released throttle control	F	7	25 mm (1 in)
	Clearance behind the released throttle control	G	8	3 x 25 mm (3 x 1 in)
*The dimensions shall be gauged free of play, i.e., with a slight initial pressure on the throttle control.				



NOTE – Refer to Table 1 for A and D dimensions.

Figure 4 – Finger clearance in the grip area and distance between the throttle control and front handles for rear handle machines



NOTE – Refer to Table 1 for H dimension.

Figure 5 – Perimeter of handle cross section