BRITISH STANDARD

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Earth-moving machinery — Dumpers — Terminology and commercial specifications

ICS 01.040.53; 53.100

BSi
British Standards

National foreword

This British Standard reproduces verbatim ISO 7132:2003 and implements it as the UK national standard. It supersedes BS 6914-4:1990 which is withdrawn.

The UK participation in its preparation was entrusted by Technical Committee B/513, Construction equipment and plant, and site safety, to Subcommittee B/513/1, Earth-moving machinery (International), which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

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

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Summary of pages

This document comprises a front cover, an inside front cover, the ISO title page, pages ii to iv, pages 1 to 28, an inside back cover and a back cover.

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Amendments issued since publication

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INTERNATIONAL STANDARD

ISO 7132

Third edition
2003-12-01

Earth-moving machinery — Dumpers — Terminology and commercial specifications

Engins de terrassement — Tombereaux — Terminologie et spécifications commerciales

Reference number
ISO 7132:2003(E)

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 7132 was prepared by Technical Committee ISO/TC 127, *Earth-moving machinery*, Subcommittee SC 4, *Commercial nomenclature, classification and rating*.

This third edition cancels and replaces the second edition (ISO 7132:1990), which has been technically revised.

Earth-moving machinery — Dumpers — Terminology and commercial specifications

1 Scope

This International Standard establishes a terminology for, and the content of, commercial literature specifications for self-propelled dumpers (including compact dumpers), as defined in ISO 6165, used in earth moving.

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.

ISO 3450, *Earth-moving machinery — Braking systems of rubber-tyred machines — Systems and performance requirements and test procedures*

ISO 5010, *Earth-moving machinery — Rubber-tyred machines — Steering requirements*

ISO 6014:1986, *Earth-moving machinery — Determination of ground speed*

ISO 6016:1998, *Earth-moving machinery — Methods of measuring the masses of whole machines, their equipment and components*

ISO 6165, *Earth-moving machinery — Basic types — Vocabulary*

ISO 6483:1980, *Earth-moving machinery — Dumper bodies — Volumetric rating*

ISO 6746-1, *Earth-moving machinery — Definitions of dimensions and codes — Part 1: Base machine*

ISO 7457:1997, *Earth-moving machinery — Determination of turning dimensions of wheeled machines*

ISO 9249:1997, *Earth-moving machinery — Engine test code — Net power*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6165 and the following apply.

3.1 General

3.1.1
dumper
self-propelled crawler or wheeled machine, with an open body, which transports and dumps or spreads material, loading being performed either by means external to the dumper or by self-loading equipment

3.1.2
base machine
machine with a cab or canopy and operator-protective structures (if required), without equipment or attachments but possessing the necessary mountings for such equipment and attachments

3.1.3
equipment
set of components mounted onto the base machine which allows an attachment to perform its design function

3.1.4
self-loading equipment
an integral mounted, bucket-supporting structure and linkage permanently fitted to a compact dumper enabling it to fill its own open body with material

NOTE See 4.1.5.

3.1.5
attachment
assembly of components that can be mounted onto the base machine or equipment for a specific use

3.1.6
component
part of an assembly or of a base machine, equipment or an attachment

3.2 Performance

3.2.1
tractive force rimpull
force available between the tyre and the ground to propel the dumper

3.2.1.1
tractive force with direct drive transmission
tractive force calculated or measured at the maximum engine torque in each forward gear

NOTE The maximum pull could be limited by mass and traction conditions.

3.2.1.2
tractive force rimpull with powershift transmission [electric drive] [hydrostatic drive]
tractive force rimpull given by the calculated or measured pull versus machine speed curves in each forward gear range

NOTE The maximum pull could be limited by mass and traction conditions.

3.2.2
empty body dump and return time
full movement cycle time of a body, door or ejector without load, at the rated engine speed

3.2.3
payload
manufacturer's rated mass that can be carried by the machine

4 Base machine

NOTE The information on the base machine parameters is provided in the referenced figures.

4.1 Types of dumper

4.1.1 Method of dumping

— Rear dump: see Figure 1.

— Bottom dump: see Figure 2.

— Side dump: see Figure 3.

— Front dump: see Figure 4.

— Rotating dump: see Figure 5.

— High dump: see Figure 6.

— Slewing dump: see Figure 7.

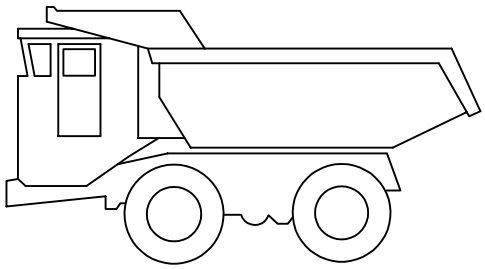


Figure 1 — Rear dump

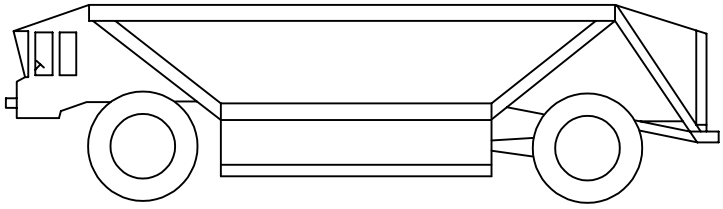


Figure 2 — Bottom dump

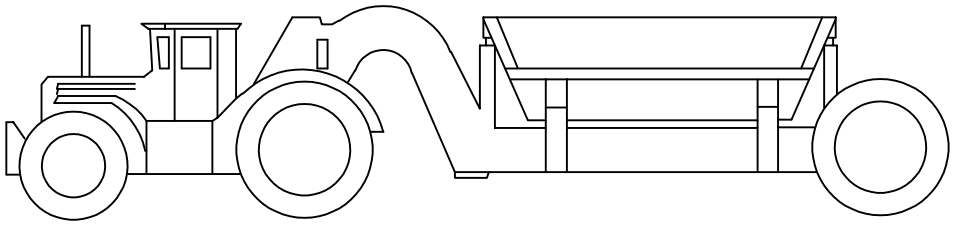


Figure 3 — Side dump

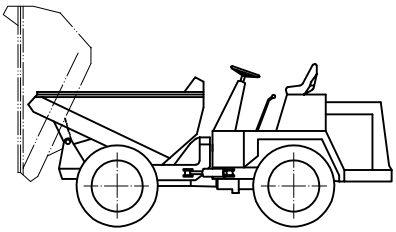


Figure 4 — Front dump

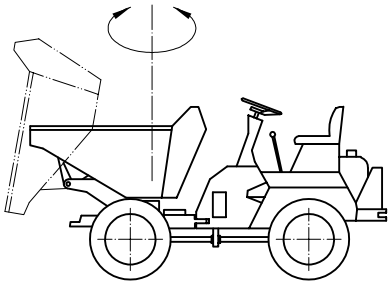


Figure 5 — Rotating dump

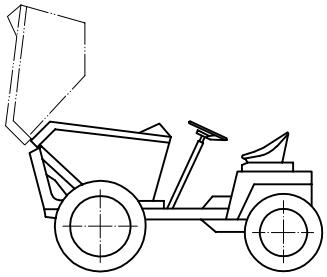


Figure 6 — High dump

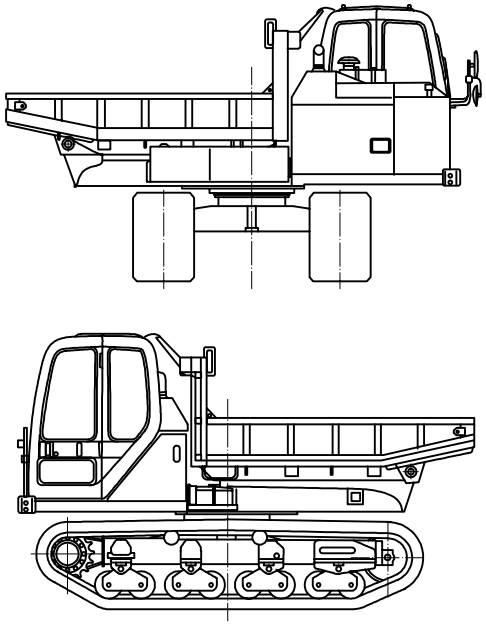


Figure 7 — Slewing dump

4.1.2 Steering system

— Front-wheel steer: see Figure 8.

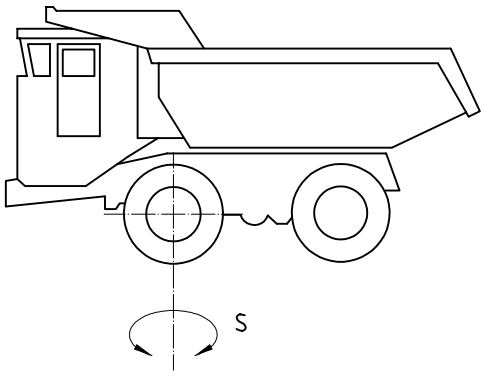
— Articulated steer: see Figure 9.

