BRITISH STANDARD

BS EN
15436-4:2009

Road service area maintenance equipment

Part 4: Delivery acceptance of the machines by the users

ICS 43.160

BSI
British Standards

National foreword

This British Standard is the UK implementation of EN 15436-4:2009.

The UK participation in its preparation was entrusted to Technical Committee B/513, Construction equipment and plant and site safety.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Straßenunterhaltungsgeräte - Teil 4: Leistungsbewertung für Maschinen durch die Anwender

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Foreword

This document (EN 15436-4:2009) has been prepared by Technical Committee CEN/TC 337 “Road service area maintenance equipment”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2010, and conflicting national standards shall be withdrawn at the latest by March 2010.

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1 Scope

This standard applies to:

— mowers;

and

— mechanical brush cutters;

used by road maintenance services.

The standard provides harmonised expressions/characteristic parameters by means of which operators can specify the above-mentioned equipment's performance to suppliers.

The standard also describes procedures for testing delivered equipment's compliance with operator requirements.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 15436-1:2008, *Road service area maintenance equipment – Part 1: Terminology*

EN 15436-2, *Road service area maintenance equipment – Part 2: Performance assessment*

3 Terms and definitions

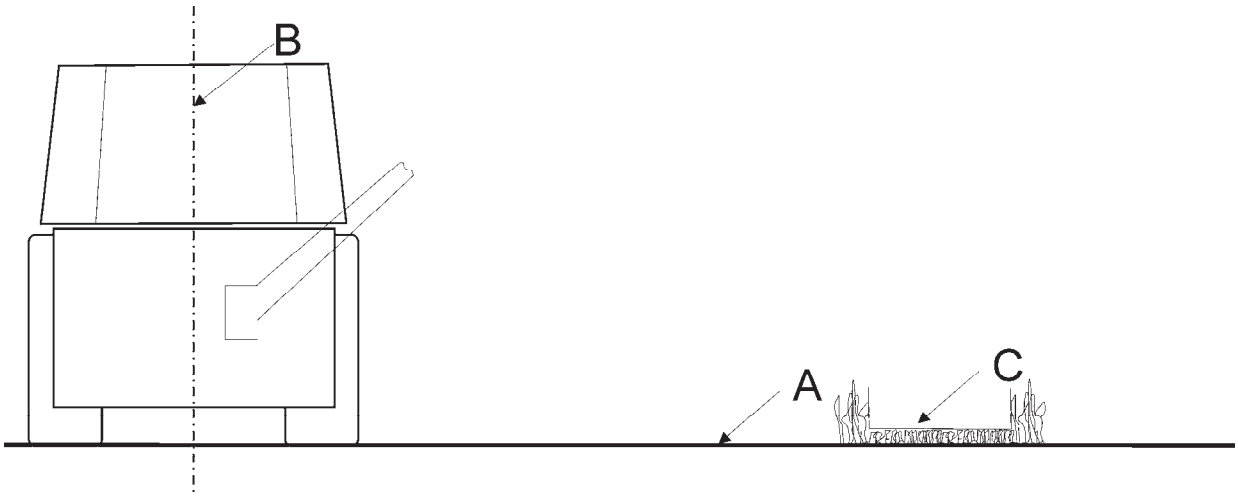
This document makes use of the expressions defined by EN 15436-1:2008 for describing machine groups and components. Dimensions and performance specifications provided by EN 15436-1:2008 do not apply here. Exceptions are referred to in this standard.

3.1
mowing strip
width-dependent area to be mowed by a machine in any one operation parallel to the carrier vehicle's direction of motion

3.2
trimming strip
width-dependent area to be trimmed by a machine in any one operation parallel to the carrier vehicle's direction of motion

3.3
mowing/trimming plane
assumed, planar, post-mowing/post-trimming, overgrown surface over which the mowing/trimming machine is routed (vertical trimming line)

3.4
central plane
vehicle's central, longitudinal plane with respect to the rolling track (Figure 1)

