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Machinery for forestry — Forwarders — Terms, definitions and commercial specifications

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National foreword

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Second edition
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Machinery for forestry — Forwarders — Terms, definitions and commercial specifications

Matériel forestier — Débardeuses — Termes, définitions et spécifications commerciales

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Foreword

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The committee responsible for this document is ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 15, *Machinery for forestry*.

This second edition cancels and replaces the first edition (ISO 13860:2000), which has been technically revised. In this edition, some definitions have been modified, machine masses are defined broader, and some technical and editorial errors have been corrected.

INTERNATIONAL STANDARD ISO 13860:2016(E)

Machinery for forestry — Forwarders — Terms, definitions and commercial specifications

1 Scope

This International Standard specifies terminology and required information as a general framework for identifying and describing the main dimensions and features of wheeled forwarders.

It is applicable to articulated wheeled forwarders (as defined in ISO 6814, a forwarder is a self-propelled machine designed to move trees or parts of trees by carrying them).

2 Terms and definitions

2.1 Basic definitions

2.1.1
front
defined for the primary direction of the travel; the primary driving direction

2.1.2
rear
defined for the primary direction of the travel; the opposite *front* (2.1.1), wherein the load space is in the rear of the machine

2.1.3
right hand side
operator's right hand side when driving in the primary driving direction and with the machine in its primary functional mode

2.1.4
left hand side
opposite side of the machine to the *right hand side* (2.1.3)

2.1.5
ground reference plane
GRP
hard, flat, horizontal surface on which the machine is placed for measurements

2.2 Masses

NOTE 1 Adapted from ISO 6016.

NOTE 2 Masses are expressed in kilograms.

2.2.1
operating mass
OM
mass of the base machine with equipment and empty attachment as specified by the manufacturer, and with the operator (75 kg), full fuel tank and all fluid systems at the levels specified by the manufacturer

2.2.2
rated paymass
rated payload
PM
manufacturer's rated mass that can be carried by the machine

2.2.3
gross machinery mass
GMM
combined mass of the *operating mass (OM)* (2.2.1) of the machine and the *rated paymass (PM)* (2.2.2)

2.2.4
axle distribution of masses of wheeled machines
load on each axle at *operating mass (OM)* (2.2.1)

Note 1 to entry: See 2.2.1.

2.2.4.1
axle load
load on each axle at *operating mass (OM)* (2.2.1)

2.2.4.2
maximum permissible axle load
maximum load on each axle specified by the manufacturer

2.2.5
shipping mass
SM
mass of the base machine without an operator, and with fuel level at 10 % of tank capacity, all fluid systems at their levels specified by the manufacturer and with or without equipment, attachment, cab, canopy, ROPS and/or FOPS, wheels and counterweights as stated by the manufacturer

Note 1 to entry: If the machine has to be disassembled for shipping purposes, the masses of these dismounted components shall be stated by the manufacturer.

2.2.6
cab mass
mass of a cab with all its components and the moorings required to secure it to the base machine

2.2.7
canopy mass
mass of a canopy with all its components and the moorings required to secure it to the base machine

2.2.8
ROPS mass
mass of an ROPS with all its components and the moorings required to secure it to the base machine

2.2.9
FOPS mass
mass of an FOPS with all its components and the moorings required to secure it to the base machine

2.3 Main machine dimensions

2.3.1
total frame length
l_1
horizontal distance between the vertical planes perpendicular to the longitudinal axis passing through the farthest points on the front and rear frame of the machine, blade and loader excluded

Note 1 to entry: See Figure 1.

2.3.2
overall length
l_2
horizontal distance from a vertical plane touching the forward-most point of the machine, blade positioned to give maximum forward reach (if so equipped), to a vertical plane touching the rearmost point of the machine, loader excluded

Note 1 to entry: See Figure 1.

2.3.3
wheelbase
l_3
horizontal distance from the centre of the front axle or front bogie axle assembly to the centre of the rear axle or rear bogie axle assembly when both axles are perpendicular to the longitudinal axis

Note 1 to entry: See Figure 1.

2.3.4
articulation joint to maximum blade arc
l_4
horizontal distance from the centreline of the articulation joint to a vertical line tangent to the arc of the blade's lower edge as it passes from its maximum height h_4 to the *lowest blade position* h_5 (2.3.12)

Note 1 to entry: See Figure 1.

2.3.5
articulation joint to front of machine
l_5
horizontal distance from the centreline of the articulation joint to a vertical plane touching the farthest point forward, blade excluded

Note 1 to entry: See Figure 1.

