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Terminology for Forage Harvesters and Forage Harvesting

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Terminology for Forage Harvesters and Forage Harvesting

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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.

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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

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