— Rear-wheel steer: see Figure 10.

— All-wheel steer: see Figure 11.

— Crawler skid steer: see Figure 12.

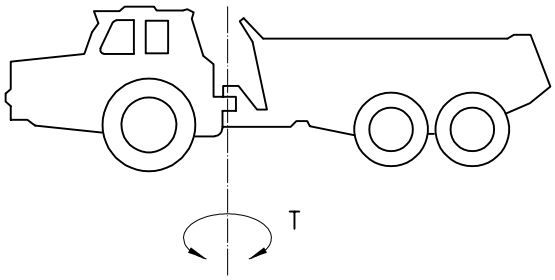
— Wheel skid steer: see Figure 13.



Key

S steerable wheels

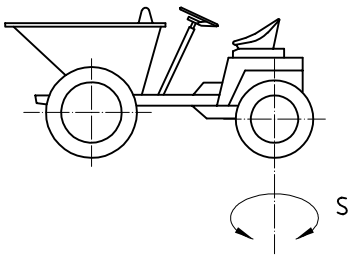
Figure 8 — Front-wheel steer



Key

T turning centre

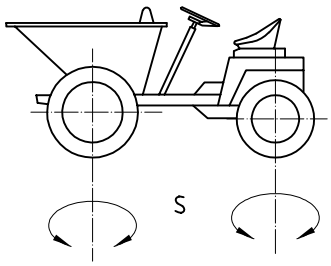
Figure 9 — Articulated steer



Key

S steerable wheels

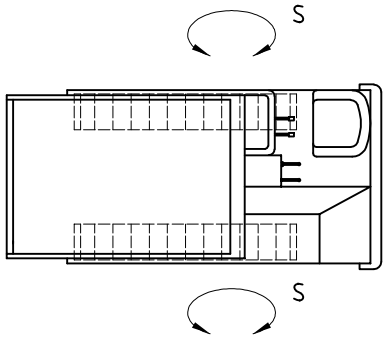
Figure 10 — Rear-wheel steer



Key

S steerable wheels

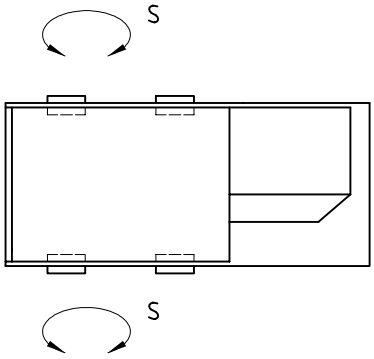
Figure 11 — All-wheel steer



Key

S steerable track

Figure 12 — Crawler skid steer



Key

S steerable wheels

Figure 13 — Wheel skid steer

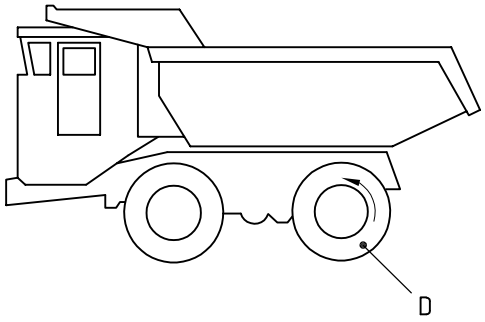
4.1.3 Drive system

— Rear-wheel drive: see Figure 14.

— All-wheel drive: see Figure 15.

— Centre-axle drive: see Figure 16.

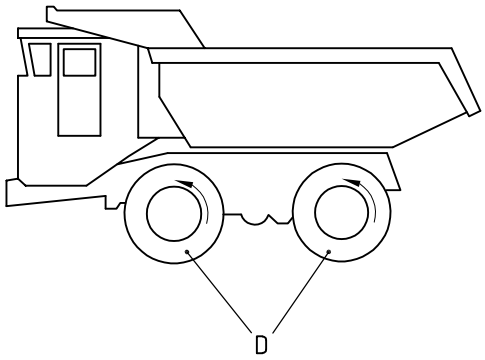
— Crawler drive: see Figure 17.



Key

D drive wheels

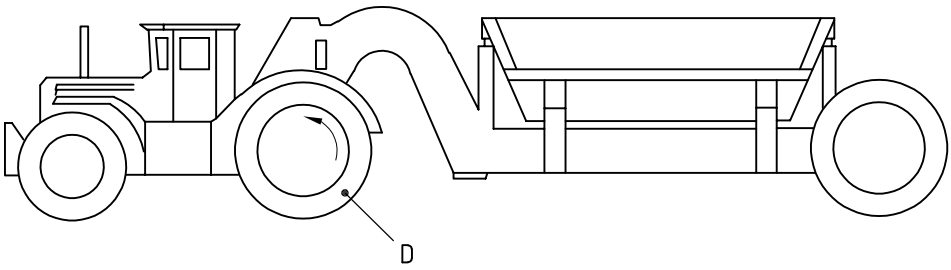
Figure 14 — Rear-wheel drive



Key

D drive wheels

Figure 15 — All-wheel drive



Key

D drive wheels

Figure 16 — Centre-axle drive

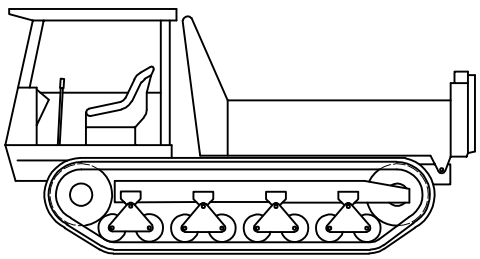


Figure 17 — Crawler drive

4.1.4 Number of axles

— Two axles: see Figure 18.

— Three axles: see Figure 19.

— More than three axles: see Figure 20.

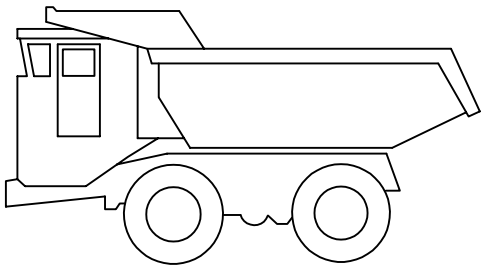


Figure 18 — Two axles

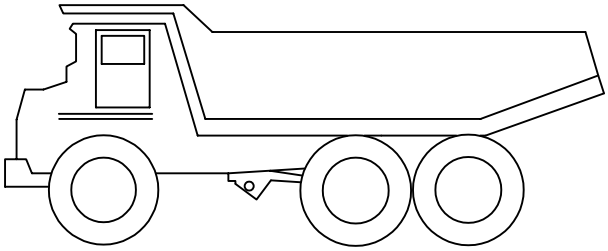


Figure 19 — Three axles

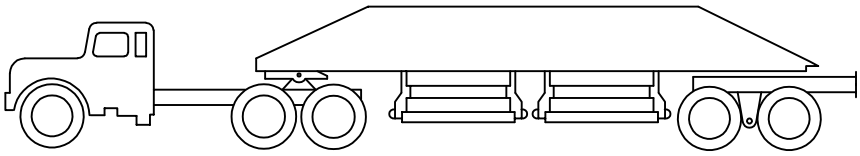


Figure 20 — More than three axles

4.1.5 Method of self-loading

— Body loading: see Figure 21.

— Shovel loading: see Figure 22.

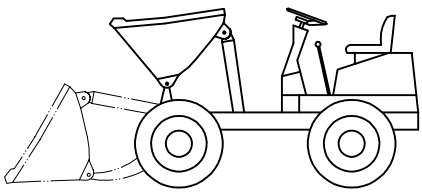


Figure 21 — Body loading

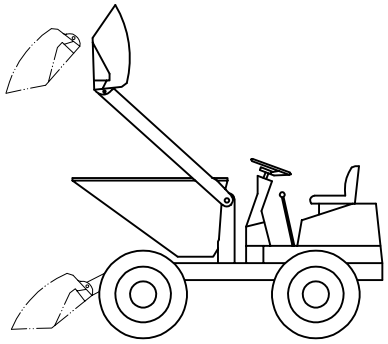


Figure 22 — Shovel loading

4.1.6 Operator position

— Rear operator position: see Figure 23.

— Front operator position: see Figure 24.

— Reversible operator position: see Figure 25.