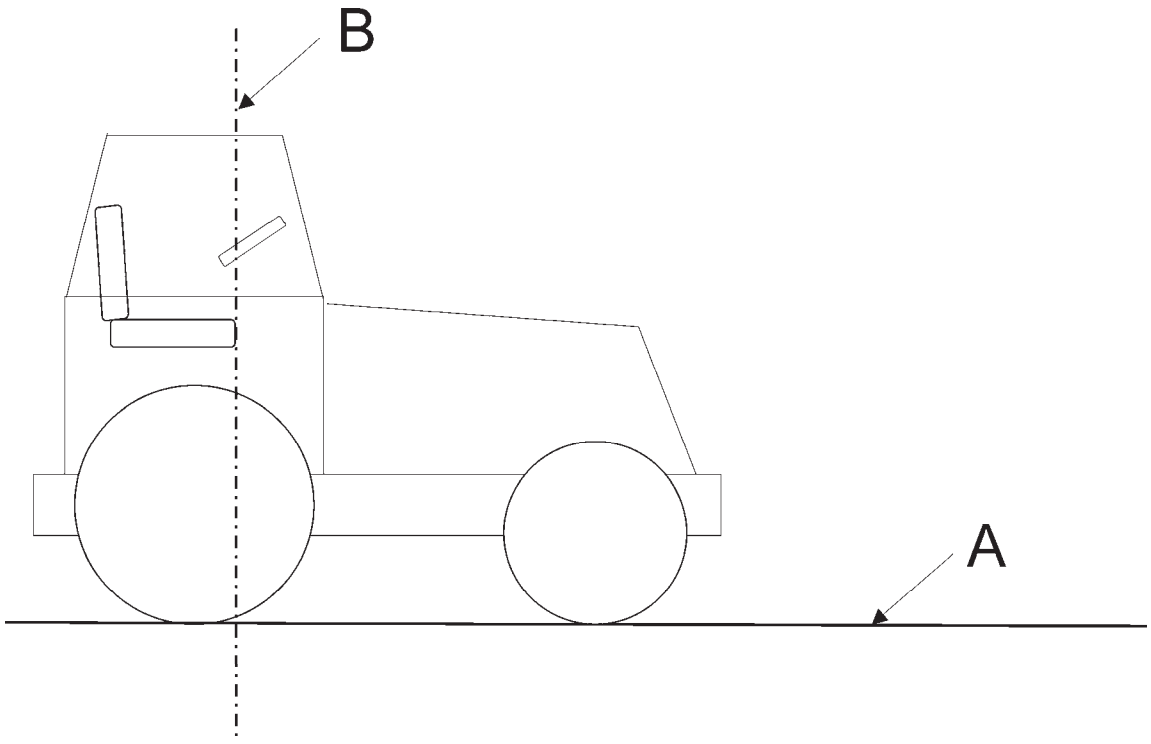


Key

A Ground plane
B Middle plane
C Mowing strip

Figure 1 — Central plane

3.5
operator's seat reference plane
plane meeting the middle of the operator's seat with respect to the vehicle's direction of motion. The operator's seat is located in the middle position. If the operator seat is not aligned with the vehicle's direction of motion the middle position is also to be taken as the reference line. Should the carrier vehicle be unknown this data does not apply (Figure 2)



Key

A Ground plane
B Operator's seat reference plane

Figure 2 — Operator's seat reference plane

4 Performance specifications

4.1 Specifications for mowers/mechanical branch cutters

— Post-mowing/post-trimming width: corresponding to EN 15436-1 [in cm].

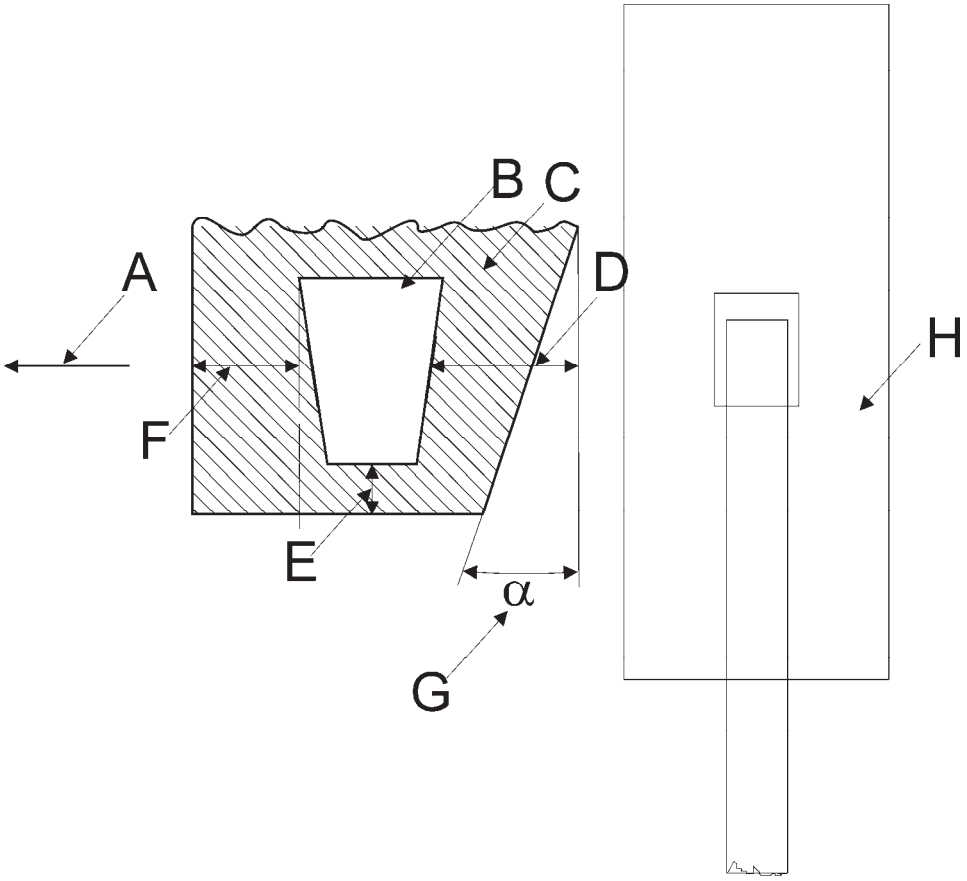
— Mowing/trimming height: corresponding to EN 15436-1 [in cm].

— Quality of the mowing: admissible number of parts of plants in a defined area which are not mowed or which are longer than the mowing height.

— Length of the mowed/trimmed material (chaff function): length of the mowed/trimmed vegetation [in cm].

— Distance to obstructions (design of the mowing/trimming device): the minimum distance to be attained to obstructions (e.g. posts, walls) during mowing/trimming (see Figure 3).

The user shall specify how the mowing/trimming device is to avoid obstructions and, if necessary, bypass them from the front or behind transversely with respect to the mowing/trimming direction.



