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Machinery for forestry — Machine-fed woody biomass reduction chippers, grinders, and shredders — Vocabulary

Machines forestières — Broyeurs et déchiqueteuses de réduction de la biomasse ligneuse alimentés par machine — Vocabulaire

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Foreword

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Introduction

The figures in this document (see Annex A and Annex B) are intended to illustrate machine concepts for applying dimensional characteristics and for component identification purposes related to the machines defined in 3.2.

Machinery for forestry — Machine-fed woody biomass reduction chippers, grinders, and shredders — Vocabulary

1 Scope

This document identifies and defines terms used, illustrates configurations, and gives a nomenclature of components for machine-fed woody biomass reduction chippers, grinders, and shredders used in forestry. It aims to establish a uniform description of the various configurations of these types of forestry machines.

Machines covered by this document include:

— drum chippers;

— disc chippers;

— screw chippers;

— horizontal grinders;

— tub grinders;

— shredders.

Chippers, grinders, and shredders that are manually fed are not covered by this document.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1 General terms

3.1.1
woody biomass
biomass originating from trees, bushes and shrubs together with their fruit, leaves and needles inherent to the biomass

Note 1 to entry: This definition includes forest, plantation and other virgin wood, wood processing industry by-products and residues, and used wood.

[SOURCE: ISO 16559:2022, 3.227]

3.2 Terms related to base machines

3.2.1
chipper
<machine-fed>
self-propelled, portable, or stationary forestry machine designed to chip whole trees or parts of trees where the material is mechanically loaded into the infeed components using a material loading device

Note 1 to entry: The material loading device can be another machine or a loading mechanism [for example, a *grapple loader* (3.6.2)] mounted on the chipper.

3.2.1.1
drum chipper
chipper (3.2.1) where the cutting elements are mounted on the periphery of cylindrical steel drum

3.2.1.2
disc chipper
chipper (3.2.1) where the cutting elements are mounted in slots on a large steel disc

3.2.1.3
screw chipper
chipper (3.2.1) where rotating conical-screw blades attached to a flywheel pull in the material and chip it simultaneously

3.2.2
grinder
self-propelled, towed, or stationary forestry machine designed to reduce trees, brush, or parts of trees by tearing, shredding, impacting, or shearing

[SOURCE: ISO 6814:2009, 2.3.1.10 modified to add "stationary forestry" and remove "to a uniform particle size"]

3.2.2.1
horizontal grinder
grinder (3.2.2) that presents and advances material with a horizontal feeding mechanism to *the grinding system* (3.3.2) and grinds the material to a reduced particle size

3.2.2.2
tub grinder
grinder (3.2.2) that presents and advances material with a vertical feeding mechanism to the *grinding system* (3.3.2) using a rotating tub and grinds the material to a reduced particle size

3.2.3
shredder
self-propelled, towed, or stationary forest machine that presents and advances material with either a vertical feeding mechanism or a horizontal feeding mechanism to the *shredding system* (3.3.3) and shreds the material to a reduced particle size

3.3 Terms related to cutting systems

3.3.1
chipping system
device used to chip and reduce whole or partial trees

3.3.2
grinding system
rotating components that reduce the fed material by impacting or shearing

3.3.3
shredding system
rotating components that reduce the fed material by shredding

3.3.4
cutting element
component incorporating single or multiple cutting surfaces

Note 1 to entry: The cutting element attachment hardware is not considered part of the cutting element.

Note 2 to entry: Examples of cutting elements include drums, discs, and screws.

[SOURCE: ISO 11839:2021, 3.1, modified — Note 1 to entry modified and Note 2 to entry added.]

3.3.5
grinding element
component incorporating single or multiple grinding surfaces

Note 1 to entry: The grinding element attachment hardware is not considered part of the grinding element.

[SOURCE: ISO 11839:2021, 3.1, modified — Note 1 to entry modified.]

3.3.6
shredding element
component incorporating single or multiple shredding surfaces

Note 1 to entry: The shredding element attachment hardware is not considered to be part of the shredding element.

3.3.7
anvil
sheer bar
counter-knife
element located close to the cutting system which restrains the feed material while it is cut, shredded, impacted, and reduced

3.3.8
screen
restricting element located close to the cutting system which retains the feed material while it is cut and reduced until it is reduced to a passing size

3.4 Terms related to infeed

3.4.1
infeed system
machine structure that accepts material from a loading machine or *grapple loader* (3.6.2) mechanism

EXAMPLE Feed rollers, conveyor(s), tub, hopper.

3.4.1.1
horizontal infeed
device that presents and advances material with a horizontal or near horizontal feeding action to the cutting system where gravity has a negligible effect

3.4.1.2
tub infeed
device that presents and advances material with a vertical and rotating feeding action to cutting system where gravity has a significant effect

3.4.1.3
hopper infeed
device that retains material and allows gravity to provide the principle feeding action to the cutting system

3.4.2
feed roller
component of a horizontal feeding mechanism using powered rotation on top of the feed material to assist feeding of the material

3.4.3
chipper infeed winch
mechanism which pulls, by means of a flexible element (rope) from a power-driven drum, whole trees or parts of trees to the infeed mechanism of a *chipper* (3.2.1)

3.4.4
infeed conveyor
portion of the *infeed system* (3.4.1) that continuously transports *woody biomass* (3.1.1) to the *feed roller* (3.4.2) using an endless belt, chain, or rollers

3.4.5
tub
rotating funnel-shaped receptacle, into which *woody biomass* (3.1.1) is loaded for processing

3.4.6
hopper
stationary receptacle, into which *woody biomass* (3.1.1) is loaded for processing or used for storage

Note 1 to entry: Hopper can be tipped for unloading.

3.4.7
hammermill
drum
rotor
device containing a vertical or horizontal rotating shaft or drum with hammer bars that impact material being fed into the *hopper infeed* (3.4.1.1) and is thereby shredded and expelled through *screens* (3.3.8)

3.5 Terms related to discharge

3.5.1
discharge system
system that transports reduced material away from the cutting system (3.3), by momentum, air flow or mechanical means

EXAMPLE a *discharge chute* (3.5.2), a *discharge conveyor* (3.5.3), a *discharge fan* (3.5.4).

3.5.2
discharge chute
portion of the *discharge system* (3.5.1) extending outward from the *discharge fan* (3.5.4) opening designed to control the ejection of processed material

3.5.3
discharge conveyor
portion of the *discharge system* (3.5.1) that continuously transports processed material along a gentle slope using an endless belt

3.5.4
discharge fan
portion of the *discharge system* (3.5.1) producing an airstream to the *discharge chute* (3.5.2) where processed material is discharged

3.5.5
discharge auger
device within the *discharge system* (3.5.1) for moving processed material to the *discharge chute* (3.5.2) or *discharge conveyor* (3.5.3)

3.6 Terms related to other components

3.6.1
operator's cab
enclosure on the machine where the operator is stationed to control machine functions

Note 1 to entry: An operator's cab can be repositioned (for example, tilted, elevated).

Note 2 to entry: Operator's cab can be the same as the driver's position.

3.6.2
grapple loader
knuckle-boom device with a grapple and supporting structure designed to grab, lift, swing and place trees or parts of trees

3.6.3
metal separator
device that separates metallic objects from the non-metallic material in the processed material stream

EXAMPLE Magnetics.

3.7 Terms related to dimensional characteristics

3.7.1
chipping system diameter
path described by the outermost point of the *cutting elements* (3.3.4) when rotating around an axis

3.7.2
grinding system diameter
path described by the outermost point of the *grinding elements* (3.3.5) when rotating around an axis

3.7.3
shredding system diameter
path described by the outermost point of the *shredding elements* (3.3.6) when rotating around an axis

3.7.4
infeed height
H_4
height from ground plane to leading edge of a *horizontal infeed* (3.4.1.1)

3.7.5
infeed opening height
H_3
height of the opening to the cutting system

3.7.6
infeed opening width
W_3
width of the opening to the cutting system

3.7.7
infeed opening length
L_3
length of the opening to the cutting system on a *tub grinder* (3.2.2.2)

3.7.8
tub size
diameter and depth of the *tub* (3.4.5)

3.7.9
operating height
H_1
distance from the ground to the highest extended machine element when in the operating configuration

3.7.10
operating length
L_1
linear distance between the forward-most extended machine element and the rearward-most extended machine element when in the operating configuration

3.7.11
operating width
W_1
linear distance between each side-most extended machine elements when in the operating configuration

3.7.12
transport height
H_2
distance from the ground to the highest machine element when in the transport configuration

3.7.13
transport length
L_2
linear distance between the forward-most machine element and the rearward-most machine element when in the transport configuration

3.7.14
transport width
W_2
linear distance between side-most retracted machine elements when in the transport configuration

3.8 Terms related to configurations

NOTE Chippers and grinders can be configured according to the type of mobility, power source or both.