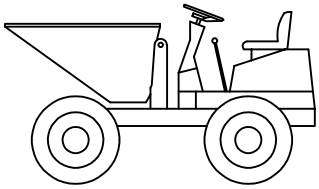


Figure 23 — Rear operator position

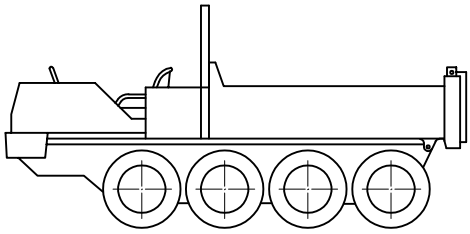


Figure 24 — Front operator position

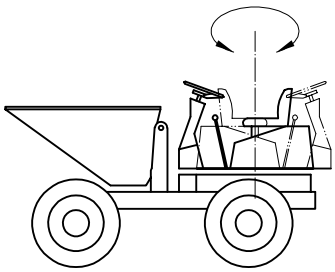
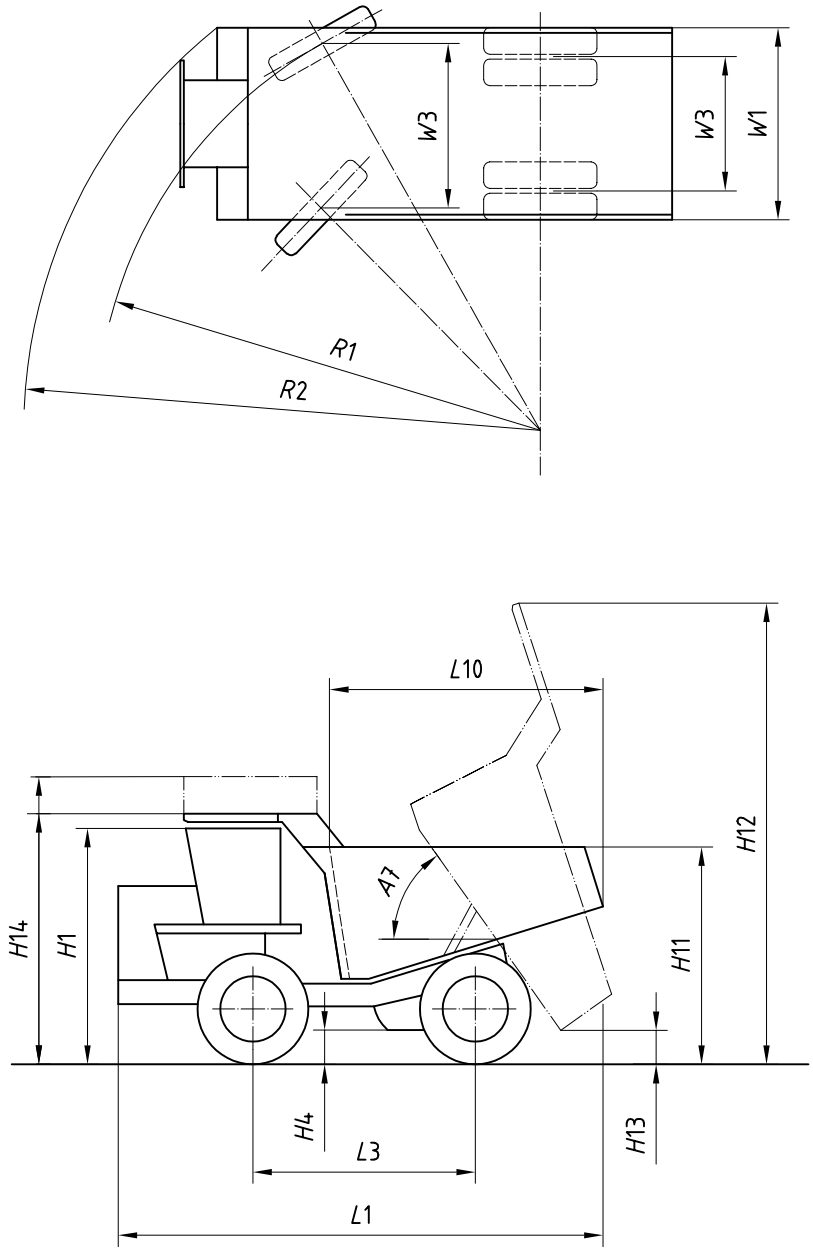


Figure 25 — Reversible operator position

4.2 Dimensions (see ISO 6746-1)

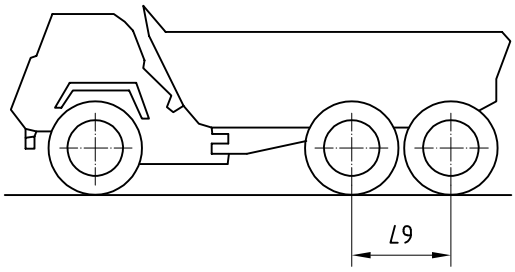
4.2.1 Dumpers

See Figure 26. For additional definitions of dimensions and their terms and codes related to dumpers, see Annex A.

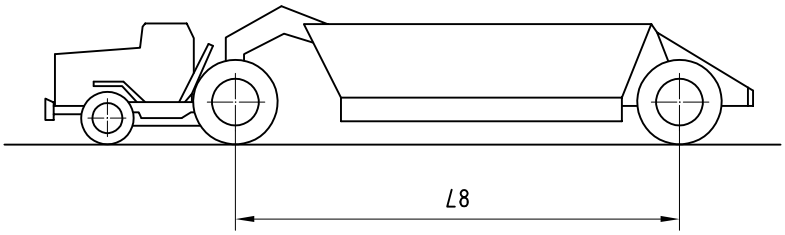


a) Rigid frame

Figure 26 — Dimensions of base machine — Dumper



b) Tandem



c) Trailer

Figure 26 — Dimensions of base machine — Dumper

4.2.2 Compact dumpers

See Figures 27, 28, 29, 30 and 31. For definitions of dimensions and their terms and codes, see Annex A. For additional dimensions and codes strictly related to compact dumpers, see Annex B.