Key

A Direction of mowing
B Obstruction
C Admissible area, which shall not be mowed
D Admissible distance between end of mowing and obstruction
E Admissible distance between mowing strip and obstruction
F Admissible distance between beginning of mowing and obstruction
G Accomplishable angle
H Cutting device

Figure 3 — View from top

4.2 Kinematic parameters/ranges

4.2.1 General

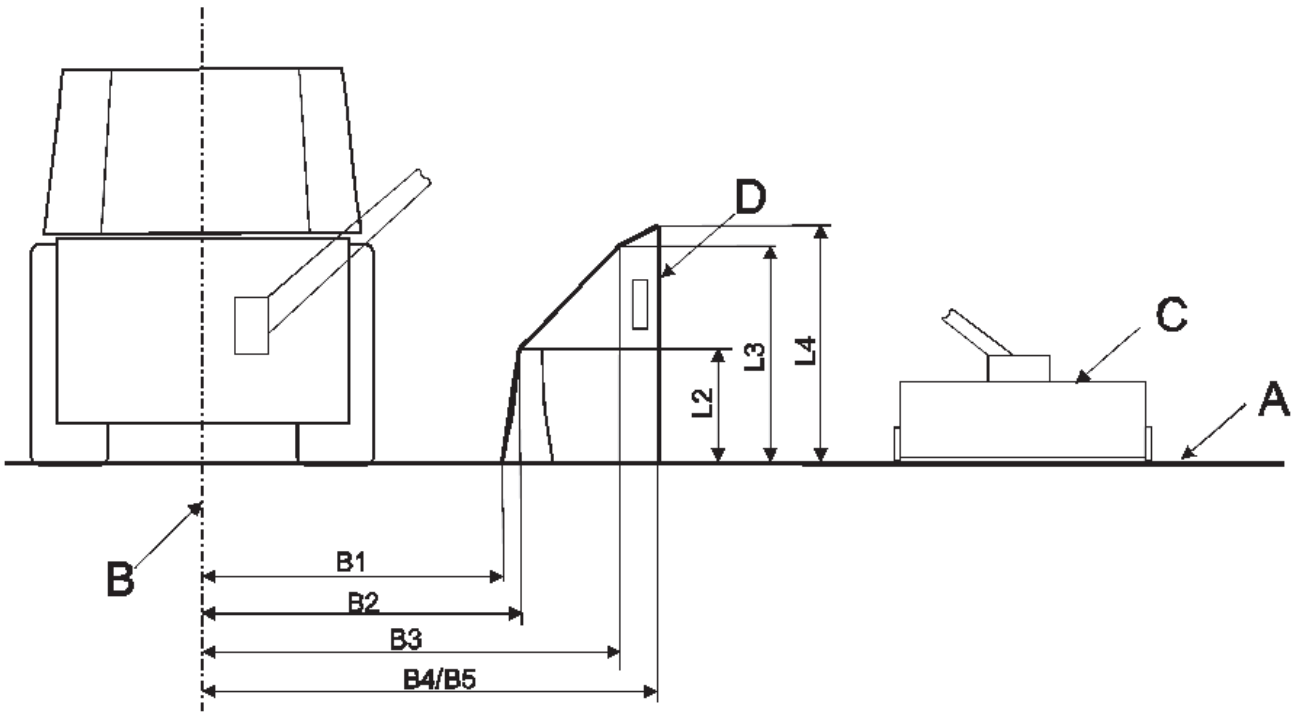
Kinematic specifications for mowing and trimming machines apply in the mounted state on a carrier vehicle. All stipulated geometric dimensions apply with the carrier vehicle positioned on a level horizontal surface with a maximum inclination of 1 % (base plane).

The user's kinematic specifications/ranges for the supplier shall also indicate whether the work is to be performed on the right-hand side, left-hand side or both sides of the direction of travel.

4.2.2 Obstructions and clearances

— Obstructions behind which mowing is required.

The ability to mow strips is influenced by obstructions such as protective barriers, traffic signs etc. If an obstruction cannot be avoided, the kinematics shall allow the mowing/trimming device to pass above the obstruction. The obstruction to be bypassed from above is to be specified as a linear envelope comprising the corner coordinates Bx and Lx with respect to the central or base plane (refer to the Figure 4). Obstructions on embankments and ditch banks shall be specified separately [in m] wherever necessary.