2.3.6
articulation joint to front axle
l_6
horizontal distance from the centreline of the articulation joint to the centre of the front axle or front bogie axle assembly

Note 1 to entry: See Figure 1.

2.3.7
overall height
h_1
horizontal distance from the centreline of the articulation joint to the centre of the front axle or front bogie axle assembly

Note 1 to entry: See Figure 1.

2.3.8
operator cab overall height
h_2
height of the operator cab frame with rigid attachments

Note 1 to entry: See Figure 1.

2.3.9
blade height
h_3
vertical distance from the lower edge, resting on the *GRP* (2.1.5), to the top of the blade, decking lugs excluded

Note 1 to entry: See Figure 1.

2.3.10
blade width
w_3
horizontal distance between the outer edges of the blade

Note 1 to entry: See Figure 3.

2.3.11
maximum blade lift lower edge
h_4
maximum vertical height to which the lower edge of the blade can be raised from the *GRP* (2.1.5)

Note 1 to entry: See Figure 1.

2.3.12
lowest blade position
h_5
vertical distance from the *GRP* (2.1.5) to the blade's lower edge with blade at its lowest position

Note 1 to entry: See Figure 1.

2.3.13
ground clearance
h_6
vertical distance from the *GRP* (2.1.5) to the machine centre portion, i.e. 25 % of the track width either side of the longitudinal centreline

Note 1 to entry: See Figure 2.

2.3.14
ground clearance at articulation joint
h_7
vertical distance from the *GRP* (2.1.5) to the lowest point at the articulation joint

Note 1 to entry: See Figure 1.

2.3.15
loaded tire radius
r_1
vertical distance from the *GRP* (2.1.5) to the horizontal centre of the axle with the machine at normal *operating mass (OM)* (2.2.1)

Note 1 to entry: See Figure 1.

2.3.16
articulation joint to the axis of loader rotation
l_7
horizontal distance from the centreline of the articulation joint to the centreline of the vertical axis of loader rotation along the longitudinal axis of the machine

Note 1 to entry: See Figure 1.

2.3.17
distance of load bunk headboard to rear axle
distance of load bunk front guard to rear axle
l_8
horizontal distance from the load side of the headboard to the centre of rear axle or to rear bogie axle assembly

Note 1 to entry: See Figure 1.

2.3.18
distance of load bunk headboard to rearmost bunk
distance of load bunk front guard to rearmost bunk
l_9
horizontal distance from the load side of the headboard to the rear of the rearmost position of adjustable bunk

Note 1 to entry: See Figure 1.

2.3.19
overall width
w_1
horizontal distance between two vertical planes parallel to the longitudinal axis of the machine and passing through the farthest points on the two sides of this axis

Note 1 to entry: See Figure 2.

2.3.20
trackwidth
w_2
horizontal distance between two parallel vertical planes passing through the centreline of the tires on an axle

Note 1 to entry: If the front and rear are different, both must be specified.

Note 2 to entry: See Figure 2.

2.3.21
frame oscillation angle
a_1
angle that one frame will rotate from a horizontal datum, in both directions, without rotating the other frame, measured in degrees

Note 1 to entry: See Figure 2.

2.3.22
axle oscillation angle
a_2
angle that one axle will rotate from a horizontal datum, in both directions, without rotating either frame, measured in degrees

Note 1 to entry: See Figure 2.

2.3.23
clearance circle
d_1
diameter of the smallest circle that the outermost point on the machine will describe when turning (brakes unapplied, blade in uppermost position, unloaded)

Note 1 to entry: See Figure 3.

2.3.24
angle of articulation
a_3
maximum angle of frame steering movement from the straight ahead position measured in degrees between longitudinal centrelines of the front and rear frames

Note 1 to entry: Quantify both left and right if unequal.

Note 2 to entry: See Figure 3.

2.4 Loader dimensions

2.4.1
loader tilt
aa_1
maximum angle between the axis of loader rotation and vertical line, on loaders with a tilting base

Note 1 to entry: Specify direction if unequal.

Note 2 to entry: See Figure 1.

2.4.2
loader rotation
aa_2
maximum loader horizontal rotation from the longitudinal centreline of the machine, measured in degrees

Note 1 to entry: Specify if continuous rotation, quantify both right and left if unequal.

Note 2 to entry: See Figure 3.

2.4.3
maximum loader reach
ll_1
maximum horizontal distance from the loader axis of rotation to the centreline of the grapple yoke

Note 1 to entry: See Figure 4.

2.4.4
maximum loader reach at ground level
ll_2
maximum horizontal distance from the loader axis of rotation to the grapple yoke with the open grapple resting on the *GRP* (2.1.5), measured when loader oriented 90 degrees sideways from the machine axis

Note 1 to entry: See Figure 4.