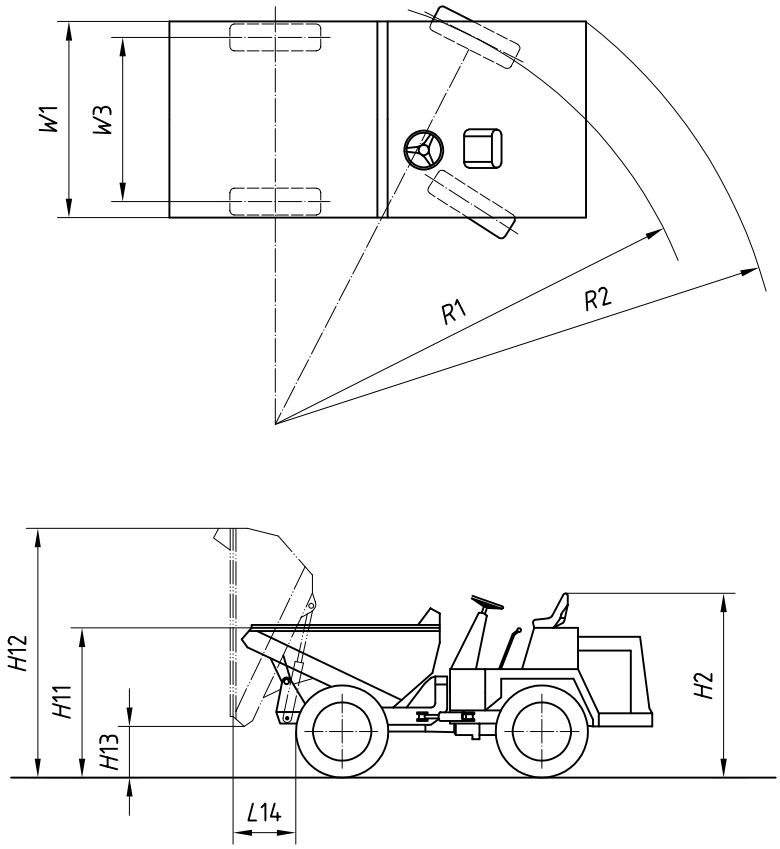


Figure 27 — Dimensions of wheeled compact dumper — Four-wheel

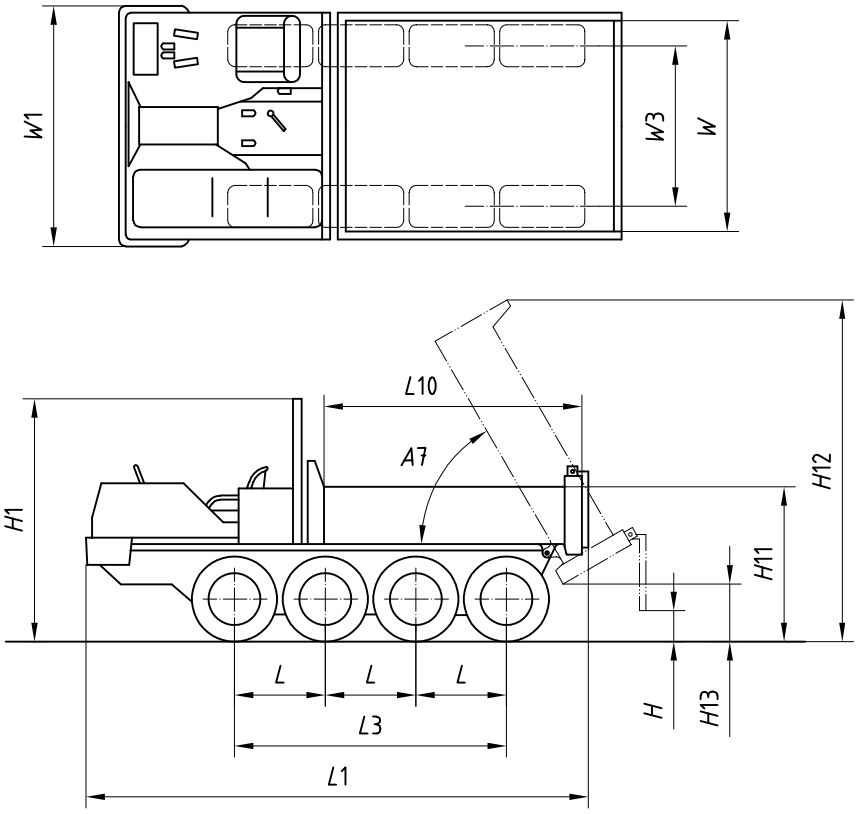


Figure 28 — Dimensions of wheeled compact dumper — Eight-wheel

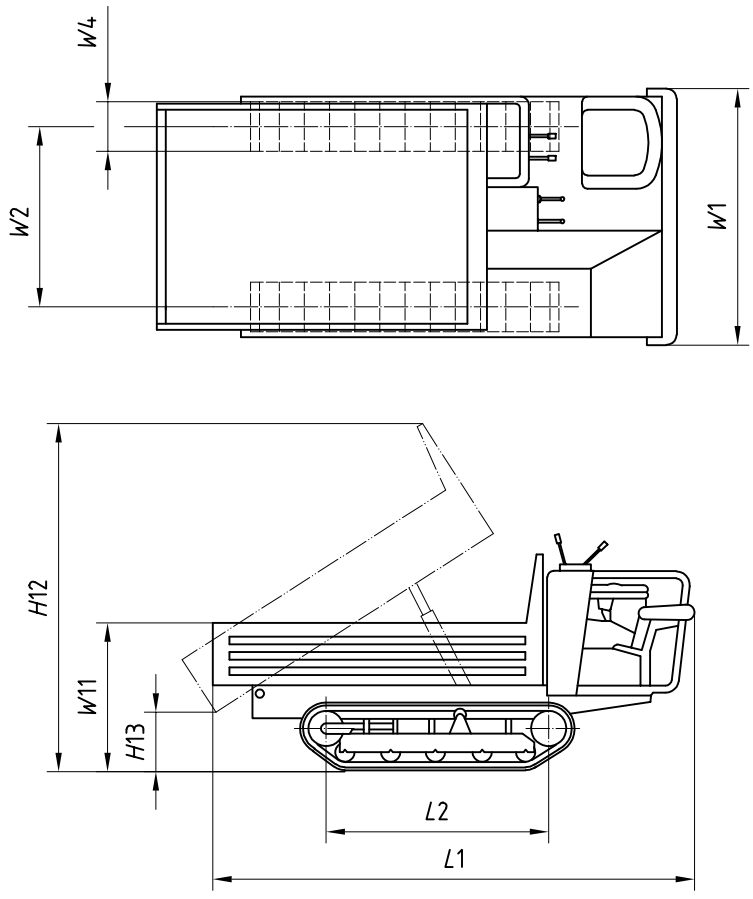


Figure 29 — Dimensions of crawler compact dumper — Rear operator position

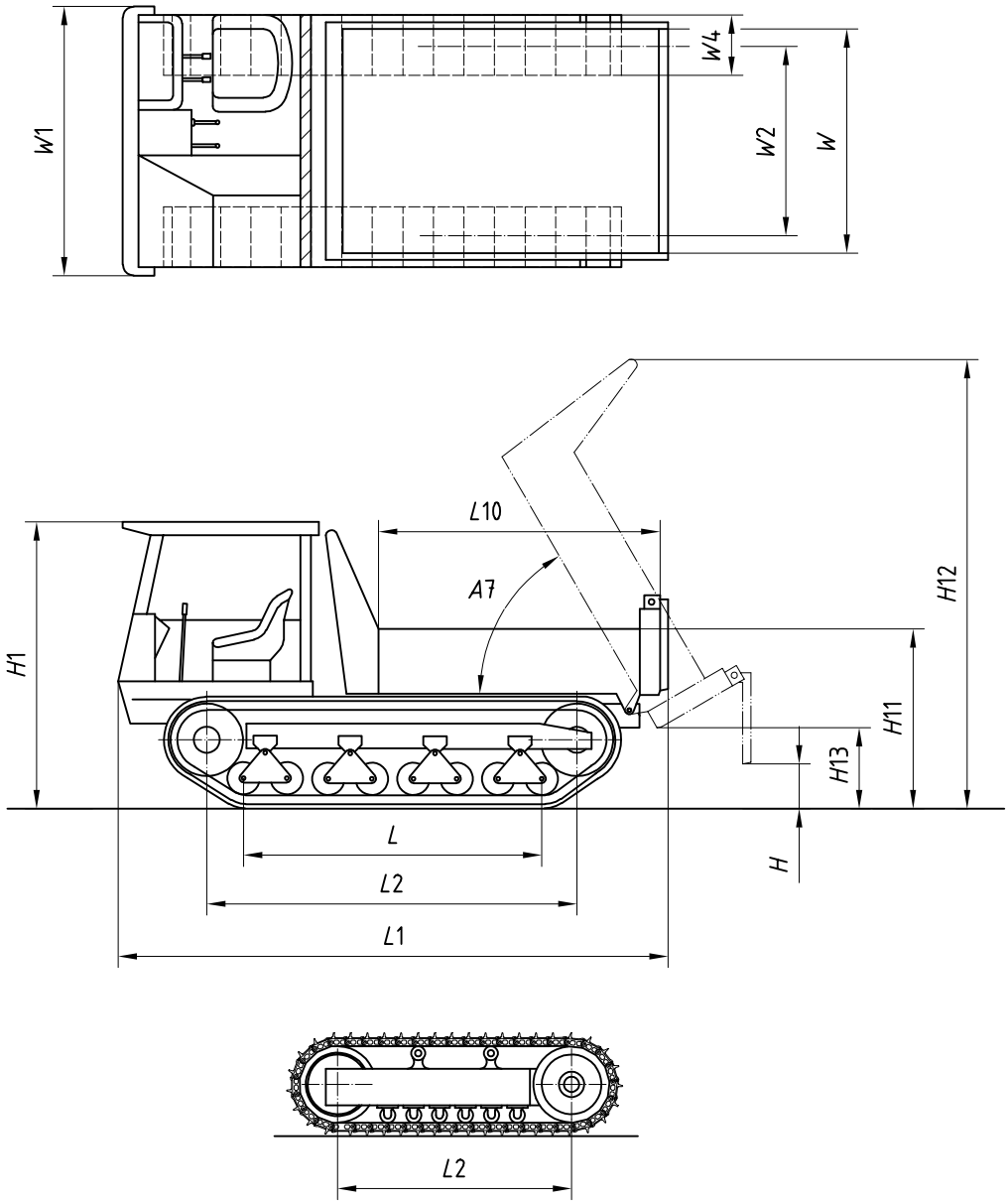


Figure 30 — Dimensions of crawler compact dumper — Front operator position

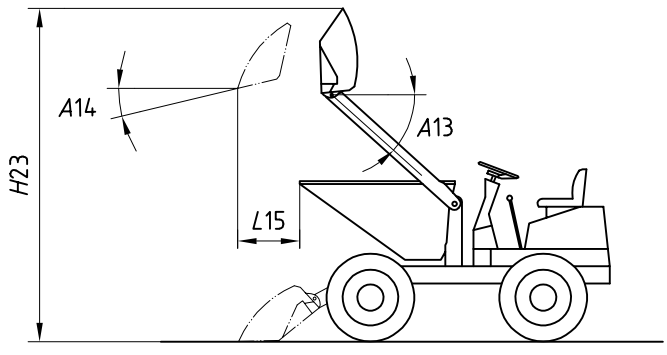


Figure 31 — Dimensions of self-loading compact dumper

4.3 Masses

See ISO 6016.