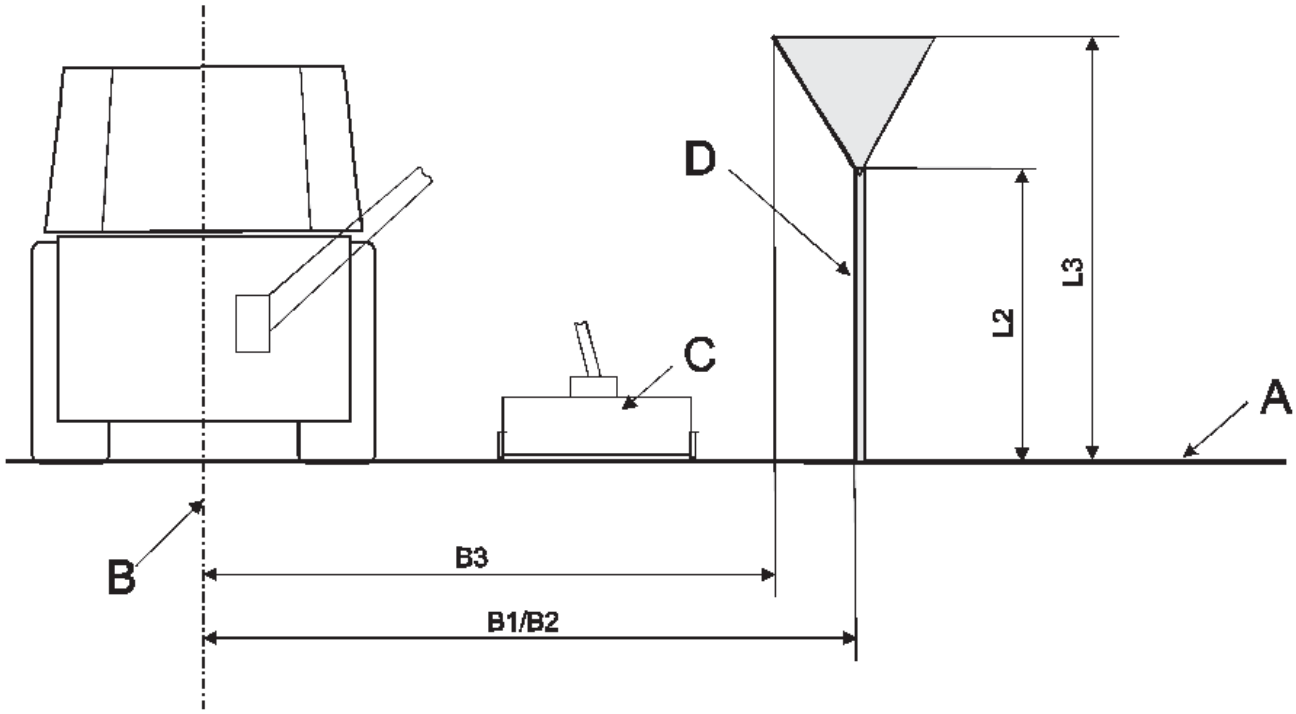


Key

A Ground plane
B Middle plane
C Cutting device
D Envelope of the obstructions

Figure 4 — Obstructions behind which mowing is required (L1 and L5 Term here 0m)

— Obstructions before which mowing is required (Figure 5).



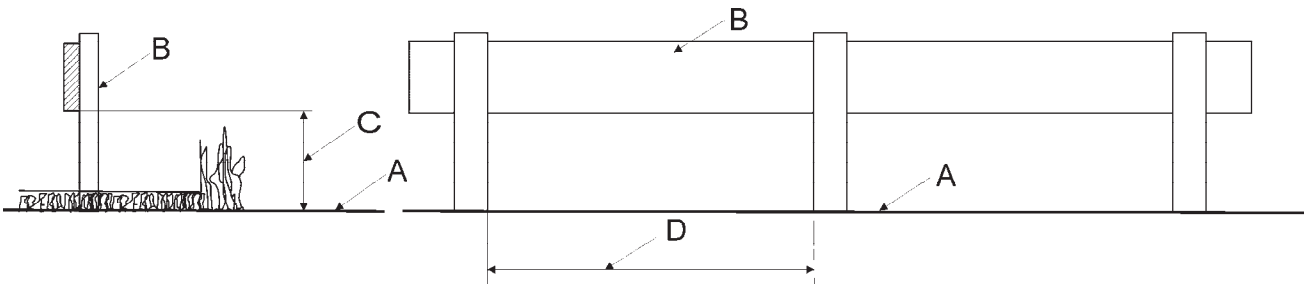
Key

A Ground plane
B Middle plane
C Cutting device
D Line of clearance boundary

Figure 5 — Obstructions before which mowing is required (L1 Term here 0m)

— Obstructions below/between which mowing is required.

Clearances shall be specified [in m] for obstructions between which mowing/trimming is needed (Figure 6).



Key

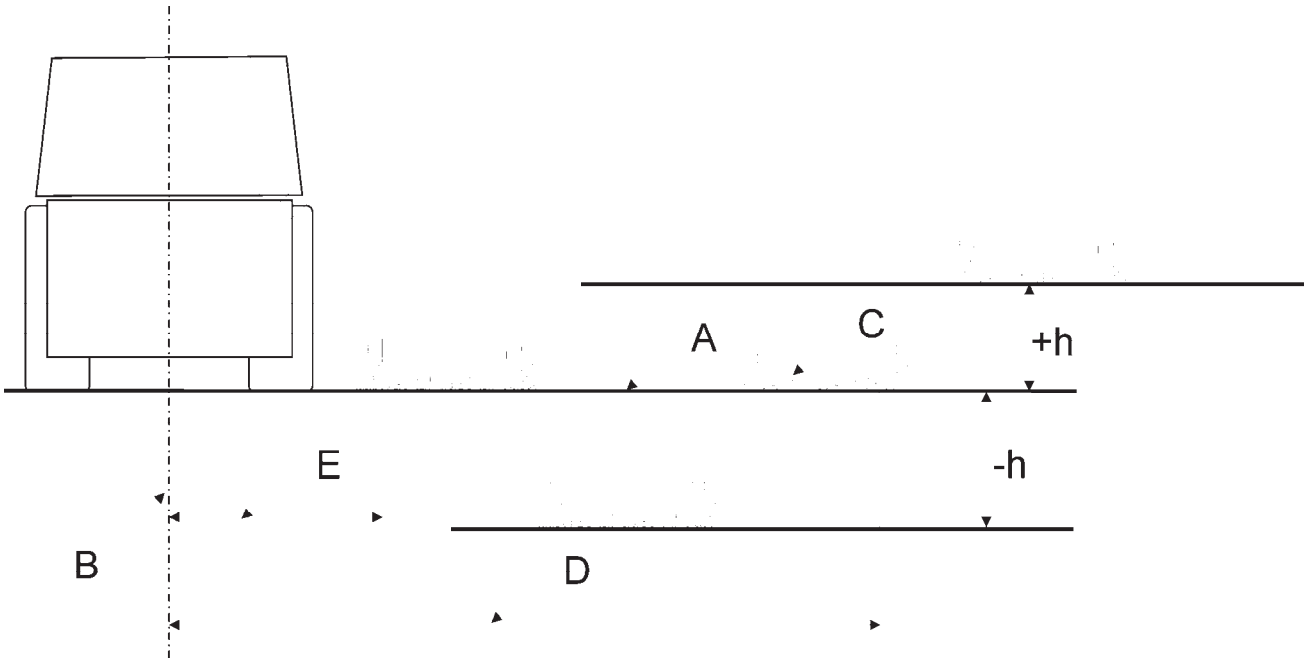
A Ground plane
B Obstruction
C High of obstruction for underriding
D Distance between obstruction