2.4.5
maximum loader lift height
hh_1
maximum vertical lift height from the *GRP* (2.1.5) to the bottom of the grapple in tip-to-tip condition at a specified horizontal radius from the axis of rotation

Note 1 to entry: See Figure 4.

2.4.6
loading height of loader at maximum reach
hh_2
vertical distance from the *GRP* (2.1.5) to the bottom of the grapple in tip-to-tip condition with the loader at the maximum horizontal reach (EE)

Note 1 to entry: See Figure 4.

2.4.7
maximum depth of loader
hh_3
maximum depth below the *GRP* (2.1.5) to the bottom of the grapple in tip-to-tip condition at a specified horizontal radius from the loader axis of rotation

Note 1 to entry: See Figure 4.

2.4.8
grapple height closed
hh_4
vertical distance between the centreline of the boom pivot of the grapple yoke and the bottom of the grapple in tip-to-tip condition

Note 1 to entry: See Figure 4.

2.4.9
grapple height open
hh_5
vertical distance between the centreline of the boom pivot of the grapple yoke and the tips of the fully open grapple

Note 1 to entry: See Figure 4.

2.4.10
area of grapple opening
A
cross-sectional area of the grapple opening in the tip-to-tip position

Note 1 to entry: See Figure 4.

2.4.11
height of main boom pivot
hh_6
vertical distance between the *GRP* (2.1.5) and the horizontal axis of the main boom pivot

Note 1 to entry: See Figure 4.

2.5 Bogie and load space dimensions

2.5.1
bogie axle assembly centreline distance
ll_3
horizontal distance from the centreline of the bogie axle to the centreline of the front or rear tire of the bogie axle assembly

Note 1 to entry: See Figure 5.

2.5.2
bogie axle assembly wheelbase
ll_4
horizontal distance between the centrelines of the front and rear tire of the bogie axle assembly

Note 1 to entry: See Figure 5.

2.5.3
bogie axle assembly wheelbase angle
aa_3
angle that the bogie axle assembly can rotate from a horizontal datum

Note 1 to entry: See Figure 5.

2.5.4
cross-sectional area of load space
AA
effective area of the load space in a vertical plane perpendicular to the longitudinal axis of the machine with the height of the load defined by the height of the stakes or the headboard, whichever is lower

Note 1 to entry: See Figure 6.

2.5.5
width across stakes
ww_1
horizontal distance between the load side of the stakes

Note 1 to entry: See Figure 6.

2.5.6
stake height
hh_7
vertical distance from the *GRP* (2.1.5) to the top of the stakes

Note 1 to entry: See Figure 6.

2.5.7
height of load centre
hh_8
vertical distance from the *GRP* (2.1.5) to the centroid of the effective area of the load space

Note 1 to entry: See Figure 6.

3 Required information

In addition to the identification of relevant dimensions and features as defined in Clause 2, the following information shall be supplied where appropriate:

— tyre size;

— ply rating;

— inflation pressure;

— possible hydro-inflation;

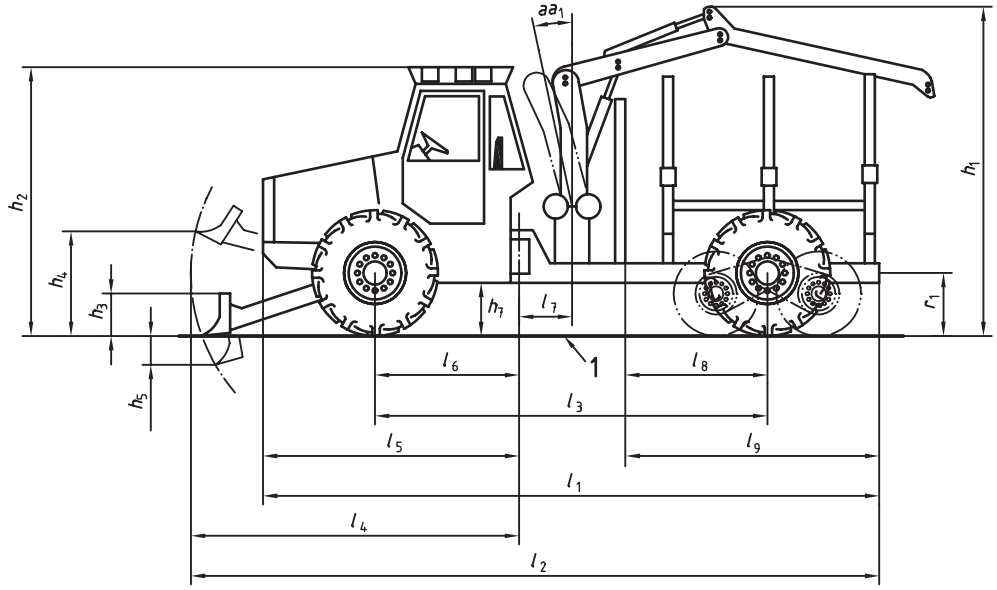
— maximum and minimum for adjustable dimensions, e.g. stake height (2.5.6);