4.4 Component nomenclature

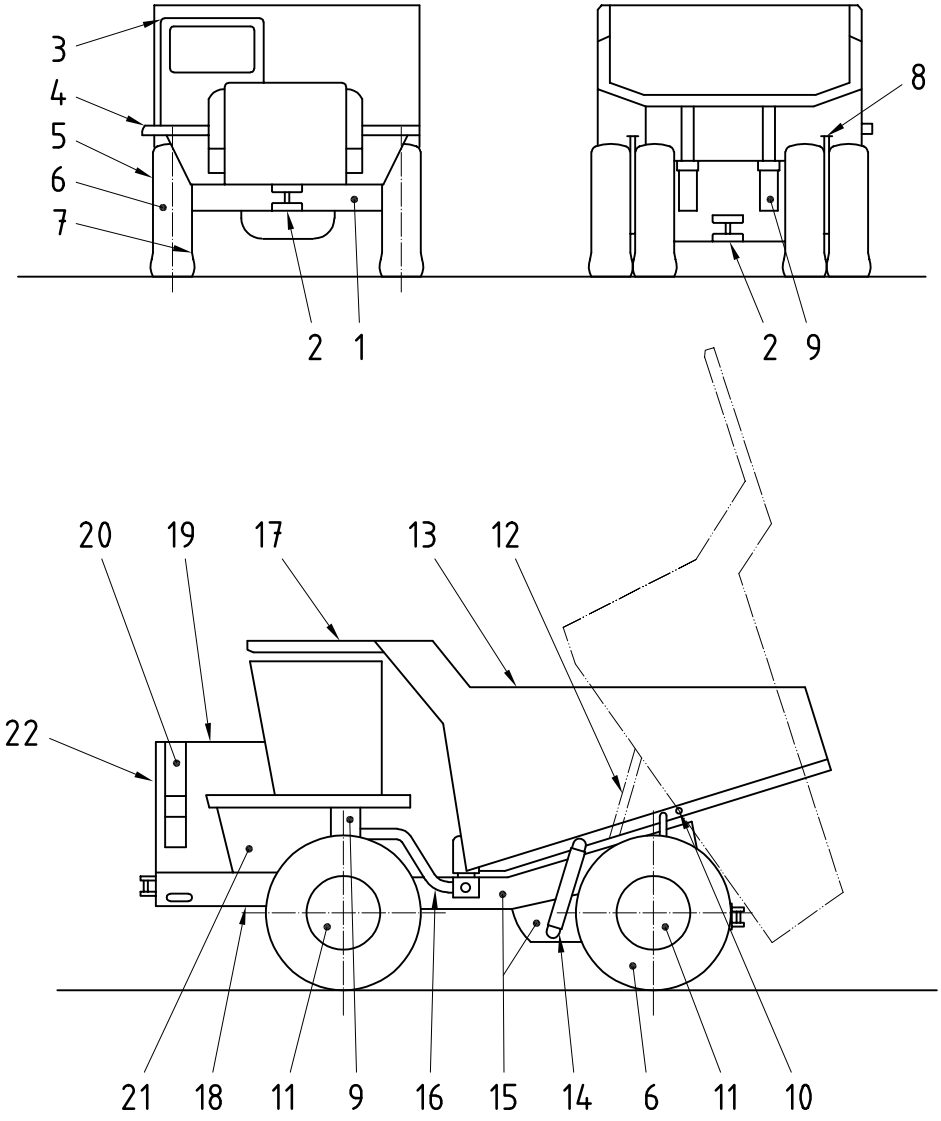
— Two-axle rear dump: see Figure 32.

— Two- and four-wheel tractor: see Figure 33.

— Trailing units: see Figure 34.

— Wheeled compact dumpers: see Figures 35 and 36.

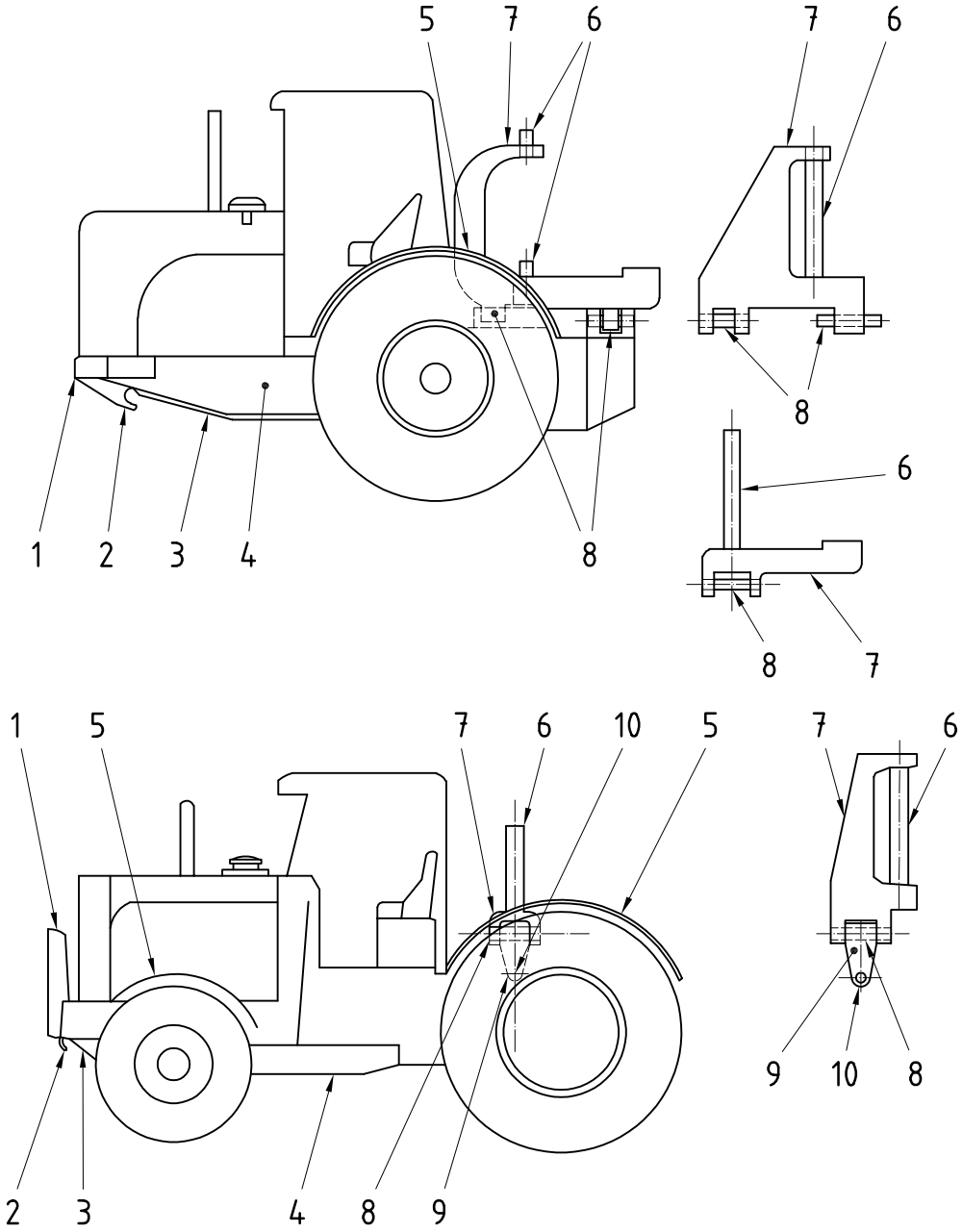
— Crawler compact dumpers: see Figures 37 and 38.



Key

1 bumper
2 pin, towing
3 cab
4 fender
5 wheel
6 tyre
7 brake
8 bar, rock ejector
9 suspension (optional)
10 pin, body pivot
11 axle(s)
12 prop, raised body
13 body
14 cylinder, dump
15 drive system
16 exhaust, atmospheric or body heating
17 canopy
18 frame, main
19 hood
20 ladder
21 power plant
22 grill