Figure 6 — Obstructions below / between which mowing is required

4.2.3 Planar ranges

Minimum and maximum distances shall be specified. The mowing machine shall cover the entire range in between. The minimum distance is the interval between the central plane and the nearest line of the mowing strip. The maximum distance is the interval between the central plane and the furthest line of the mowing strip (Figure 7).

The mowing plane can be identical to the base plane. If the mowing strip does not lie in the base plane, a horizontal interval h to this plane shall be specified. If the mowing strip is located below the base plane, the interval h shall be specified with a negative sign. If the mowing strip is located above the base plane, the interval h shall be specified with a positive sign [in m].



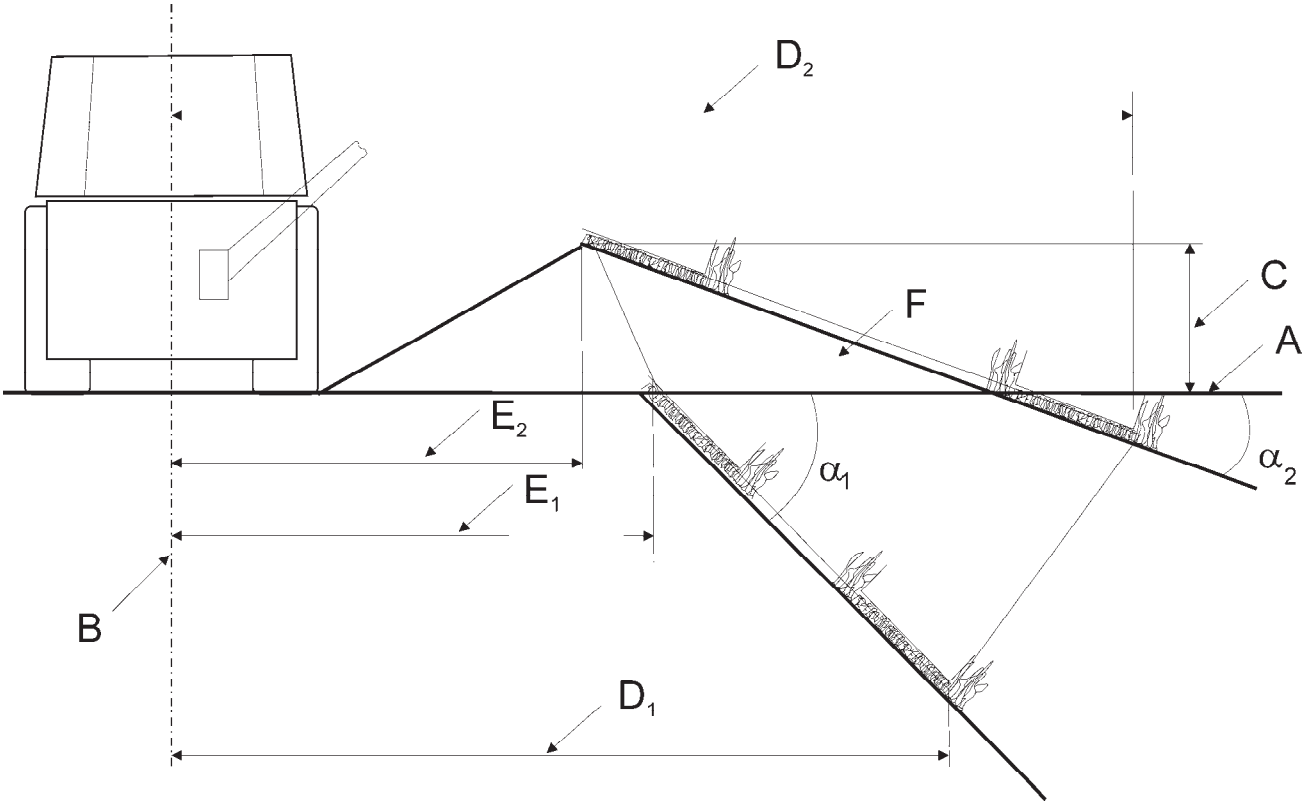
Key

A Ground plane
B Middle plane
C Mowing strip
D Maximum planar range
E Minimum planar range

Figure 7 — Planar ranges

4.2.4 Range on embankment

An embankment slope comprises a plane which is inclined with respect to the base plane and whose highest attainable point is at a shorter horizontal distance to the central plane than the lowest attainable point. The embankment beginning and end shall be specified respectively in terms of the horizontal distance to the central plane and distance to the base plane [in m] as well as the angle formed between the embankment and base plane (see illustration Figure 8).