3.8.1
mobility
method for moving the machine

3.8.1.1
towable configuration
machine configured with a frame and wheels that allow the machine to be moved by another vehicle

3.8.1.2
self-propelled configuration
machine configured to move under its own power

Note 1 to entry: These machines are typically lorry-mounted.

3.8.1.3
stationary configuration
machine configured as a structure and is not intended to be moved

3.8.2
power source
engine or electric motor which provides energy for linear or rotational movement

3.8.2.1
dedicated power source
power source (3.8.2) driving the cutting system or *mobility* (3.8.1) method

3.8.2.2
combined power source
power source (3.8.2) driving the cutting system and *mobility* (3.8.1) method

3.8.2.3
external power source
detachable *power source* (3.8.2) driving the cutting system

EXAMPLE Use of a power take-off (PTO) from another machine or vehicle.

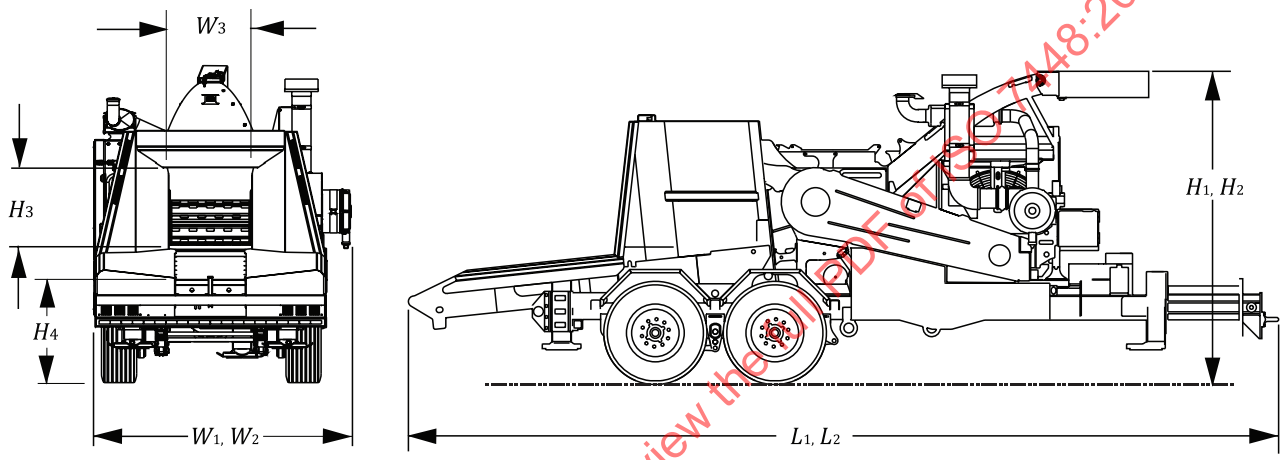
Annex A
(informative)

Dimensional characteristics and nomenclature of chippers

A.1 Dimensional characteristics of drum chippers

A.1.1 Towable drum chippers

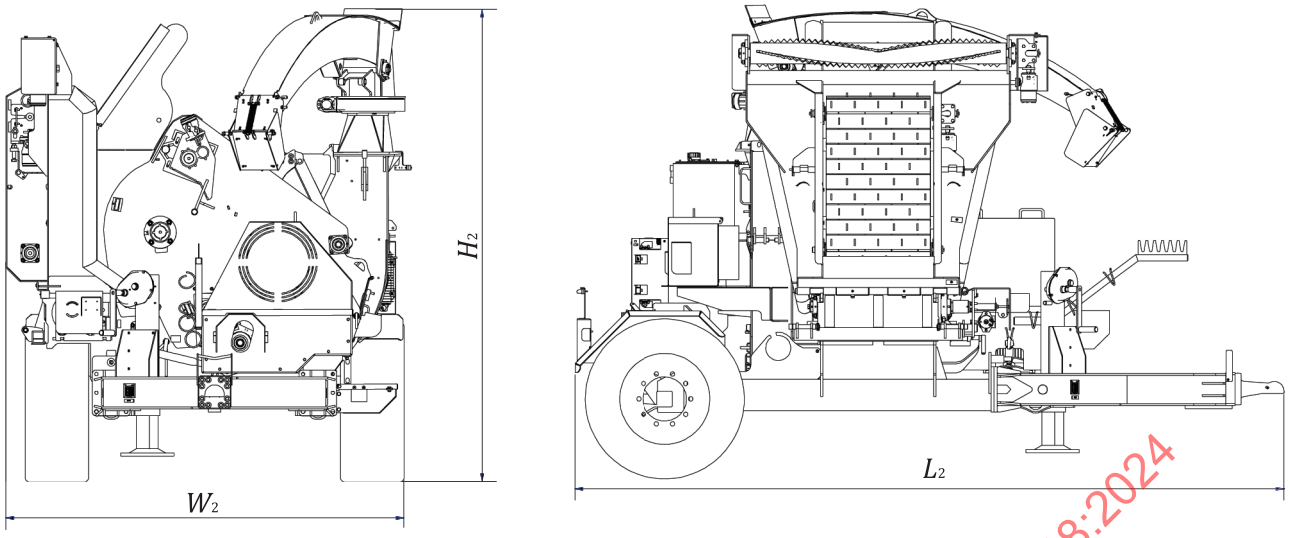
See Figures A.1 - A.5.



Key

H_1 operating height (3.7.9)
L_1 operating length (3.7.10)
W_1 operating width (3.7.11)
H_2 transport height (3.7.12)
L_2 transport length (3.7.13)
W_2 transport width (3.7.14)
W_3 infeed opening width (3.7.6)
H_3 infeed opening height (3.7.5)
H_4 infeed height (3.7.4)

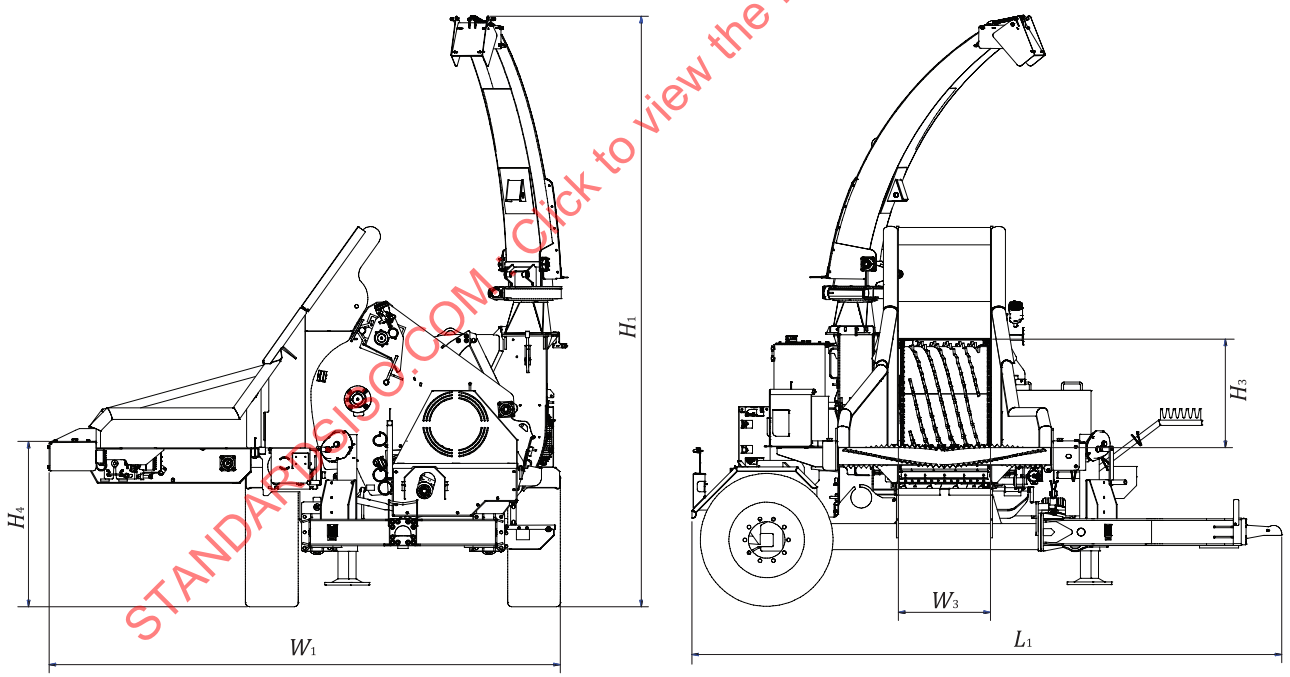
Figure A.1 — Example of towable drum chipper with dedicated (engine) power source (shown in transport configuration)



Key

H_2 transport height (3.7.12)
L_2 transport length (3.7.13)
W_2 transport width (3.7.14)