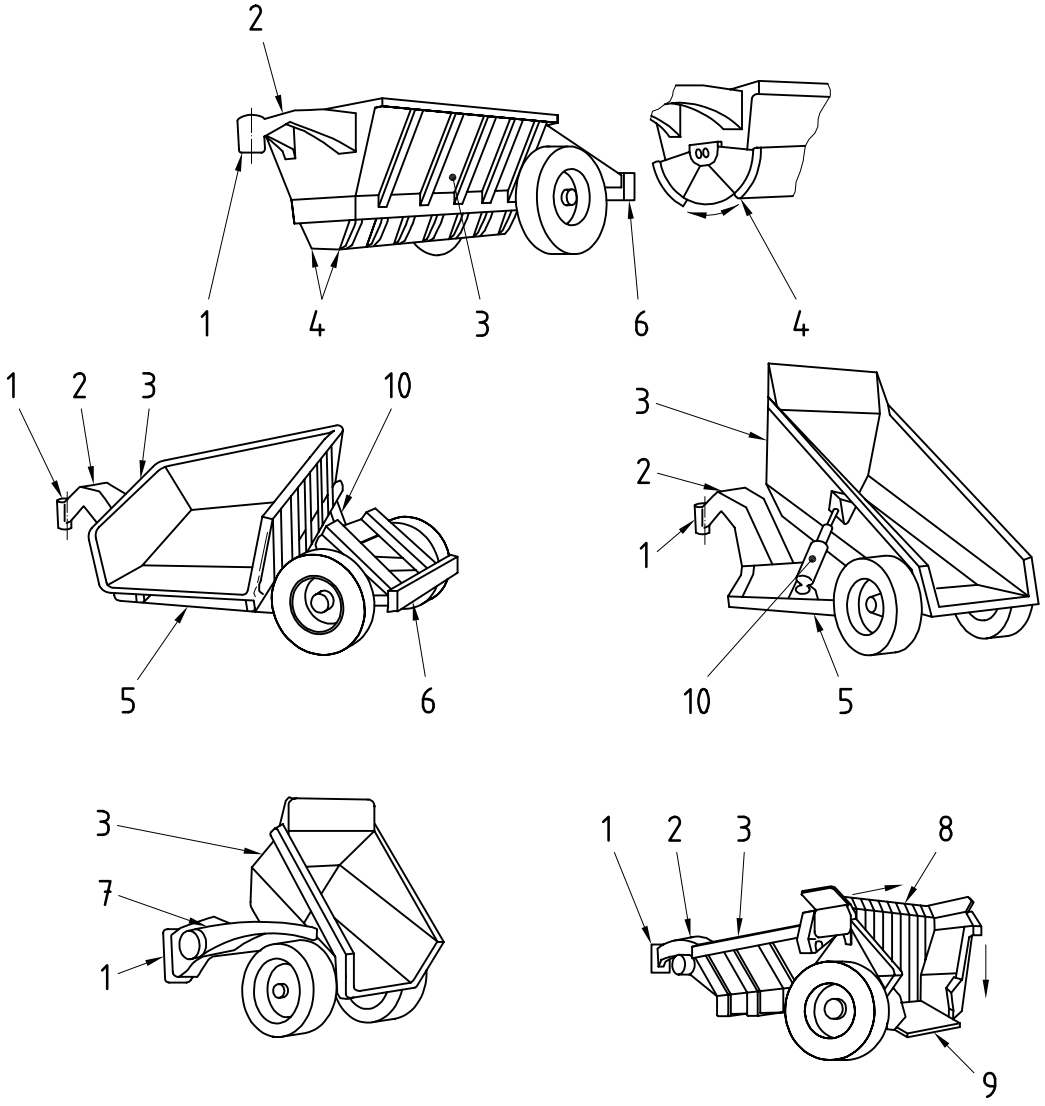
Figure 32 — Component nomenclature — Two-axle rear dump



Key

1	bumper	6	kingpin, hitch
2	hook, pull	7	hitch
3	guard, bottom	8	pin, oscillating pivot
4	frame, main	9	yoke, hitch
5	fender	10	pin, fore and aft pivot

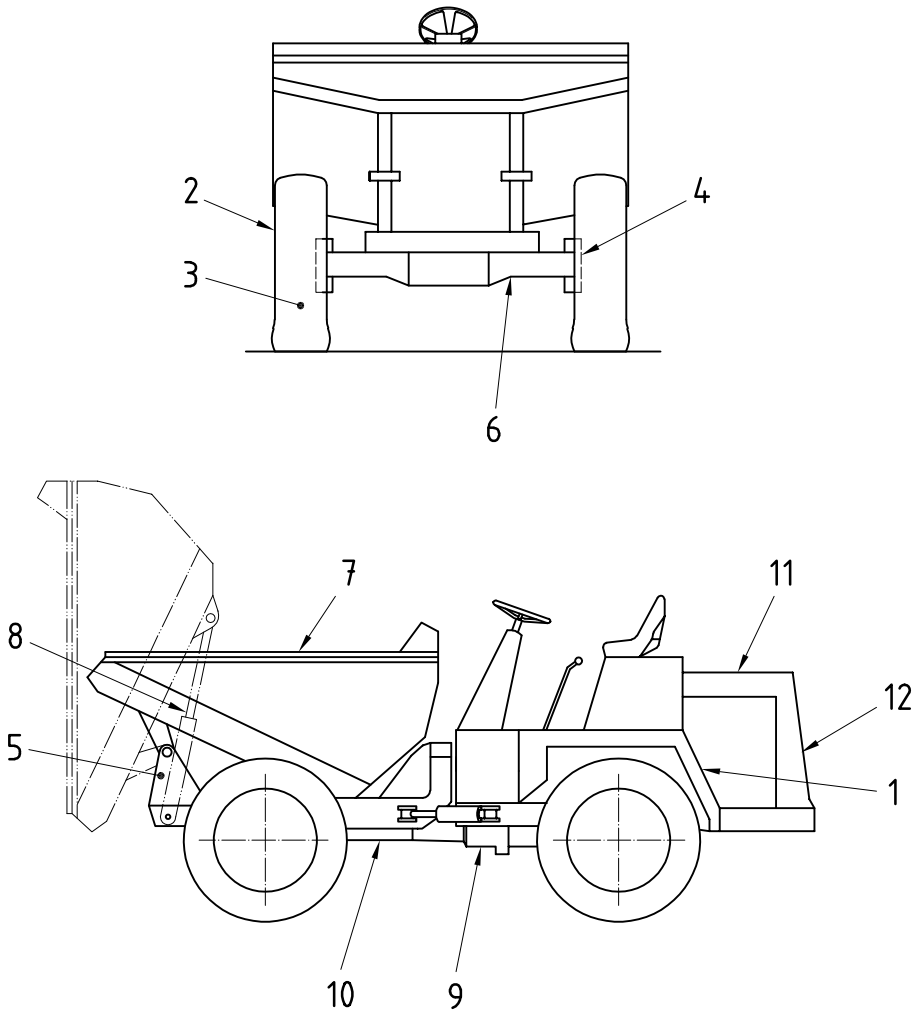
Figure 33 — Component nomenclature — Two- and four-wheel tractors



Key

1	housing, kingpin	6	bumper
2	gooseneck	7	frame, draft
3	body	8	ejector
4	doors	9	tailgate
5	frame, main	10	cylinder, dump

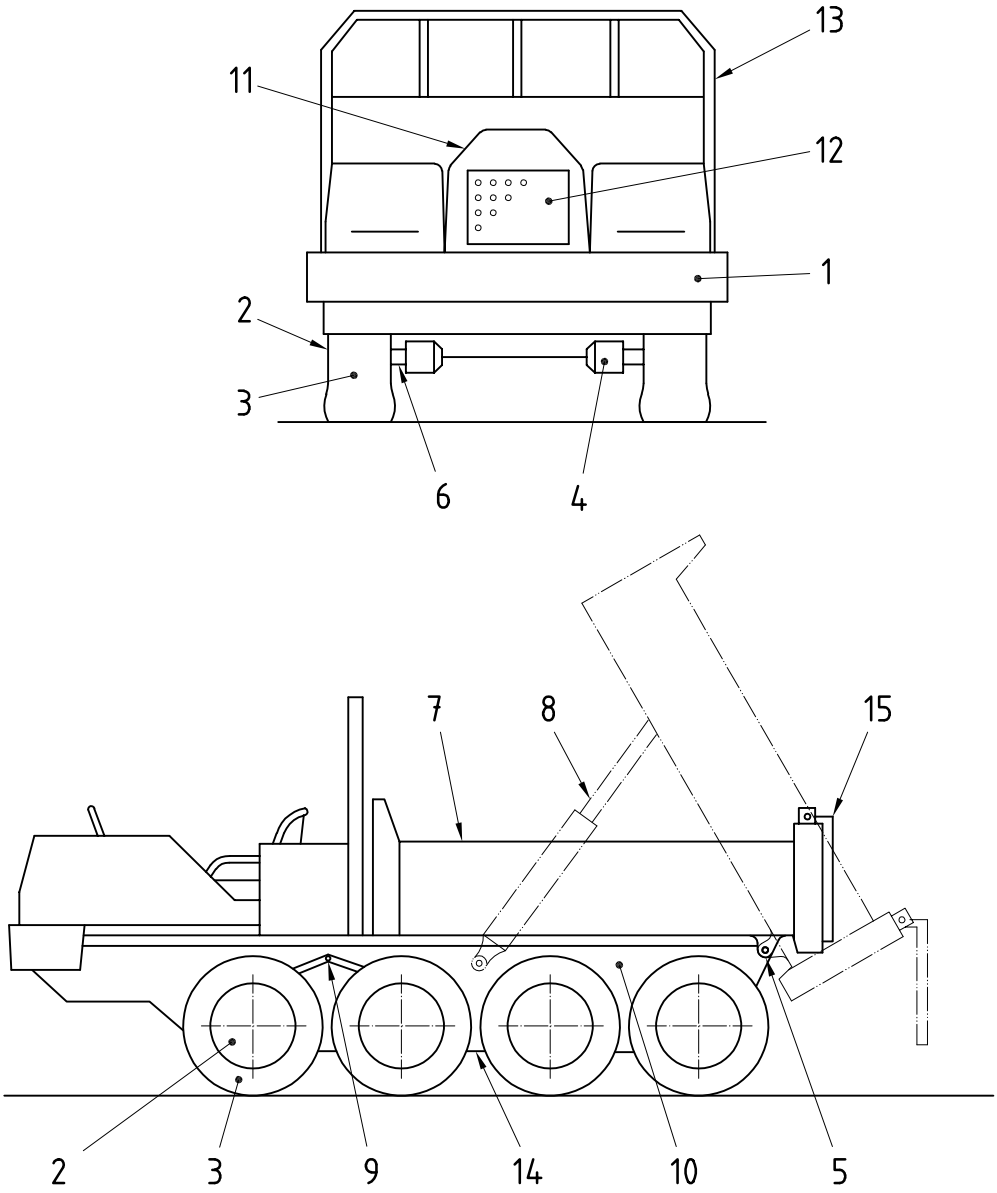
Figure 34 — Component nomenclature — Trailing units