Key

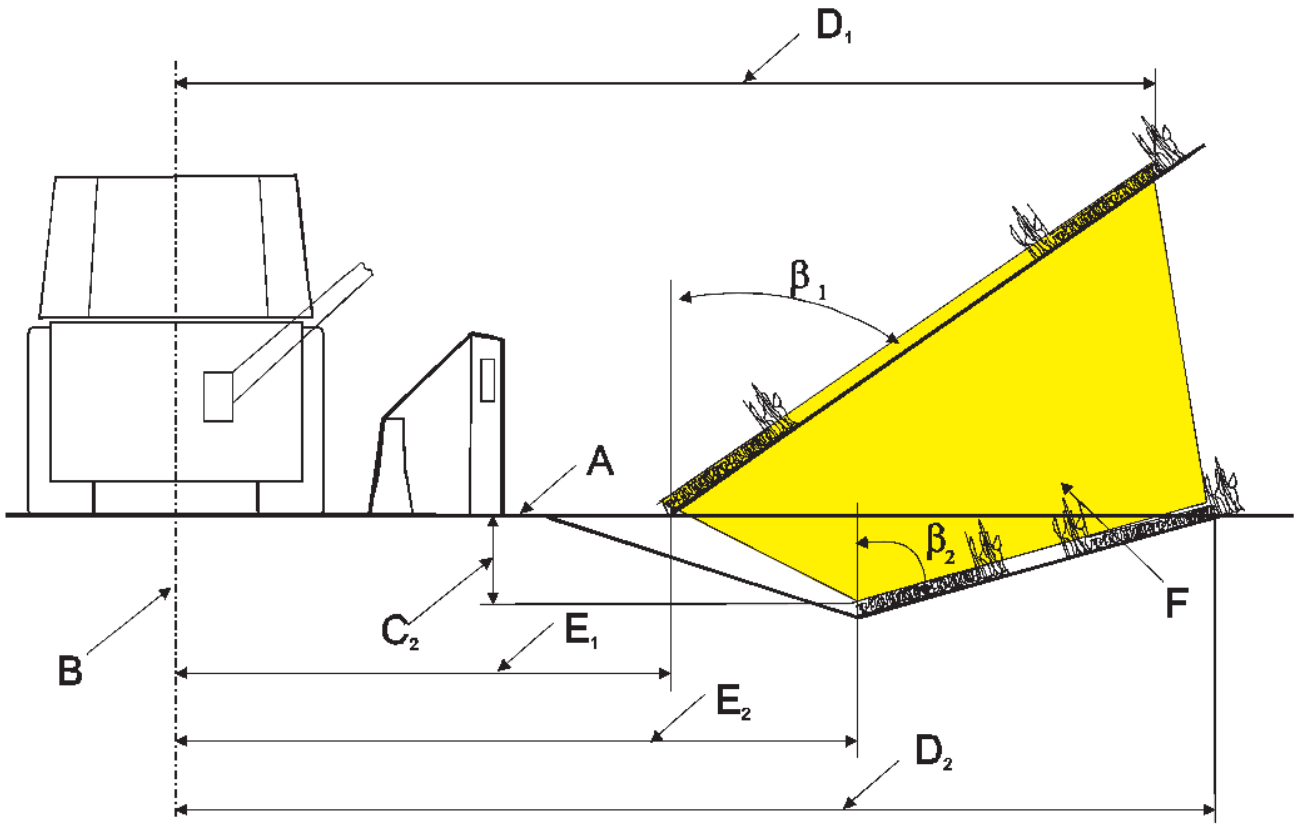
A Ground plane
B Middle plane
C Distance to the central plane
D Maximal range on embankment
E Minimal range on embankment
F Accomplishable cutting planes

Figure 8 — Range on embankment

In the case of several embankment dimensions, the extremities shall be specified. The supplier shall ensure that all intermediate positions connectable by means of straight lines can be attained. If a position cannot be represented with a single value, several values are permissible.

4.2.5 Range on ditch banks

A ditch bank comprises a plane which is inclined with respect to the base plane and whose lowest attainable point is at a shorter horizontal distance to the central plane than the highest attainable point. The ditch bank's beginning and end shall be specified respectively in terms of the horizontal distance to the central plane and distance to the base plane [in m] as well as the angle formed between the slope and base plane perpendicular (see Figure 9).