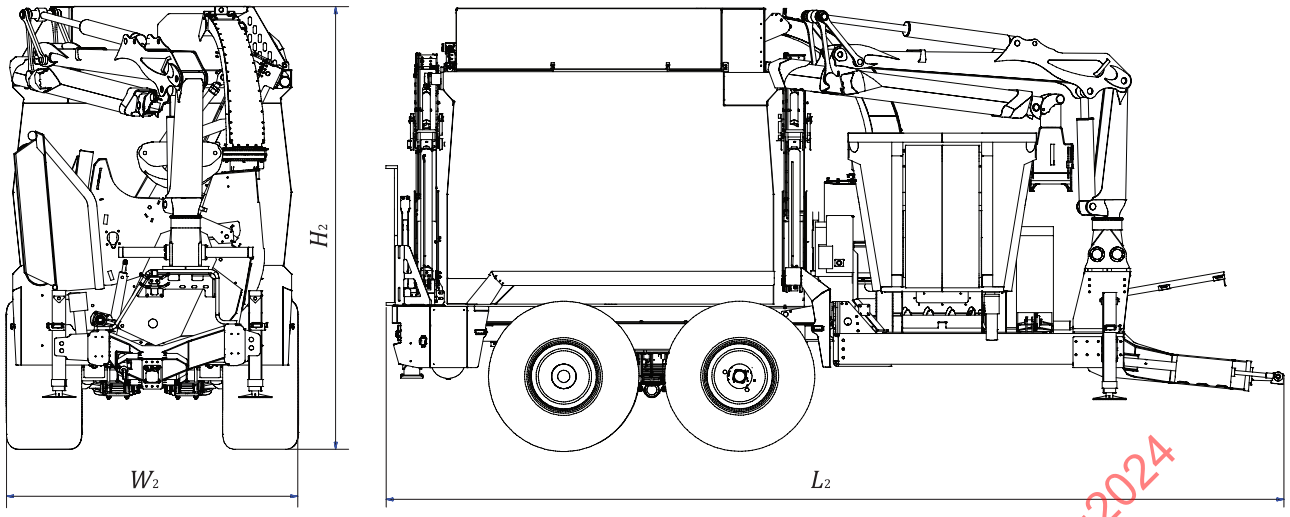
Figure A.2 — Example of towable drum chipper with external (PTO) power source (shown in transport configuration)



Key

H_1 operating height (3.7.9)
L_1 operating length (3.7.10)
W_1 operating width (3.7.11)
W_3 infeed opening width (3.7.6)
H_3 infeed opening height (3.7.5)
H_4 infeed height (3.7.4)

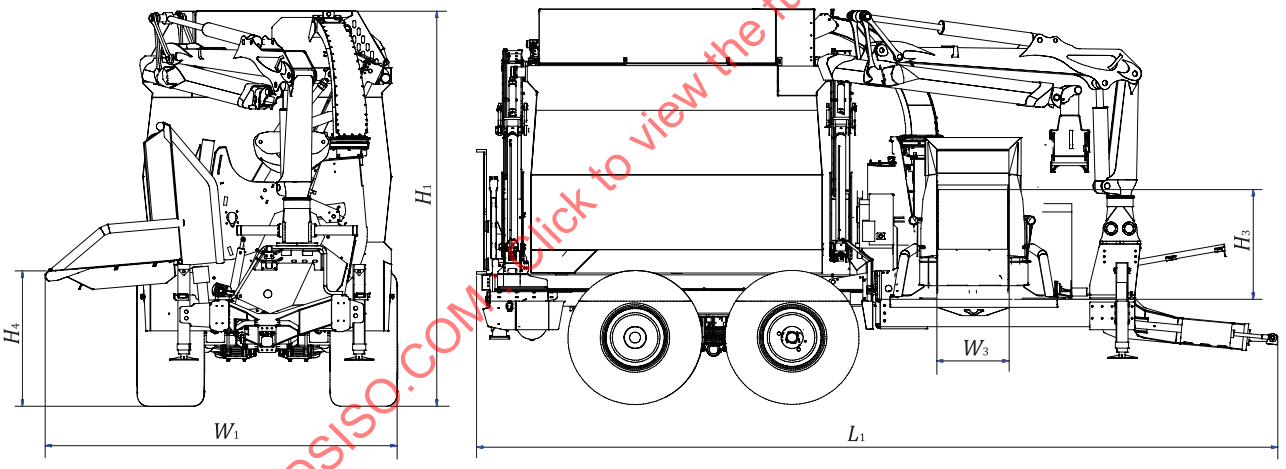
Figure A.3 — Example of towable drum chipper with external (PTO) power source (shown in operating configuration)



Key

H_2 transport height (3.7.12)
L_2 transport length (3.7.13)
W_2 transport width (3.7.14)

Figure A.4 — Example of towable drum chipper with dedicated (engine) power source and tipping box (shown in transport configuration)



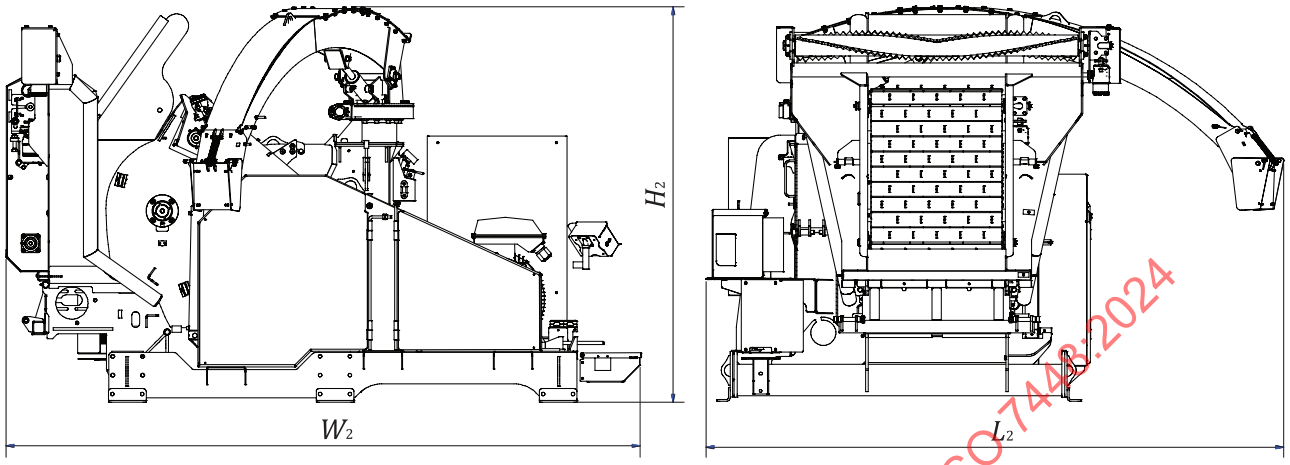
Key

H_1 operating height (3.7.9)
L_1 operating length (3.7.10)
W_1 operating width (3.7.11)
W_3 infeed opening width (3.7.6)
H_3 infeed opening height (3.7.5)
H_4 infeed height (3.7.4)

Figure A.5 — Example of towable drum chipper with dedicated (engine) power source and tipping box (shown in operating configuration)

A.1.2 Stationary drum chippers

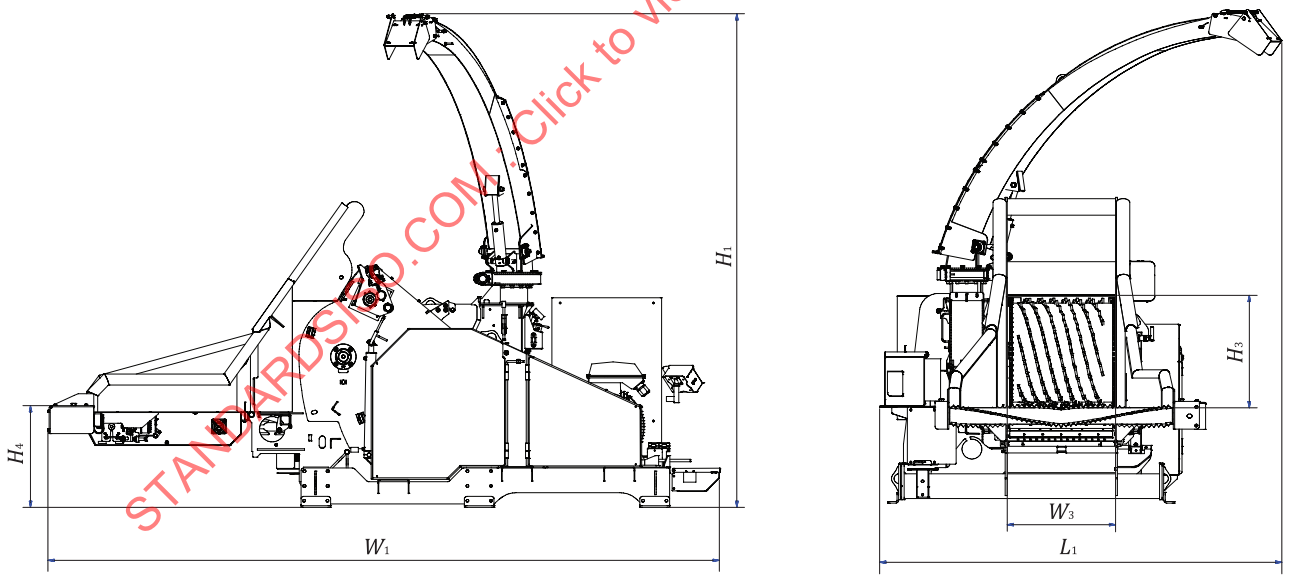
See Figures A.6 and A.7.