— unequal front/rear of left/right for asymmetrical dimensions, e.g. track width (2.3.20), angle of articulation (2.3.24), loader tilt (2.4.1), loader rotation (2.4.2);

— continuous or in steps, e.g. loader rotation (2.4.2).

NOTE 1 Figure 1 to Figure 6 are for illustrative purposes only and are not intended to depict specific machines.

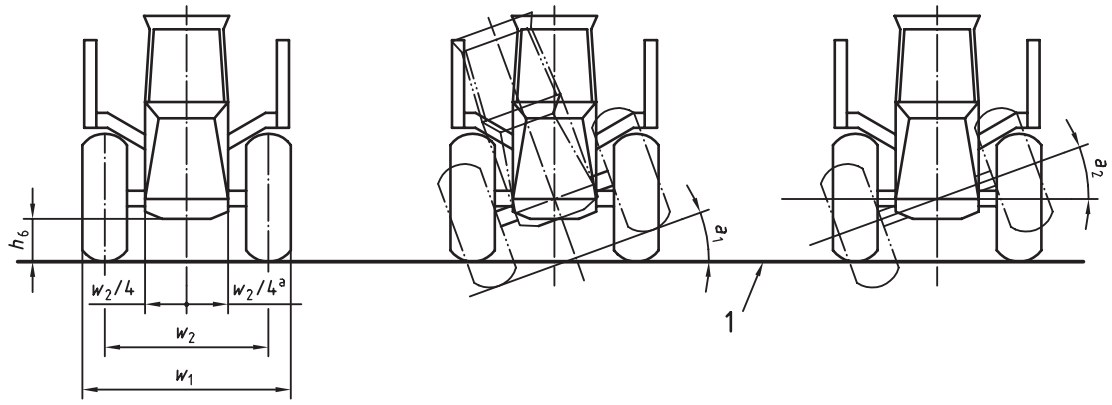
NOTE 2 All dimensions are with the axles parallel, and articulation joint angle 0°, unless otherwise specified.