Key

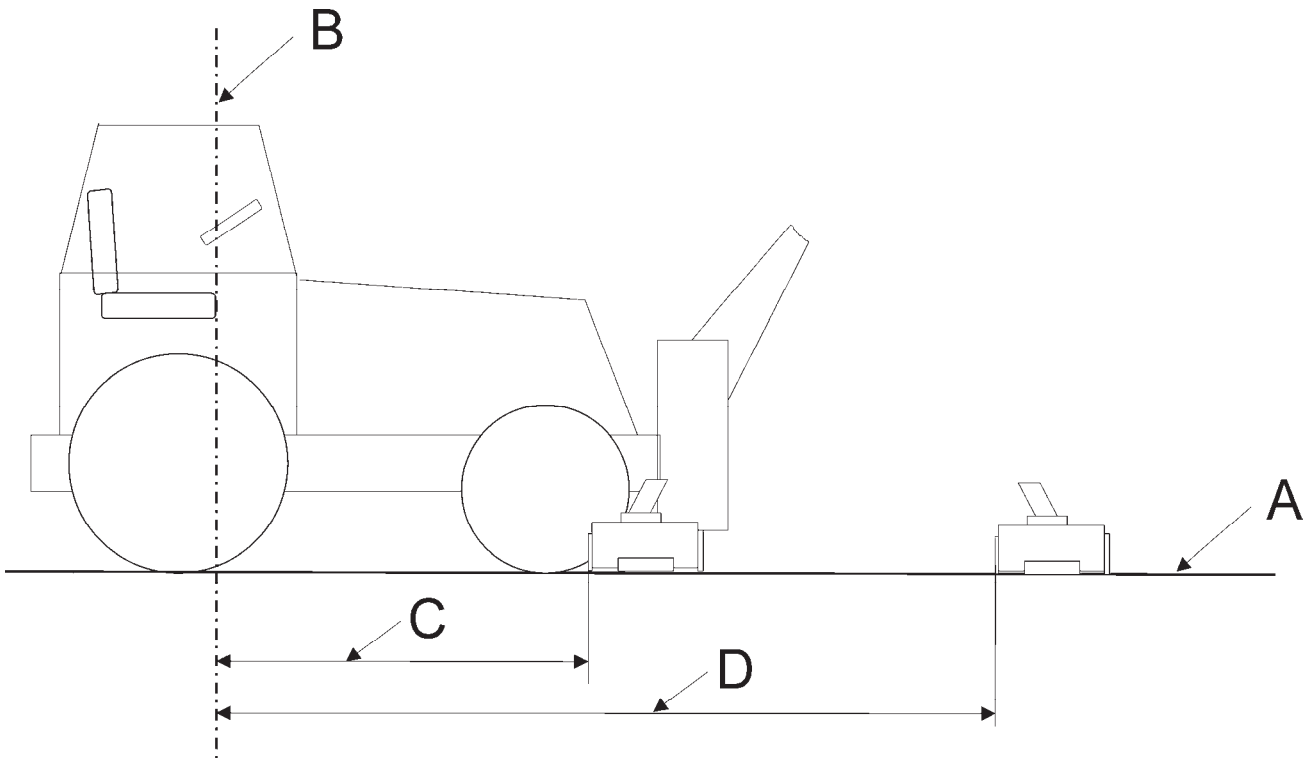
A Ground plane
B Middle plane
C Distance to the central plane (C1 term here 0m)
D Maximal range on ditch
E Minimal range on ditch
F Accomplishable cutting planes

Figure 9 — Range on ditch banks

4.2.6 Displacement with respect to the operator's seat reference plane

The displacement with respect to the operator's seat reference line is the range in which the mowing device needs to be located during the process of mowing. Serving, in particular, to ensure an ergonomic position for the operator in this process, the displacement depends on the mounting on the carrier vehicle.

The displacement range is defined by minimum and maximum distances between the operator's seat reference plane and the nearest edge of the mowing device (see Figure 10). If the mowing device is to be located behind the operator's seat reference plane as viewed in the direction of travel, the corresponding dimensions shall be specified with a negative sign.



Key

A Ground plane
B Operator's seat reference plane
C Minimal Displacement with respect to the operator's seat reference plane
D Maximal Displacement with respect to the operator's seat reference plane

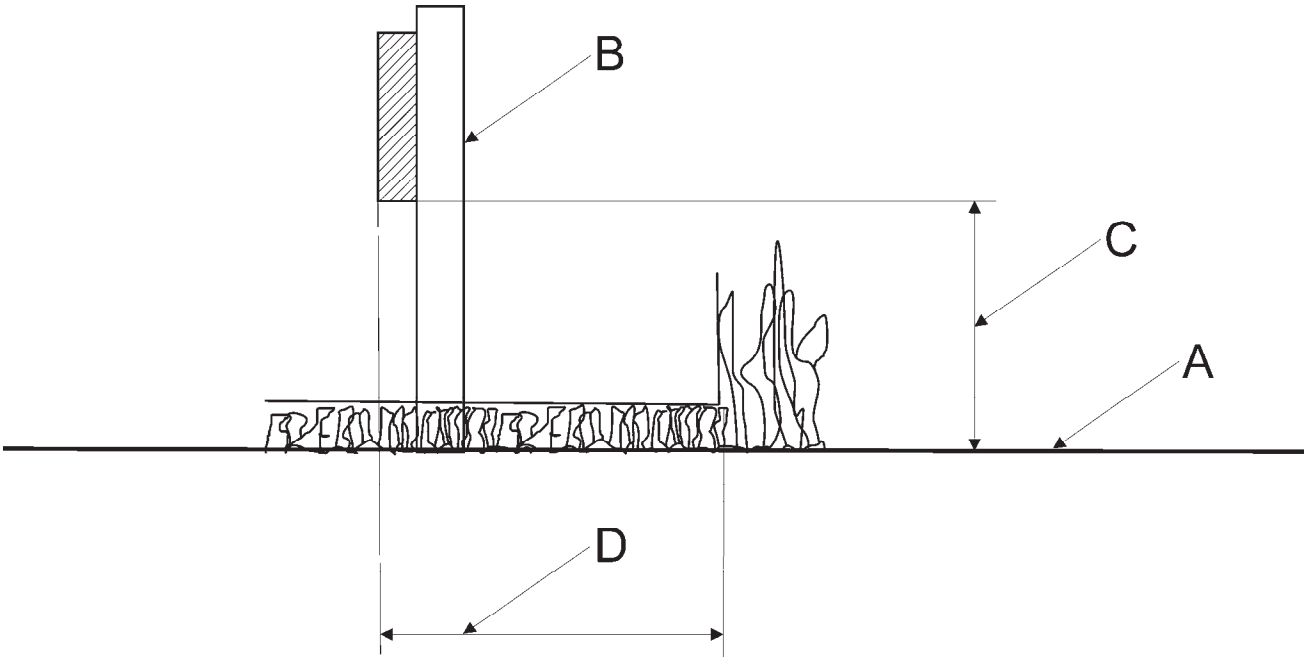
Figure 10 — Displacement with respect to the operator's seat reference plane