Key

H_2 transport height (3.7.12)
L_2 transport length (3.7.13)
W_2 transport width (3.7.14)

Figure A.6 — Example of stationary drum chipper with dedicated power source (shown in transport configuration)



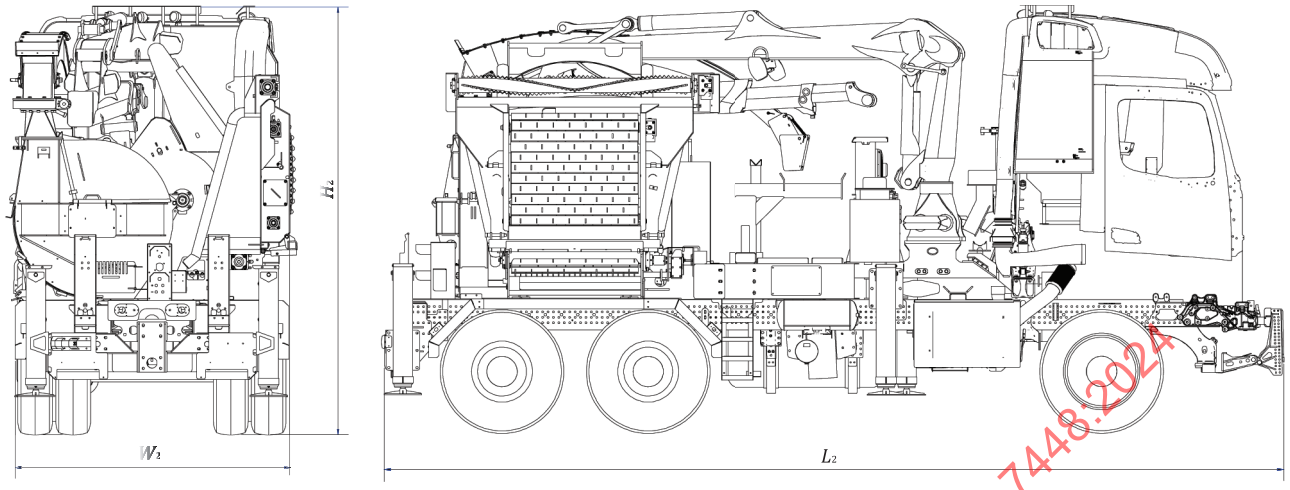
Key

H_1 operating height (3.7.9)
L_1 operating length (3.7.10)
W_1 operating width (3.7.11)
W_3 infeed opening width (3.7.6)
H_3 infeed opening height (3.7.5)
H_4 infeed height (3.7.4)

Figure A.7 — Example of stationary drum chipper with dedicated power source (shown in operating configuration)

A.1.3 Self-propelled drum chippers

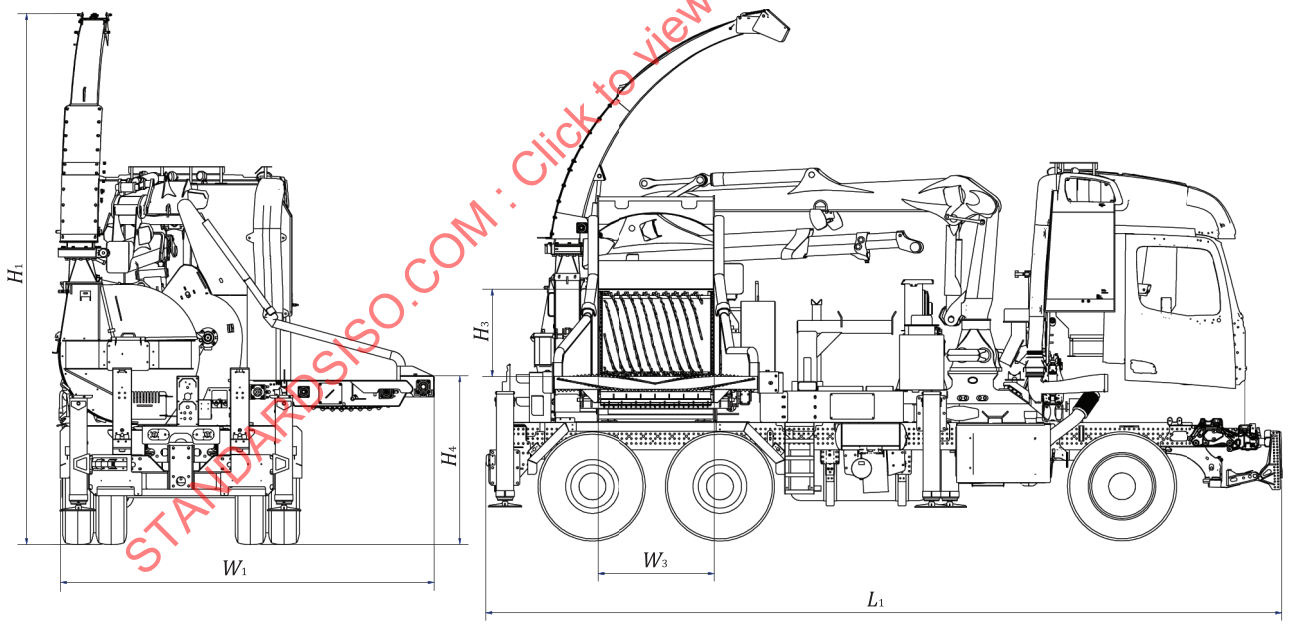
See Figures A.8 and A.9.



Key

H_2 transport height (3.7.12)
L_2 transport length (3.7.13)
W_2 transport width (3.7.14)

Figure A.8 — Example of self-propelled (lorry-mounted) drum chipper with combined (engine) power source and grapple loader (shown in transport configuration)



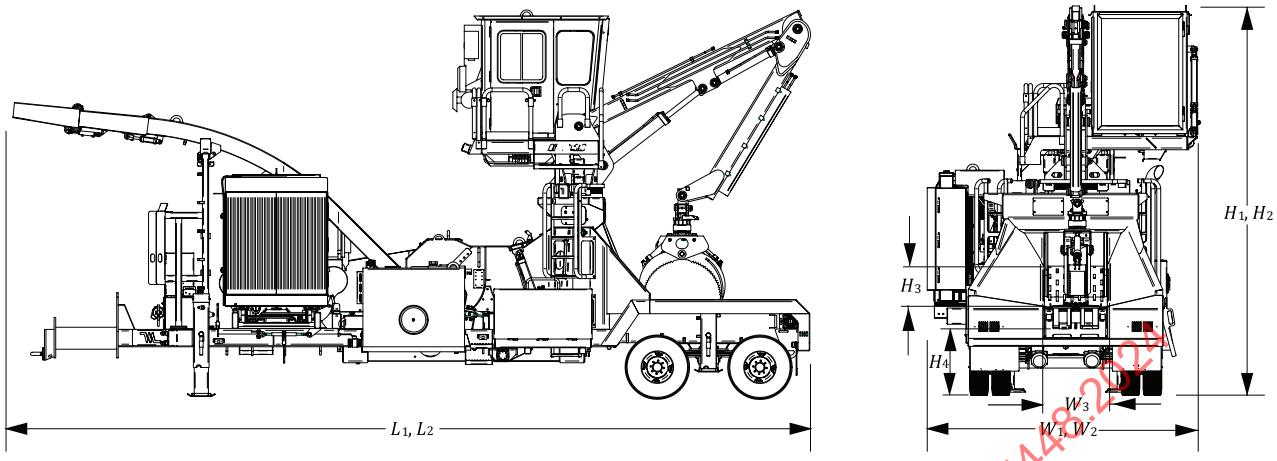
Key

H_1 operating height (3.7.9)
L_1 operating length (3.7.10)
W_1 operating width (3.7.11)
W_3 infeed opening width (3.7.6)
H_3 infeed opening height (3.7.5)
H_4 infeed height (3.7.4)

Figure A.9 — Example of self-propelled (lorry-mounted) drum chipper with combined (engine) power source and grapple loader (shown in operating configuration)

A.2 Dimensional characteristics of disc chippers

See Figure A.10.