Key

1 ground reference plane

Figure 1 — Articulated rubber-tired forwarder



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1 ground reference plane

Figure 2 — Width, ground clearance and oscillation

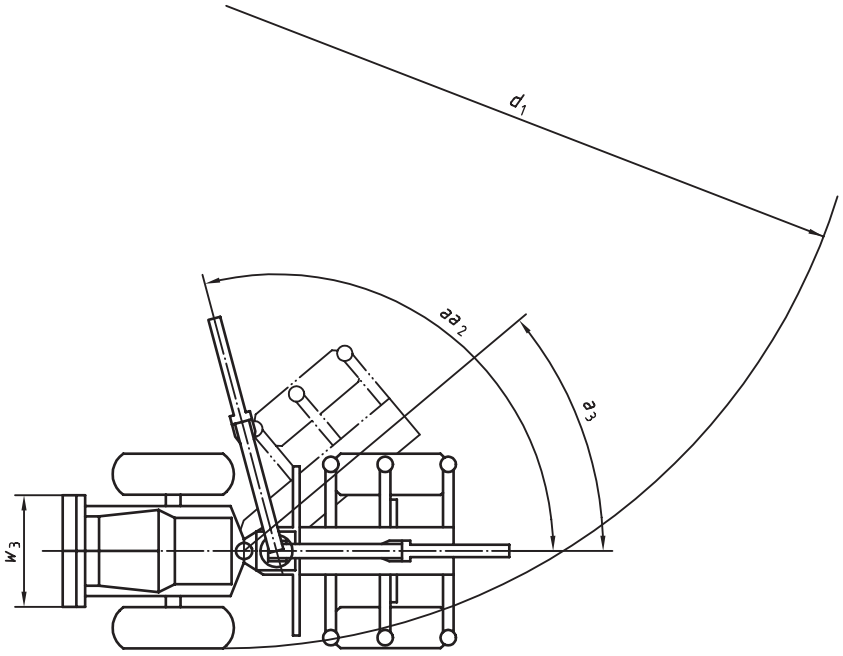
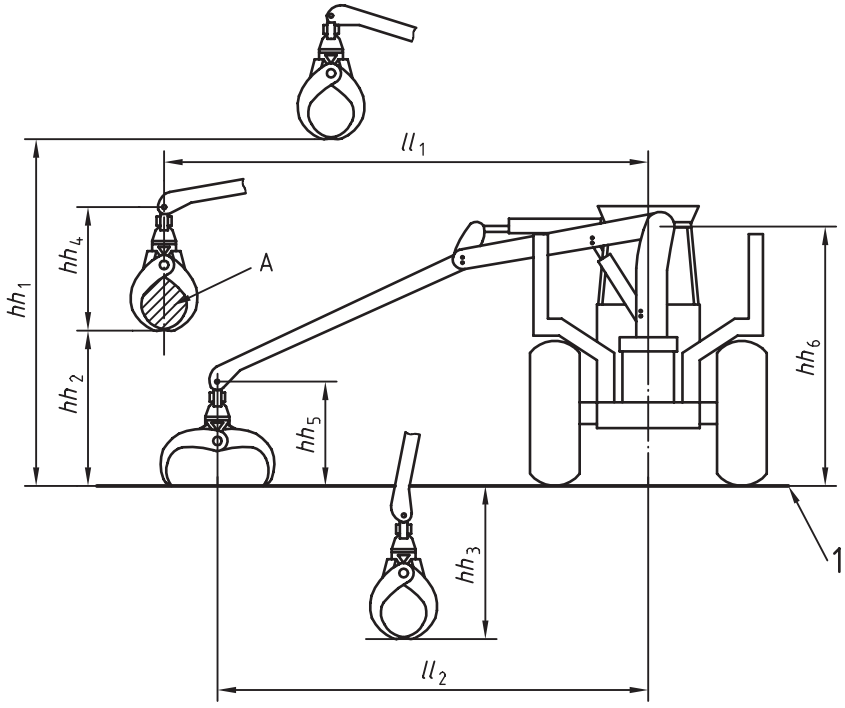


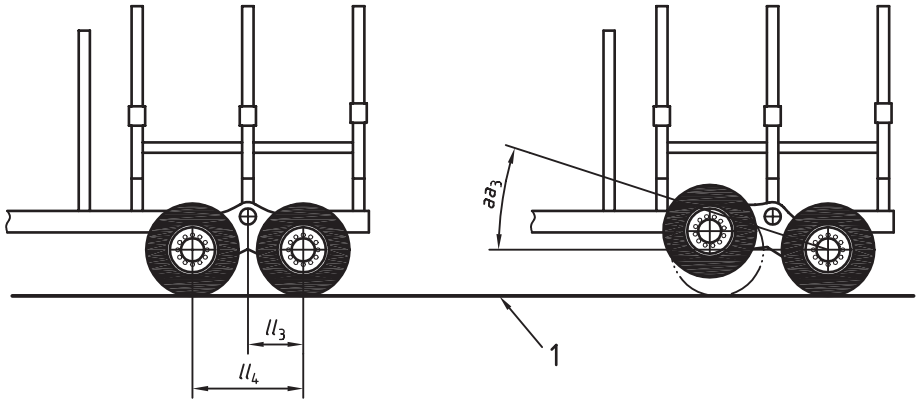
Figure 3 — Steering and loader rotation



Key

1 ground reference plane

Figure 4 — Loader specifications



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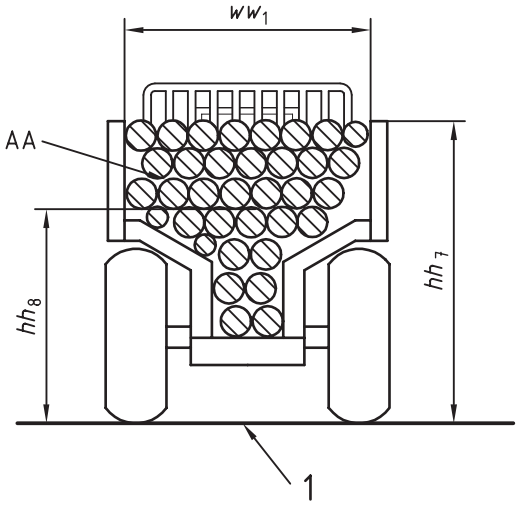
1 ground reference plane

Figure 5 — Bogie specifications



Key

1 ground reference plane

Figure 6 — Bunk specifications

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[1] ISO 6814, *Machinery for forestry — Mobile and self-propelled machinery — Terms, definitions and classification*

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