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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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International Standard ISO 13860 was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 15, *Machinery for forestry*.

# 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.

NOTE The terminology and requirements given in this International Standard will not necessarily all apply to a specific machine. Machines may be characterized by the dimensions and features which are relevant to them.

## 2 Normative reference



The following normative document contains provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the normative document indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.



ISO 6814:2000, *Machinery for forestry — Mobile and self-propelled machinery — Terms, definitions and classification*.

## 3 Terms and definitions

See Figures 1 to 6. The figures are for illustrative purposes only and are not intended to depict specific machines.

All dimensions are with the axles parallel, unless otherwise specified.

### 3.1 General

**3.1.1**
**right (left) hand**
operator's right hand side (left hand side) when facing in the normal direction of travel and with the machine in its primary functional mode

**3.1.2**
**front/rear**
front or rear of the operator, respectively, when facing in the normal direction of travel and with the machine in its primary functional mode

**3.1.3**
**ground reference plane**
**GRP**
hard, flat, horizontal surface on which the machine is placed for measurements

## 3.2 Masses

**3.2.1**
**normal operating mass**
total mass of the machine as specified, fully serviced, with full fluid levels and a 75 kg operator

**3.2.2**
**maximum operating mass**
total mass of the machine as specified, fully serviced, with full fluid levels and a 75 kg operator, including all machine options with the largest tyre or hydro-inflation combination and the manufacturer's maximum specified load

**3.2.3**
**load per axle**
standard and maximum mass on both the front and rear axles

## 3.3 Main machine dimensions

**3.3.1**
**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 of the machine, blade and loader excluded

**3.3.2**
**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



**3.3.3**
**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

**3.3.4**
**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 $h_5$

**3.3.5**
**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

**3.3.6**
**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

**3.3.7**
**overall height**
$h_1$
vertical distance between the GRP and a horizontal plane passing through the highest point of the machine with the loader in the retracted or travel position

**3.3.8**
**operator enclosure height**
$h_2$
vertical distance between the GRP and a horizontal plane passing through the uppermost point of the operator enclosure

**3.3.9**
**blade height**
$h_3$
vertical distance from the lower edge, resting on the GRP, to the top of the blade, decking lugs excluded

**3.3.10**
**maximum blade lift of lower edge**
$h_4$
maximum vertical height to which the lower edge of the blade can be raised from the GRP

**3.3.11**
**lowest blade position**
$h_5$
vertical distance from the GRP to the blade's lower edge with blade at its lowest position



**3.3.12**
**ground clearance**
$h_6$
vertical distance from the GRP to the lowest point of the machine centre portion, i.e. 25 % of the tread to either side of the longitudinal centreline



**3.3.13**
**ground clearance at articulation joint**
$h_7$
vertical distance from the GRP to the lowest point at the articulation joint

**3.3.14**
**loaded tire radius**
$r_1$
vertical distance from the GRP to the horizontal centre of the axle with the machine at normal operating mass

**3.3.15**
**articulation joint to the centreline of the loader head**
$l_7$
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

**3.3.16**
**headboard (load bunk front guard) to rear axle**
$l_8$
horizontal distance from the load side of the headboard to the centre of the rear axle or rear bogie axle assembly

**3.3.17**
**headboard (load bunk front guard) to rear of frame**
$l_9$
horizontal distance from the load side of the headboard to the rear of the rearmost bunk

**3.3.18**
**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

**3.3.19**
**tread**
$w_2$
horizontal distance between two parallel vertical planes passing through the centreline of the tires on an axle

**3.3.20**
**frame oscillation**
$a_1$
angle that one frame will rotate from a horizontal datum, in both directions, without rotating the other frame, measured in degrees

**3.3.21**
**axle oscillation**
$a_2$
angle that one axle will rotate from a horizontal datum, in both directions, without rotating either frame, measured in degrees

**3.3.22**
**clearance circle**
$d_1$
diameter of the smallest circle that the outermost point on the machine will describe when turning, brakes unapplied, blade in travel position, unloaded



**3.3.23**
**angle of articulation**
$a_3$
maximum angle of frame steering movement from the straight ahead position between longitudinal centrelines of the front and rear frames, measured in degrees



**3.3.24**
**blade width**
$w_3$
horizontal distance between the outer edges of the blade

## 3.4 Loader dimensions

**3.4.1**
**loader tilt**
$aa_1$
maximum angle between the axis of loader rotation and vertical line, on loaders with a tilting base

**3.4.2**
**loader rotation**
$aa_2$
maximum loader horizontal rotation from the longitudinal centreline of the machine, measured in degrees

**3.4.3**
**maximum loader reach**
$ll_1$
maximum horizontal distance from the loader axis of rotation to the centreline of the grapple yoke

**3.4.4**
**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

**3.4.5**
**maximum loader lift height**
$hh_1$
maximum vertical lift height from the GRP to the bottom of the grapple in tip-to-tip condition at a specified horizontal radius from the axis of rotation

**3.4.6**
**loading height of loader at maximum reach**
$hh_2$
vertical distance from the GRP to the bottom of the grapple in tip-to-tip condition with the loader at the maximum loader reach $ll_1$

**3.4.7**
**maximum depth of loader**
$hh_3$
maximum depth below the GRP to the bottom of the grapple in tip-to-tip condition at a specified horizontal radius from the loader axis of rotation

**3.4.8**
**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



**3.4.9**
**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

**3.4.10**
**area of grapple opening**
$A$
cross-sectional area of the grapple opening in the tip-to-tip position

**3.4.11**
**height of main boom pivot**
$hh_6$
vertical distance between the GRP and the horizontal axis of the main boom pivot

## 3.5 Bogie and load space dimensions

**3.5.1**
**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

**3.5.2**
**bogie axle assembly wheelbase**
$ll_4$
horizontal distance between the centrelines of the front and rear tire of the bogie axle assembly