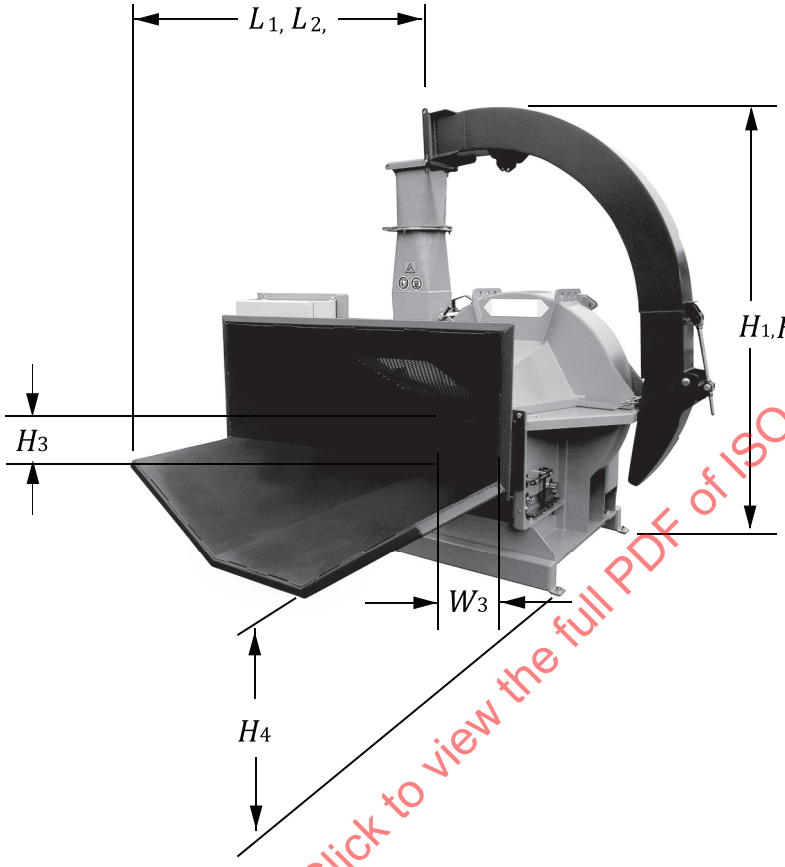
Key

H_1 operating height (3.7.9)
L_1 operating length (3.7.10)
W_1 operating width (3.7.11)
H_2 transport height (3.7.12)
L_2 transport length (3.7.13)
W_2 transport width (3.7.14)
W_3 infeed opening width (3.7.6)
H_3 infeed opening height (3.7.5)
H_4 infeed height (3.7.4)

Figure A.10 — Example of towable disc chipper with dedicated (engine) power source, operator's cab and grapple loader (shown in transport configuration)

A.3 Dimensional characteristics of screw chippers

See Figure A.11.



Key

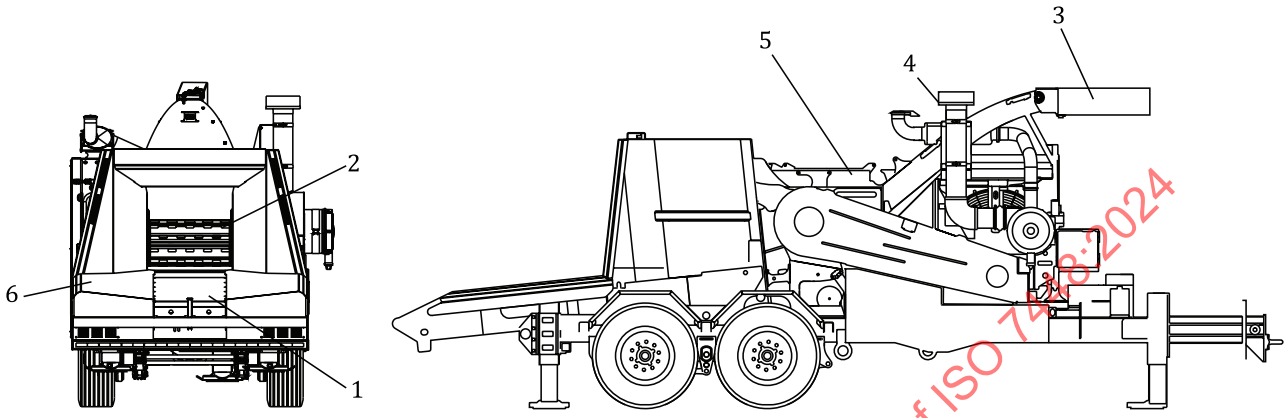
H_1	operating height (3.7.9)	L_2	transport length (3.7.13)
L_1	operating length (3.7.10)	W_3	infeed opening width (3.7.6)
W_1	operating width (3.7.11) (not shown)	H_3	infeed opening height (3.7.5)
H_2	transport height (3.7.12)	H_4	infeed height (3.7.4)

Figure A.11 — Example of stationary screw chipper with dedicated (electric motor) power source

A.4 Nomenclature of drum chippers

A.4.1 Towable drum chipper

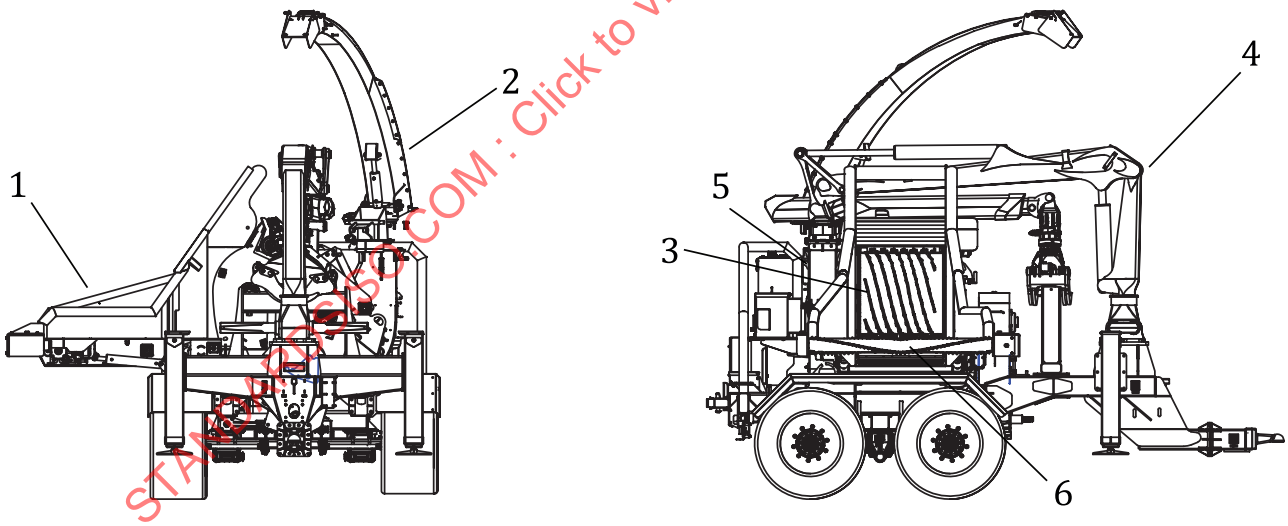
See Figures A.12 — A.13.



Key

1 infeed system (3.4.1)
2 chipping system (3.3.1)
3 discharge chute (3.5.2)
4 dedicated power source (3.8.2.1)
5 discharge fan (3.5.4)
6 hopper (3.4.6)

Figure A.12 — Example of towable drum chipper with dedicated (engine) power source



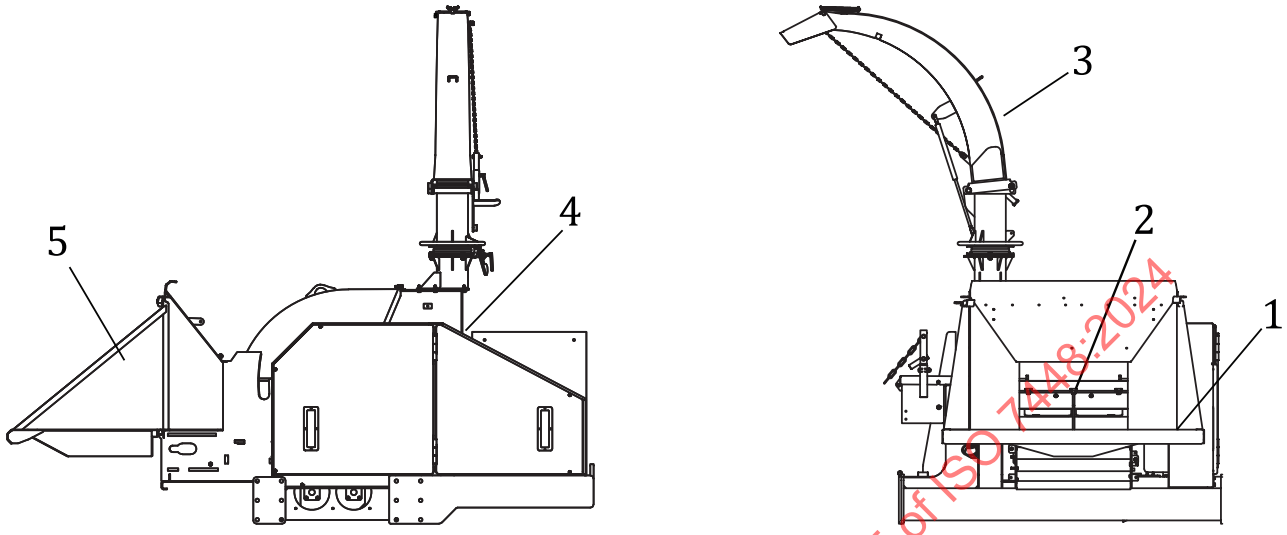
Key

1 hopper (3.4.6)
2 discharge chute (3.5.2)
3 chipping system (3.3.1)
4 grapple loader (3.6.2)
5 discharge fan (3.5.4)
6 infeed system (3.4.1)

Figure A.13 — Example of towable drum chipper with external (PTO) power source and grapple loader

A.4.2 Stationary drum chipper

See Figure A.14.