Key

1	fender	7	body
2	wheel	8	cylinder
3	tyre	9	drive system
4	brake	10	frame, main
5	pin, body pivot	11	hood
6	axle(s)	12	power plant

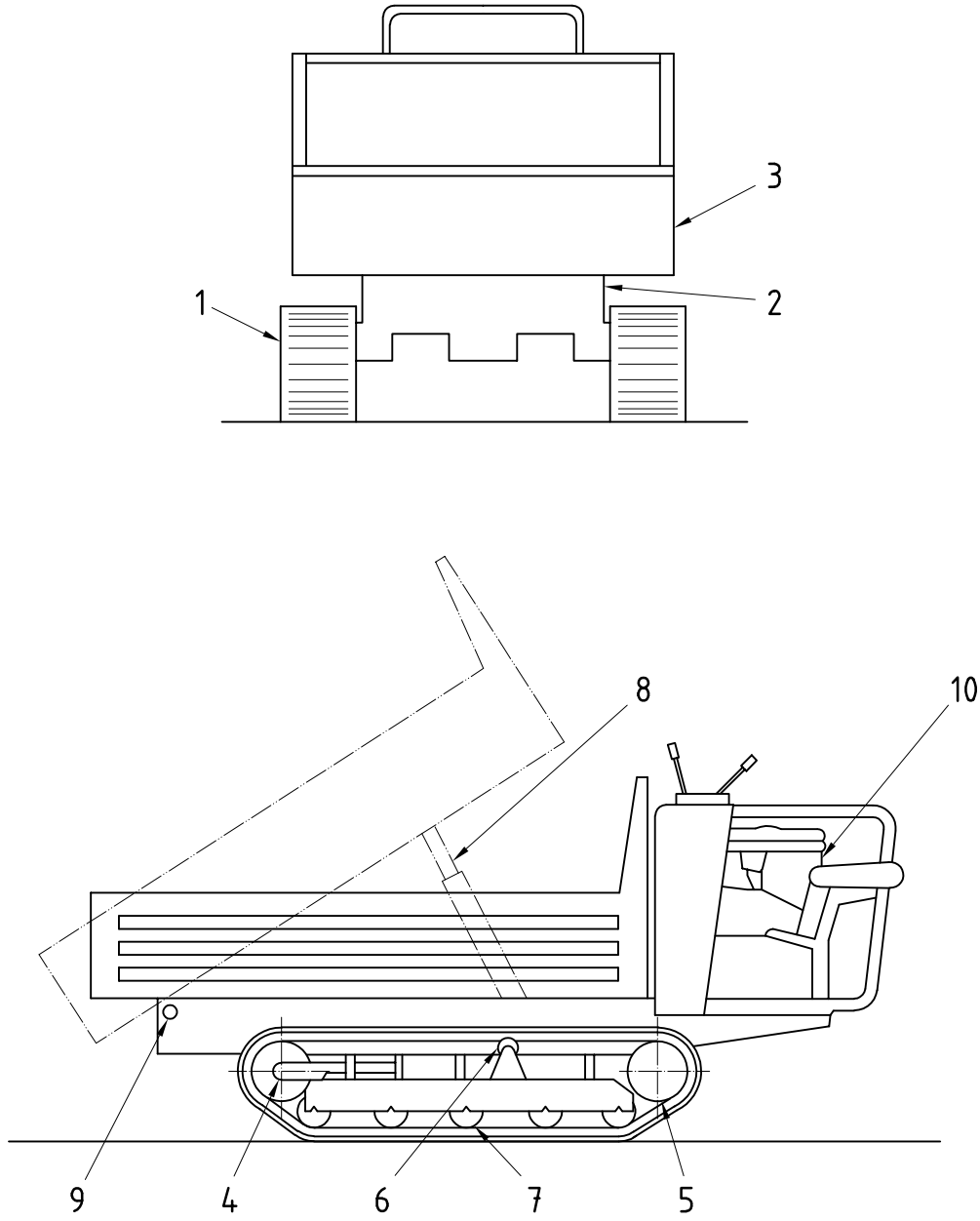
Figure 35 — Component nomenclature — Two-axle wheeled compact dumpers



Key

1	bumper	9	drive system
2	wheel	10	frame, main
3	tyre	11	hood
4	brake	12	power plant
5	pin, body pivot	13	guard
6	axle	14	case, chain drive
7	body	15	tailgate
8	cylinder, dump		

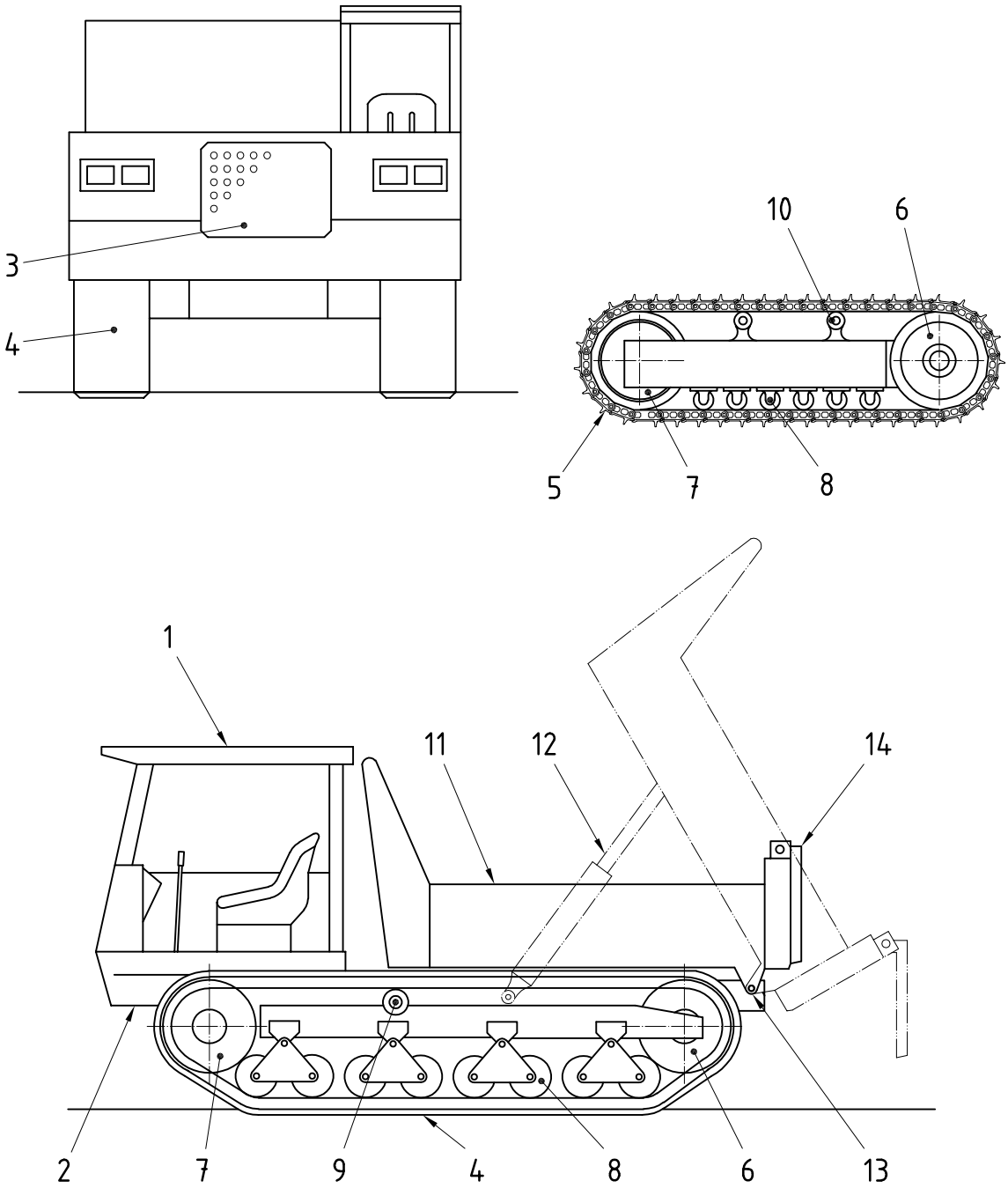
Figure 36 — Component nomenclature — More-than-three-axle, wheeled compact dumpers



