

ANSI/ASAE S472 DEC1986 (R2017)
Terminology for Forage Harvesters and Forage Harvesting



**American Society of
Agricultural and Biological Engineers**

**S
T
A
N
D
A
R
D**

ASABE is a professional and technical organization, of members worldwide, who are dedicated to advancement of engineering applicable to agricultural, food, and biological systems. ASABE Standards are consensus documents developed and adopted by the American Society of Agricultural and Biological Engineers to meet standardization needs within the scope of the Society; principally agricultural field equipment, farmstead equipment, structures, soil and water resource management, turf and landscape equipment, forest engineering, food and process engineering, electric power applications, plant and animal environment, and waste management.

NOTE: ASABE Standards, Engineering Practices, and Data are informational and advisory only. Their use by anyone engaged in industry or trade is entirely voluntary. The ASABE assumes no responsibility for results attributable to the application of ASABE Standards, Engineering Practices, and Data. Conformity does not ensure compliance with applicable ordinances, laws and regulations. Prospective users are responsible for protecting themselves against liability for infringement of patents.

ASABE Standards, Engineering Practices, and Data initially approved prior to the society name change in July of 2005 are designated as "ASAE", regardless of the revision approval date. Newly developed Standards, Engineering Practices and Data approved after July of 2005 are designated as "ASABE".

Standards designated as "ANSI" are American National Standards as are all ISO adoptions published by ASABE. Adoption as an American National Standard requires verification by ANSI that the requirements for due process, consensus, and other criteria for approval have been met by ASABE.

Consensus is established when, in the judgment 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 toward their resolution.

CAUTION NOTICE: ASABE and ANSI standards may be revised or withdrawn at any time. Additionally, procedures of ASABE require that action be taken periodically to reaffirm, revise, or withdraw each standard.

Copyright American Society of Agricultural and Biological Engineers. All rights reserved.

ASABE, 2950 Niles Road, St. Joseph, MI 49085-9659, USA, phone 269-429-0300, fax 269-429-3852, hq@asabe.org

ANSI/ASAE S472 DEC1986 (R2017)

Approved March 1988; reaffirmed January 2017 as an American National Standard

Terminology for Forage Harvesters and Forage Harvesting

Developed by the ASAE Forage Harvesting and Utilization Committee; approved by the ASAE Power and Machinery Division Standards Committee; adopted by ASAE December 1986; revised editorially February 1988; approved as an American National Standard March 1988; revised editorially July 1989; reaffirmed December 1991; reaffirmed by ANSI September 1992; revised editorially December 1992; reaffirmed by ASAE December 1996; reaffirmed by ANSI March 1998; reaffirmed December 2001, January 2007, January 2012, January 2017.

Keywords: Forage, Harvesters, Terminology

1 Purpose and Scope

1.1 The purpose of this Standard is to establish terminology and specifications pertinent to forage harvester design and performance. It is intended to improve communication among engineers and researchers and to provide a basis for comparative listing of machine specifications.

2 Forage Harvester Basic Designs

2.1 Forage harvesters are used to harvest and cut crops into short particle lengths. The chopped product may be preserved in storage by ensiling or dehydrating or it may be fed directly to livestock. Forage harvesters may be tractor mounted, pull-type (towed), or self-propelled.

2.2 There are two basic types of forage harvesters; precision cut and non-precision cut.

2.2.1 Precision cut forage harvesters: A forage harvester that uses a feeding mechanism to meter the crop into the cutting or shearing mechanism at a uniform velocity; thus, the crop is cut off at regular, "uniform" particle lengths generally ranging from 3 to 50 mm.

2.2.2 Non-precision cut forage harvesters: A forage harvester that generally uses a rotary impact cutting device to cut standing crop or windrows directly into shorter pieces. The chopped particle length distribution is not uniform due to the random cutting process of the crop stems. A secondary shearing device may be incorporated into the crop blower to recut the crop into more uniform lengths. Typical particle lengths generally exceed those of precision cut forage harvesters.

3 Forage Harvester Component Terminology and Specifications

3.1 crop gathering headers: Devices used to gather the crop into the forage harvester. They are usually detachable from the forage harvester.

3.1.1 row crop header: A device used to cut off and gather row crops. Cutting of the plant usually takes place near ground level.

3.1.2 maize (ear corn) header: A device used to harvest and gather only the ears of corn (maize).

3.1.3 pickup header: A device for picking up a previously cut crop. The crop may be in a swath or a windrow.

3.1.4 direct cut header: A device capable of cutting a standing crop across its full width and conveying the cut crop directly into the forage harvester.

3.2 header harvesting widths

3.2.1 row crop and ear corn header harvesting widths: The average distance between the centerlines of adjacent row units multiplied by the number of row units. For single row headers, the harvesting width equals the row centerline spacing. Where row crop unit width is adjustable, maximum and minimum distances between row centerlines shall be stated, expressed in centimeters to the nearest whole centimeter. The maximum and minimum harvesting widths shall be expressed in meters to the nearest hundredth, and the number of row units shall be stated.

3.2.2 pickup header harvesting width: The minimum distance between the outermost conveying elements, up to and including the header side sheets but not the side sheet flared portions, expressed in meters to the nearest hundredth.

3.2.3 direct cut header harvesting width: The minimum distance between the side sheets of the harvesting unit measured directly above the forward tips of the sickle sections. For rotary impact cutters, the cutting width is equal to the distance between the innermost and outermost disk/drum centerlines plus one disk/drum diameter. The width shall be expressed in meters to the nearest hundredth.

3.3 header cutting mechanism: A device on the header used to cut off the standing crop from its root system. The cutting device may be a sickle, rotary impact knives, rotary disk(s), oscillating scissor, or other devices for cutting.

3.3.1 sickle: A cutting device which uses a reciprocating cutter to cut the standing crop.

3.3.1.1 sickle frequency: The number of cycles which the sickle makes in a given time period. One cycle is the full movement of the sickle in one direction and its return to the starting point. Frequency shall be expressed in hertz.

3.3.1.2 sickle stroke: The distance that a point on the sickle travels with respect to the centerline of a guard in one half cycle expressed in millimeters.

3.3.2 rotary impact knives: A rotary cutting device using high velocity knives driven about a vertical or horizontal axis to impact cut the standing crop (no stationary knife used).

3.3.2.1 disk cutter: A multiple disk device, using two or more blades per disk, driven about vertical axes from beneath at sufficiently high rotational speeds to achieve impact cutting.

3.3.2.2 drum cutter: A multiple drum device, using two or more blades per drum, driven about vertical axes from above at sufficiently high rotational speeds to achieve impact cutting. The blades are located at or near the drum bottom.

3.3.2.3 flail cutter: A device using multiple, radially mounted blades that are pivotally mounted on a horizontal rotor to impact cut. The rotor is positioned transverse to the direction of travel.

3.3.3 rotary disk(s): One or two disks per row crop header row unit are used to shear off the crop. The one disk rotary knife system requires a stationary knife to shear the crop against. The two disk rotary knife system requires either a stationary knife or disks that are overlapped and rotated in the opposite directions such that the crop is sheared off at the forward intersection of the two disk peripheries.

3.3.4 oscillating scissor: A device consisting of one pivoting knife with two cutting surfaces per row crop header row unit. The knife reciprocates in a semi-circular arc and cuts the crop off against one of two stationary knives. Knife frequency and knife stroke at the forward most cutting point shall be determined as specified in paragraphs 3.3.1.1 and 3.3.1.2.

3.4 header cutting height