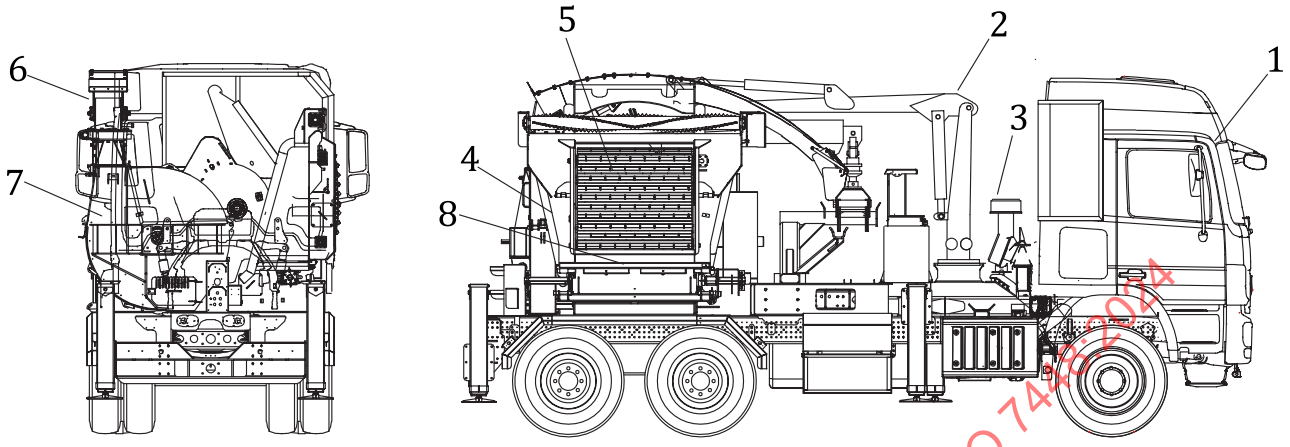
Key

1 infeed system (3.4.1)
2 chipping system (3.3.1)
3 discharge chute (3.5.2)
4 discharge fan (3.5.4)
5 hopper (3.4.6)

Figure A.14 — Example of stationary drum chipper with dedicated (electric motor) power source

A.4.3 Self-propelled drum chipper

See Figure A.15.



Key

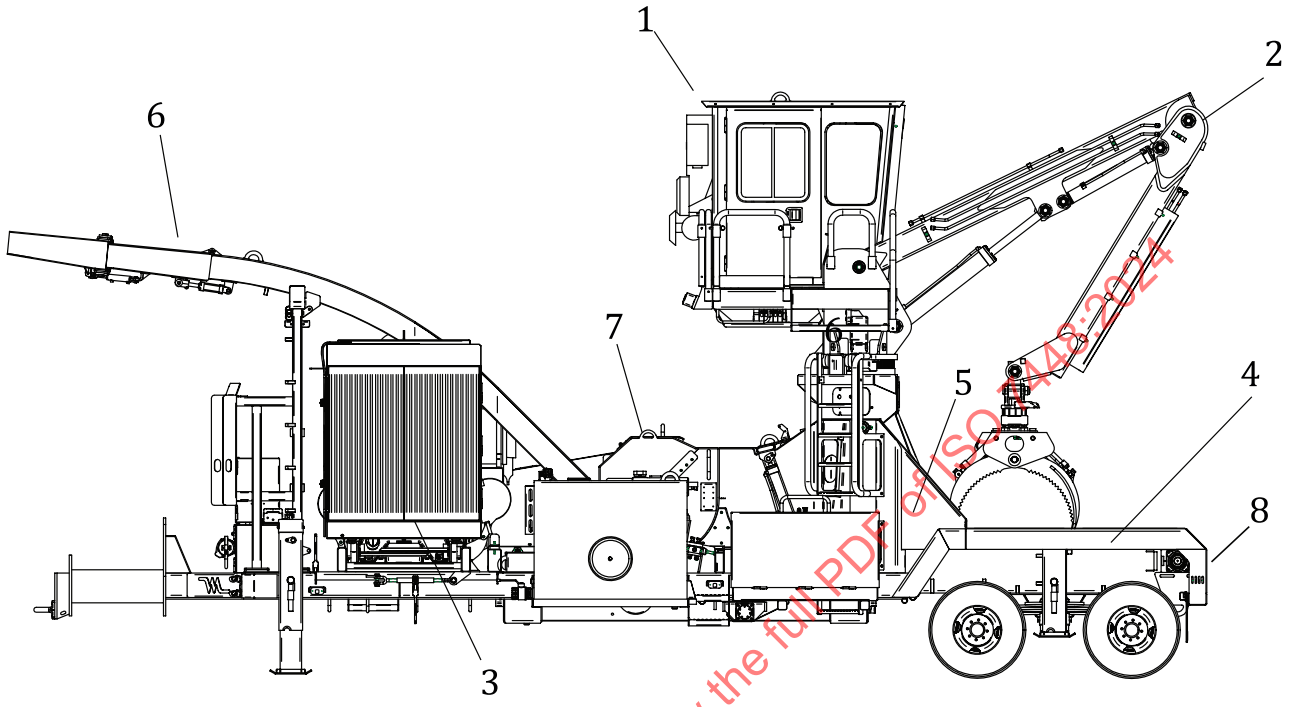
1 operator's cab[a] (3.6.1)
2 grapple loader (3.6.2)
3 combined power source (3.8.2.2)
4 hopper (3.4.6)
5 chipping system (3.3.1)
6 discharge chute (3.5.2)
7 discharge fan (3.5.4)
8 infeed system (3.4.1)

[a] NOTE: Operator's cab can be the same as the driver's position.

Figure A.15 — Example of self-propelled (lorry-mounted) drum chipper with combined (engine) power source and grapple loader

A.5 Nomenclature of disc chippers

See Figure A.16.



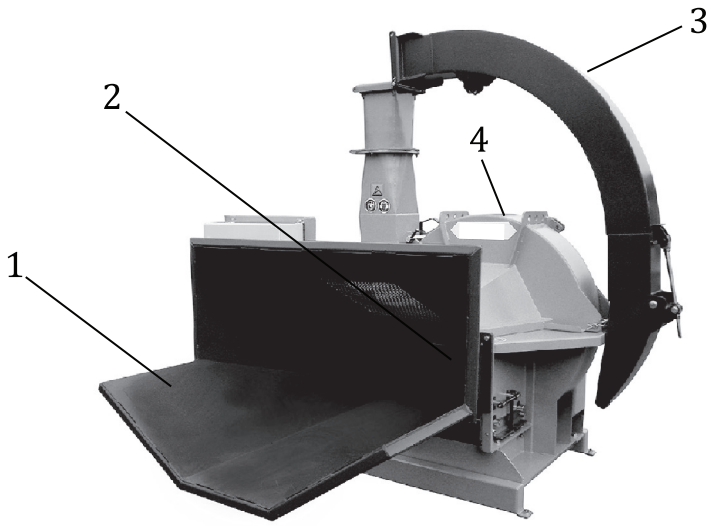
Key

1 operator's cab (3.6.1)
2 grapple loader (3.6.2)
3 dedicated power source (3.8.2.1)
4 hopper (3.4.6)
5 chipping system (3.3.1)
6 discharge chute (3.5.2)
7 discharge fan (3.5.4)
8 infeed system (3.4.1)

Figure A.16 — Example of towable disc chipper with dedicated (engine) power source, operator's cab and grapple loader

A.6 Nomenclature of screw chippers

See Figure A.17.



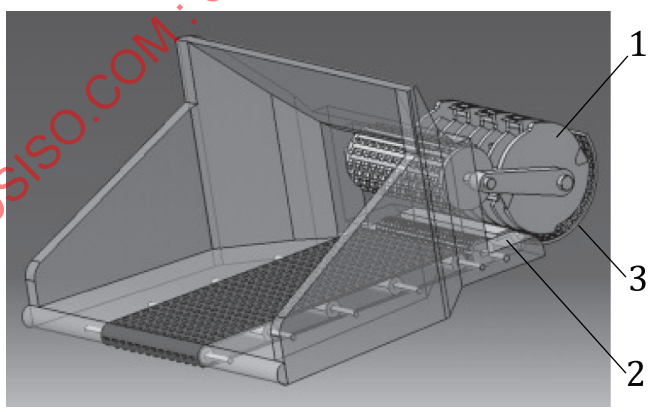
Key

1 hopper (3.4.6)
2 chipping system (3.3.1)
3 discharge chute (3.5.2)
4 discharge fan (3.5.4)

Figure A.17 — Example of stationary screw chipper with dedicated (electric motor) power source

A.7 Cutting system component nomenclature of drum chippers

See Figure A.18.