Key

1	track	6	roller, carrier
2	frame, main	7	roller, track
3	body	8	cylinder, dump
4	idler	9	pin, body pivot
5	sprocket	10	power plant

Figure 37 — Component nomenclature — Crawler compact dumpers without canopy



Key

1	canopy	8	roller, lower
2	frame, main	9	roller, upper
3	power plant	10	slide plate
4	crawler, rubber	11	body
5	crawler, steel	12	cylinder, dump
6	sprocket	13	pin, body pivot
7	idler	14	tailgate

Figure 38 — Component nomenclature — Crawler dumpers with canopy

5 Performance characteristics

The following performance characteristics are used in connection with dumpers: the International Standard indicates further characteristics and test methods as appropriate; the term number refers to the term as defined in this International Standard.

a) ISO net power (engine): see ISO 9249.

b) Maximum travel speed: see ISO 6014.

c) Tractive force rimpull (3.2.1):

   1) Tractive force with direct drive transmission (3.2.1.1);

   2) Tractive force rimpull with powershift transmission, electric drive or hydrostatic drive (3.2.1.2).

d) Empty body dump and return time (3.2.2).

e) Steering capability

   1) Turning radius: see ISO 7457.

   2) Machine clearance diameter: see ISO 7457.

f) Braking performance: based on requirements given in ISO 3450.

g) Payload (3.2.3).

6 Commercial literature specifications (SI units)

6.1 Engine

Specify the characteristics:

a) manufacturer and model;

b) compression-ignition (diesel) or spark-ignition;

c) type of cycle (two- or four-stroke);

d) naturally aspirated, mechanically supercharged, or turbo-charged, with or without aftercooling;

e) number of cylinders;

f) bore;

g) stroke;

h) displacement;

i) cooling system (air or water cooled);

j) type of fuel;

k) power, flywheel net: ….. at ….. r/min;

l) torque, maximum: ….. at ….. r/min;

m) starter type;

n) electrical system: ….. V.

6.2 Transmission

Specify the type, for example:

— manual shift with flywheel clutch;

— power shift with torque converter;

— hydrostatic;

— electric;

— number of gear speeds, forward and reverse;

— travel speeds (forward and reverse).

A graph of rimpull versus speed should be shown.

6.3 Drive axle(s)

Specify the type, for example:

— steerable;

— fixed, oscillating and/or suspended;

— hydrostatic;

— electric;

— bevel gear and pinion;

— differential — standard, non-slip, limited slip or lock-up;

— planetary final drive.

6.4 Steering

6.4.1 Type

Specify type in accordance with ISO 5010, for example:

— articulated frame;

— front-wheel steer;

— rear-wheel steer;

— all-wheel steer;

— crawler skid steer;

— boosted, manual, hydrostatic;

— emergency steer method.

6.4.2 Performance

Specify:

— turning radius: ….., left and right;

— machine clearance diameter: ……

6.5 Brakes

6.5.1 Service brakes

Specify, for example:

— type (drum, disc, wet or dry);

— actuating system type (mechanical, air, hydraulic, electrical, combination, etc.).

6.5.2 Parking brake

Specify type.

6.5.3 Secondary brake

Specify type.

6.5.4 Retarding brake

Specify:

— type;

— actuating system.

6.5.5 Brake performance

Specify in accordance with ISO 3450.

6.6 Tyres

Specify:

— size and type;

— ply rating;

— rim size.

6.7 Hydraulic system

6.7.1 Empty body dump and return time

Specify:

— pump flow: ….. at ….. pressure and engine rated r/min;

— relief valve opening pressure: ……;

— pump type;

— body raise cylinders: number, type;

— empty body dump and return time: ……

6.7.2 Steering

Specify:

— pump flow: ….. at ….. pressure;

— pump type;

— relief valve opening pressure: ……

6.8 Suspension

Specify at the individual wheel, complete axle or track.

6.8.1 Type

Specify type, for example:

— mechanical spring: coil, leaf;

— shock absorber cylinder: air, oil, air/oil;

— elastomer;

— pneumatic.

6.8.2 Capacity

Specify stroke.

6.8.3 Load/deflection rate

Specify whether this is

— empty, or

— loaded.

6.9 Body

6.9.1 Rated body capacity

Specify this in cubic metres, in accordance with ISO 6483.

6.9.2 Method of self-loading

Specify whether the method is

— body loading, or

— shovel loading.

6.10 Operator station

Specify whether this is at the

— rear,

— front, or

— reversible.

6.11 Masses

Provide the following information.

a) Distribution, empty operating mass:

   — front axle;

   — drive axle;

   — trailer axle.

b) Total empty operating mass.

c) Payload, rated.

d) Distribution, loaded mass:

   — front axle;

   — drive axle;

   — trailer axle.

e) Total loaded mass.

6.12 System fluid capacities

Provide details of the following:

— fuel tank;

— engine crankcase;

— cooling system;

— hydraulic system;

— transmission;

— differential;

— final drive.

6.13 Overall dumper dimensions

Supply an outline drawing.

Examples of significant dimensions to be specified:

— maximum total height without body;

— ground clearance, axles;

— ground clearance, bottom dump body, doors closed;

— ground clearance, under open doors;

— loading height;

— dump height;

— discharge height;

— maximum height with body;

— maximum width;

— tread;

— maximum length;

— wheelbase;

— tandem centre distance;

— turning radius;

— clearance diameter.

Annex A
(normative)

Dimensions for dumpers

This annex defines dumper dimensions and specifies their codes.

Code	Term and definition	Illustration
$H11$	**loading height** distance on Z coordinate between the ground reference plane (GRP) and the highest point of the load-containing sides, body empty	See Figure 26, a)
$H12$	**dump height** distance on Z coordinate between the GRP and the highest point on the dumper, body fully raised	See Figure 26, a)
$H13$	**(rear or side dump) discharge height** distance on Z coordinate between the GRP and the lowest point on the body, body fully raised	See Figure 26, a)
$H14$	**maximum height of dumper body or hitch** distance on Z coordinate between the GRP and the highest point on the dumper body or the hitch connection, dumper body in loading position with spillage guard if fitted, body empty	See Figure 26, a)
$L8$	**(trailer) wheelbase** distance on X coordinate between two X planes passing through the centres of the rear wheels of the tractor and the rear wheels of the trailer. In machines equipped with tandem wheels, the centre of the wheels is the line midway between the two axles of the tandem.	See Figure 26, c)
$L9$	**tandem centre distance** distance on X coordinate between X planes passing through the centres of front and rear wheels of the tandem	See Figure 26, b)
$L10$	**length of loading body** distance on X coordinate between two X planes passing through the farthest internal point on the rear of the body and the farthest internal point on the front of the load-carrying part of the body	See Figure 26, a)
$A7$	**(rear dump) body dump angle** angle on Y plane between the body main floor and GRP, body fully raised	See Figure 26, a)
NOTE The X, Y and Z coordinates and the GRP are defined in ISO 6746-1.		

Annex B
(normative)

Dimensions for compact dumpers

This annex defines compact dumper dimensions and specifies their codes.

Code	Term and definition	Illustration
$H11$	**loading height** distance on Z coordinate between the ground reference plane (GRP) and the highest point of the load containing sides, body empty	See Figure 27
$H12$	**dump height** distance on Z coordinate between the GRP and the highest point on the dumper, body fully raised	See Figure 27
$H13$	**discharge height** distance on Z coordinate between the GRP and the lowest point on the body, body fully raised	See Figure 27
$H23$	**self-loading dump height** distance on Z coordinate between the GRP and the highest point on the self-loading apparatus	See Figure 31
$L14$	**discharge distance** distance on X coordinate between the forward face of the front wheels and the forward edge of the body, body fully raised	See Figure 27
$A13$	**self-loading rear dump angle** maximum angle that the rear discharge face of the bucket will rotate below the horizontal with the bucket in the fully raised position	See Figure 31
$A14$	**self-loading front dump angle** maximum angle that the bottom face of the bucket will rotate below the horizontal with the bucket rotated fully forwards $A14 < 30°$	See Figure 31
$L15$	**self-loading dump reach** the maximum distance on the X coordinate between the forward edge of the body and the forward edge of the bucket at its maximum forward extension $L15 < 200$ mm	See Figure 31
NOTE The X and Z coordinates and the GRP are defined in ISO 6746-1.		

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BS ISO 7132:2003
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