If a variety of ranges entail different displacements/rotations, these shall be specified correspondingly [in m].

Should the carrier vehicle be unknown these data do not apply.

4.2.7 Mowing/trimming underneath obstructions

Dimensions here indicate clearances [in cm] below obstructions (e.g. protective barriers) to be observed during mowing/trimming and corresponding widths as measured from the start of the obstruction (see Figure 11).



Key

A Ground plane
B Obstruction
C High of obstruction for underriding
D Mowing/Cutting length under obstruction from the beginning of obstruction

Figure 11 — Mowing/trimming underneath obstructions

4.2.8 Shaped trimming of vegetation

When trimming vegetation (e.g. hedges) into particular shapes, it is necessary to specify ranges and obstructions as in 4.2.1 to 4.2.7. Trimming planes shall refer to the final, post-trimming surfaces.

4.2.9 Traffic zones and clearances for moving operations

These specifications describe the maximum permissible utilization of traffic zones and clearances (width x length x height) for transpositions required during interrupted operations (e.g. caused by bridges). After completion of the required task, the employed machines should be restorable to any required kinematic setting and mowing attitude in a reasonably short period of time from the operator's seat. Dimensions apply to vehicle-mounted mowing machines [in m].

4.2.10 Traffic zones and clearances for regular operations

These specifications describe the maximum permissible utilization of traffic zones and clearances (width x length x height) for mowing on all regular operational settings [in m]. Dimensions apply to vehicle-mounted mowing machines.

4.2.11 Transport settings

These specifications describe the maximum permissible utilization of traffic zones and clearances (width x length x height) [in m] during transport of mounted equipment to work sites or parking facilities (e.g. halls including their entrances). Additional a speed shall be specified [in km/h], Locking devices shall warrant a sure transport.

4.3 Deployment temperatures and periods

Air temperature ranges and permissible times shall be specified [in °C and h] for the operation of mowers.

4.4 Mower drives

Mower drives shall be specified (e.g. according to EN 15431).

4.5 Mounting on carrier vehicles

Mechanical interfaces shall be specified (e.g. according to EN 15432) for mounting mowers on carrier vehicles.

5 Requirements

5.1 Dimensional tolerances

5.1.1 Mowing width: ± 3 cm.

5.1.2 Mowing height: ± 2 cm.

5.1.3 Ranges and traffic zones/clearances and transport zones

Unless noted otherwise, user specifications are minimum requirements to be fulfilled by the supplier after a consideration of production tolerances.

6 Review of specifications

6.1 General

Specifications are reviewed after the mowing equipment has been mounted on the carrier vehicle. Should any devices be necessary to stabilize the vehicle in working operation, they shall be used during measurment.

6.2 accuracy of measuring tools

— Lengths: ± 1 cm.

— Angles: ± 1°.

— Temperatures: ± 1 °C.

— Times: ± 1 s.

6.3 Measurement procedures

6.3.1 Mowing width

According to EN 15436-1.

6.3.2 Mowing height

According to EN 15436-1.

6.3.3 Quality of mowing

First of all the highest point of the defined area shall be determined. Then all parts of plants situated in this area shall be counted, which are longer than the mowing height related to the highest point determined in this area. Vegetation pressed down or bent during mowing in this area shall be put up again.

6.3.4 Ranges, required traffic zones and clearances, transport dimensions

These values should be checked at appropriate points using suitable measuring instruments according to 6.2 (e.g. tape measure, spirit level, protractor, vernier calliper etc.).

6.3.5 Mowing capacity

Mowing capacity is determined in terms of the time needed to process a precisely measured section (> = 200 m). Mowing conditions (vegetation type, unevenness, type and number of obstructions, ambient temperature) shall be recorded.

NOTE Due to the fact that there is no standardised material (grass), the quality of mowing (6.3.3) and the mowing capacity (6.3.5) can not be used as a comparison method. The appreciation of these procedures can be only personal for the user according to his own requirements.

Bibliography

[1] EN 13524, *Highway maintenance machines – Safety requirements*

[2] EN 15431, *Winter and road service area maintenance equipments – Power system and related controls – Interchangeability and performance requirements*

[3] EN 15432, *Winter and road service area maintenance equipments – Front-mounted equipment – Interchangeability*

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