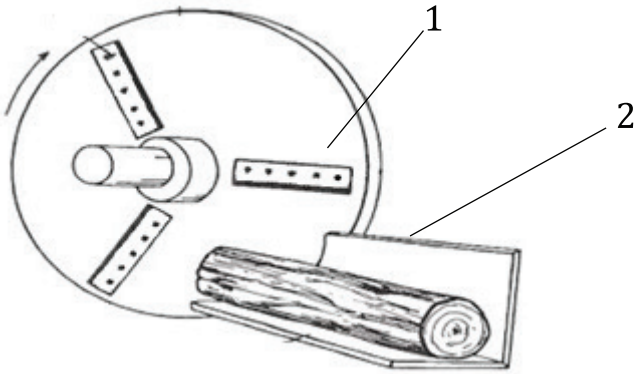
Key

1 cutting element (3.3.4) (drum)
2 anvil (3.3.7)
3 screen (3.3.8)

Figure A.18 — Example cutting system components of drum chipper

A.8 Cutting system component nomenclature of disc chippers

See Figure A.19.



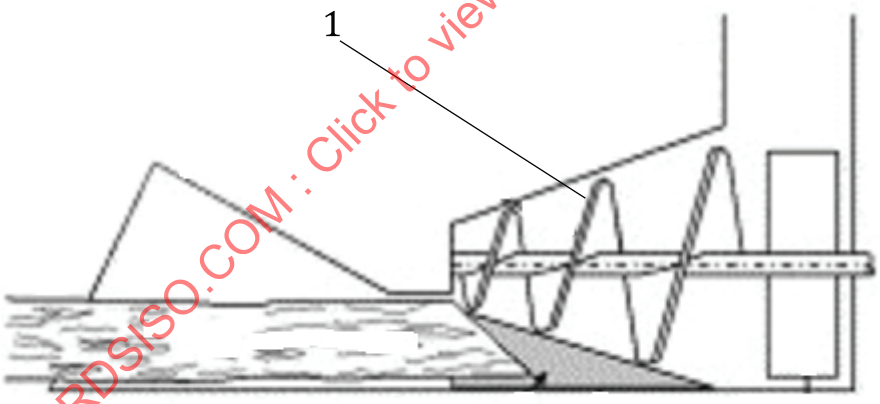
Key

1 cutting element (3.3.4) (disc)
2 infeed system (3.4.1)

Figure A.19 — Example cutting system components of disc chipper

A.9 Cutting system component nomenclature of screw chippers

See Figure A.20.



Key

1 cutting element (3.3.4) (screw)

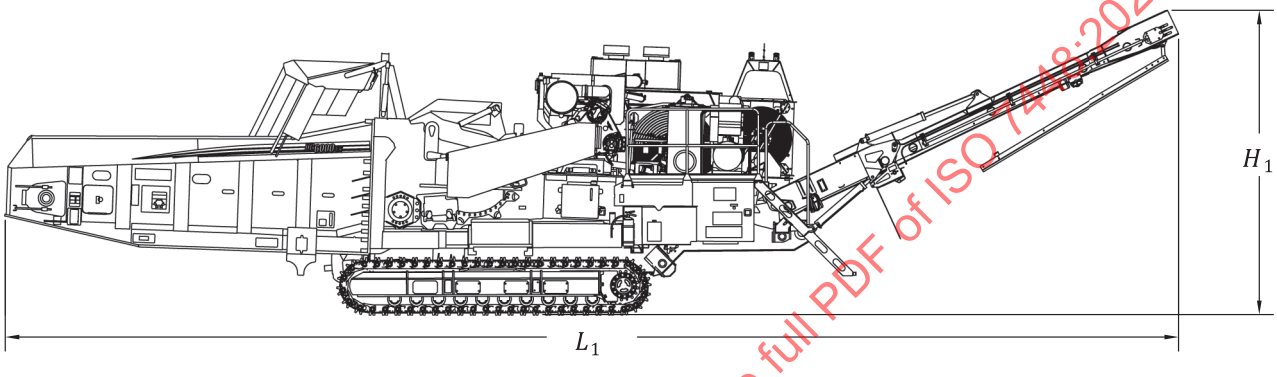
Figure A.20 — Example cutting system components of screw chipper

Annex B
(informative)

Dimensional characteristics and nomenclature of grinders and shredders

B.1 Dimensional characteristics of horizontal grinders

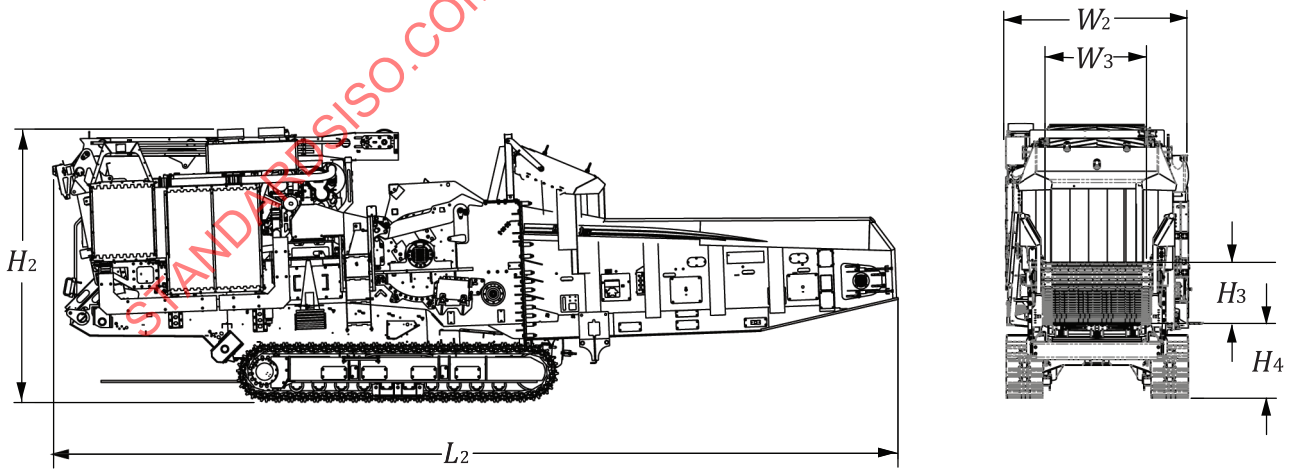
See Figures B.1 and B.2.



Key

H_1 operating height (3.7.9)
L_1 operating length (3.7.10)
W_1 operating width (3.7.11) (not shown)

Figure B.1 — Example self-propelled horizonal grinder with dedicated (engine) power source
(shown in operating configuration)



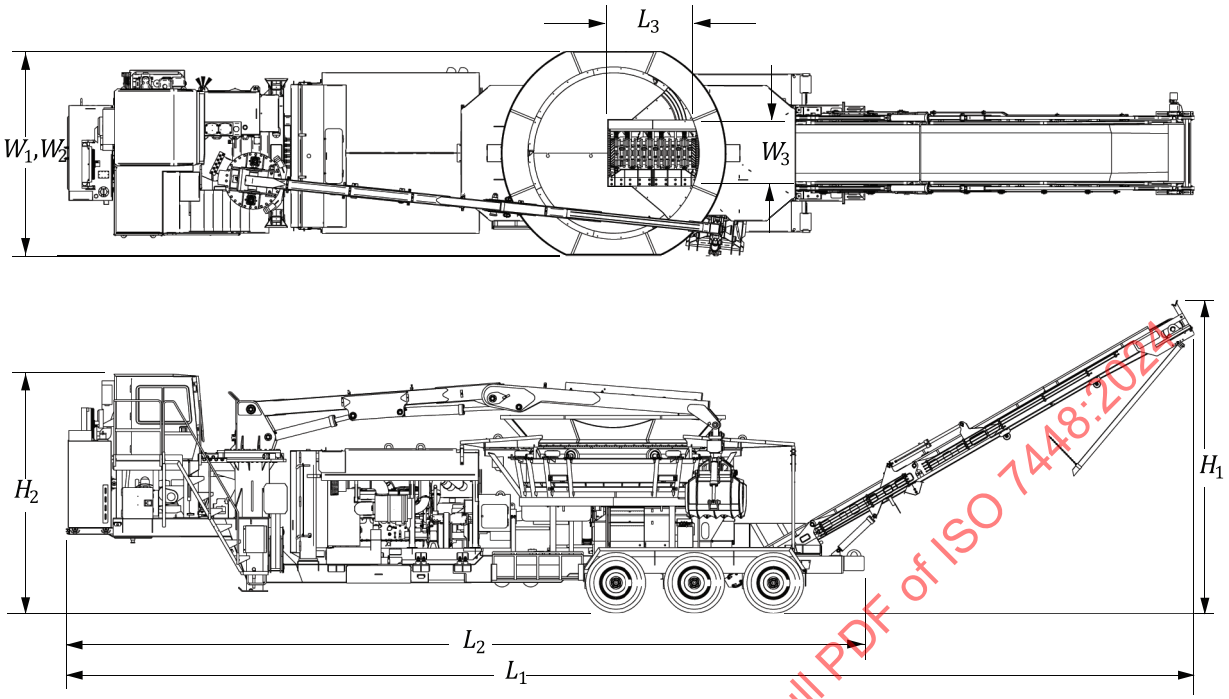
Key

H_2 transport height (3.7.12)
L_2 transport length (3.7.13)
W_2 transport width (3.7.14)
W_3 infeed opening width (3.7.6)
H_3 Infeed opening height
H_4 infeed height (3.7.4)

Figure B.2 — Example self-propelled horizonal grinder with dedicated (engine) power source
(shown in transport configuration)

B.2 Dimensional characteristics of tub grinders

See Figure B.3.



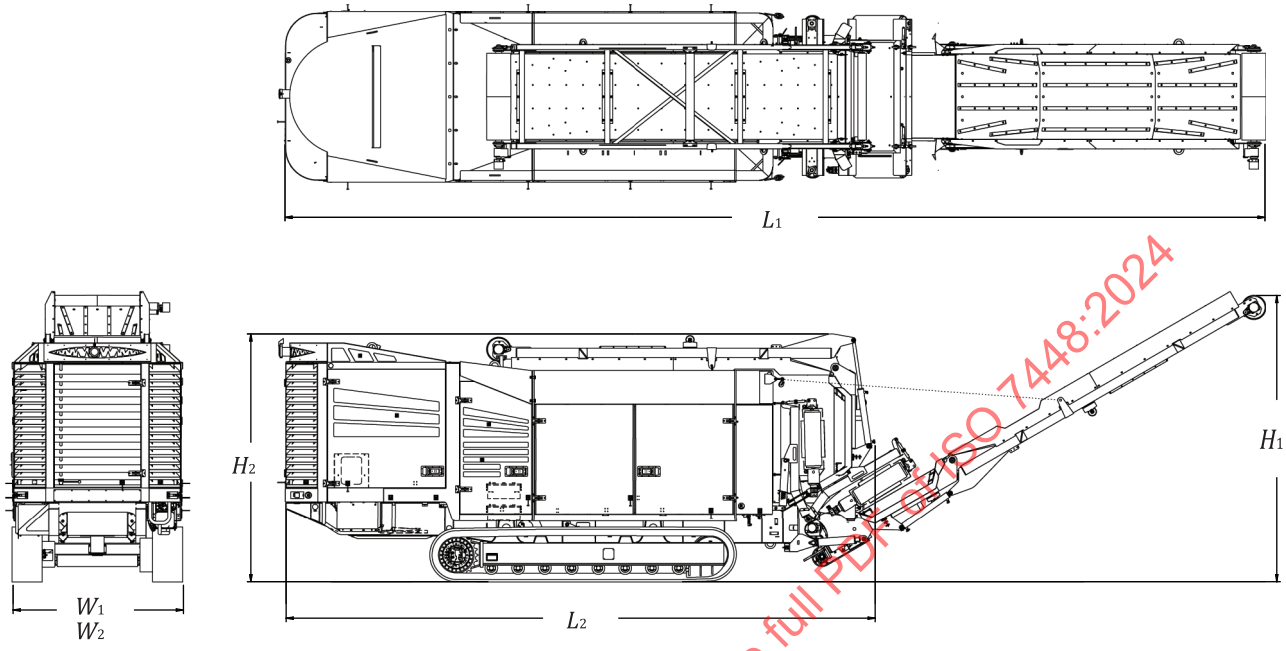
Key

H_1 operating height (3.7.9)
L_1 operating length (3.7.10)
W_1 operating width (3.7.11)
L_3 infeed opening length (3.7.7)
H_2 transport height (3.7.12)
L_2 transport length (3.7.13)
W_2 transport width (3.7.14)
W_3 infeed opening width (3.7.6)

Figure B.3 — Example towable tub grinder with dedicated (engine) power source

B.3 Dimensional characteristics of shredders

See Figure B.4.



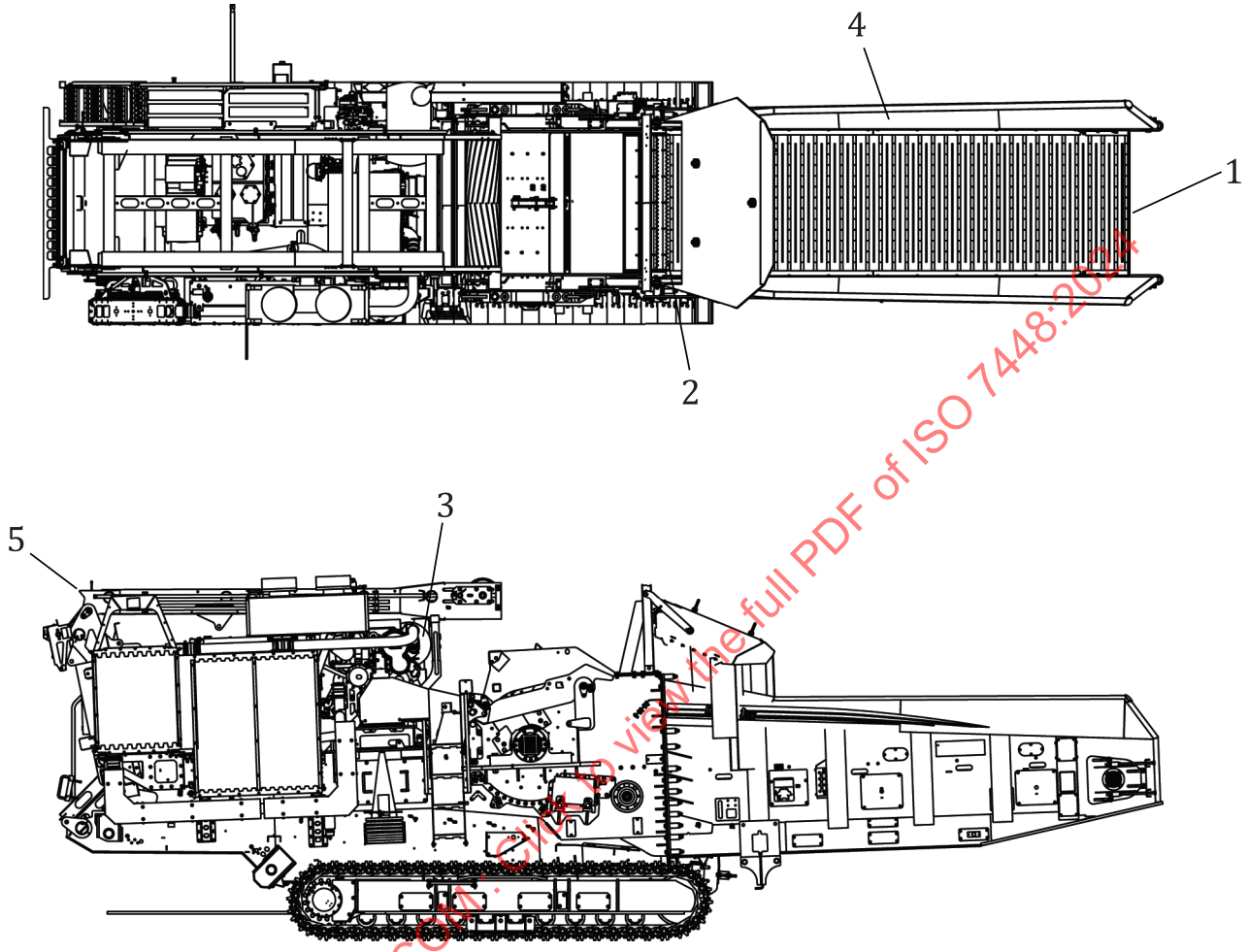
Key

H_1 operating height (3.7.9)
L_1 operating length (3.7.10)
W_1 operating width (3.7.11)
H_2 transport height (3.7.12)
L_2 transport length (3.7.13)
W_2 transport width (3.7.14)

Figure B.4 — Example self-propelled shredder with dedicated (engine) power source

B.4 Nomenclature of horizontal grinders

See Figure B.5.



Key

1 infeed system (3.4.1)
2 grinding system (3.3.2)
3 dedicated power source (3.8.2.1)
4 hopper (3.4.6)
5 discharge conveyor (3.5.1)

Figure B.5 — Example self-propelled horizontal grinder with dedicated (engine) power source