en

Operating Manual

Wheel Loader

L554 -453 from 12800

LIEBHERR

en

Operating Manual

Wheel Loader

L554 - 453 from 12800

Document identification

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Product identification

Type: L554
Type no.: 453
Serial number: from 12800
Conformity: CE

Address

Address: LIEBHERR-WERK BISCHOFSHOFEN GMBH
Dr. Hans Liebherr – Straße 4
A – 5500 BISCHOFSHOFEN

Manufacturer

Address: LIEBHERR-WERK BISCHOFSHOFEN GMBH

Machine data:

Please enter the following details on receipt of your vehicle: *You will find these details on the vehicle type plate. They will be useful when ordering spare parts.

*** Serial no.**

VATZ . . . . ZZB . . . . . .

*** Year of manufacture**

. . . .

Initial start-up date

. . / . . / . .

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Foreword

This operating manual has been written for the **driver** and for the **maintenance personnel** of the machine.

It describes:
- Chapter 1 Product description
- Chapter 2 Safety regulations
- Chapter 3 Operation and handling
- Chapter 4 Malfunctions
- Chapter 5 Maintenance

This operating manual must be carefully read before initial operation and should be read and used later at regular intervals by anyone responsible for working on the machine.

Working with or on the machine includes:
- **Operation**, including equipping, troubleshooting during operation, removing production debris, maintenance, removing operating and auxiliary materials.
- **Servicing**, including maintenance, inspection and repairs.
- **Transport** or loading the machine.

This manual helps the driver to become acquainted with the machine and prevents malfunctions due to improper operation.

Observation of the operating manual by maintenance staff:
- Increases reliability during operation
- Extends the service life of your machine
- Reduces repair costs and downtime

This manual must be kept with the machine. Place a copy within easy reach in the glove compartment in the driver's cab.

In addition to the operating manual follow the instructions based on existing national accident prevention and environmental protection regulations.

In addition to the operating manual and applicable national and local legal accident prevention rules, observe the recognised technical regulations for safe and proper operation.

This operating manual contains all the information you need to operate and service your machine.

If you should, however, require more detailed explanations or information, our technical documentation and customer service departments will be happy to provide assistance.

You will understand that we cannot accept warranty claims for damage due to improper use, insufficient maintenance, use of non-approved consumables or failure to follow the safety instructions.

LIEBHERR will cancel without prior notice all obligations such as warranty agreements and service contracts entered into by **LIEBHERR** and/or its agents if spare parts other than genuine **LIEBHERR** parts or those purchased from **LIEBHERR** are used for maintenance and repairs.

In extreme conditions, maintenance may be required more often than stated in the inspection schedule.

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– We reserve the right to alter the technical details of the machine regardless of the specifications and illustrations in these documents.
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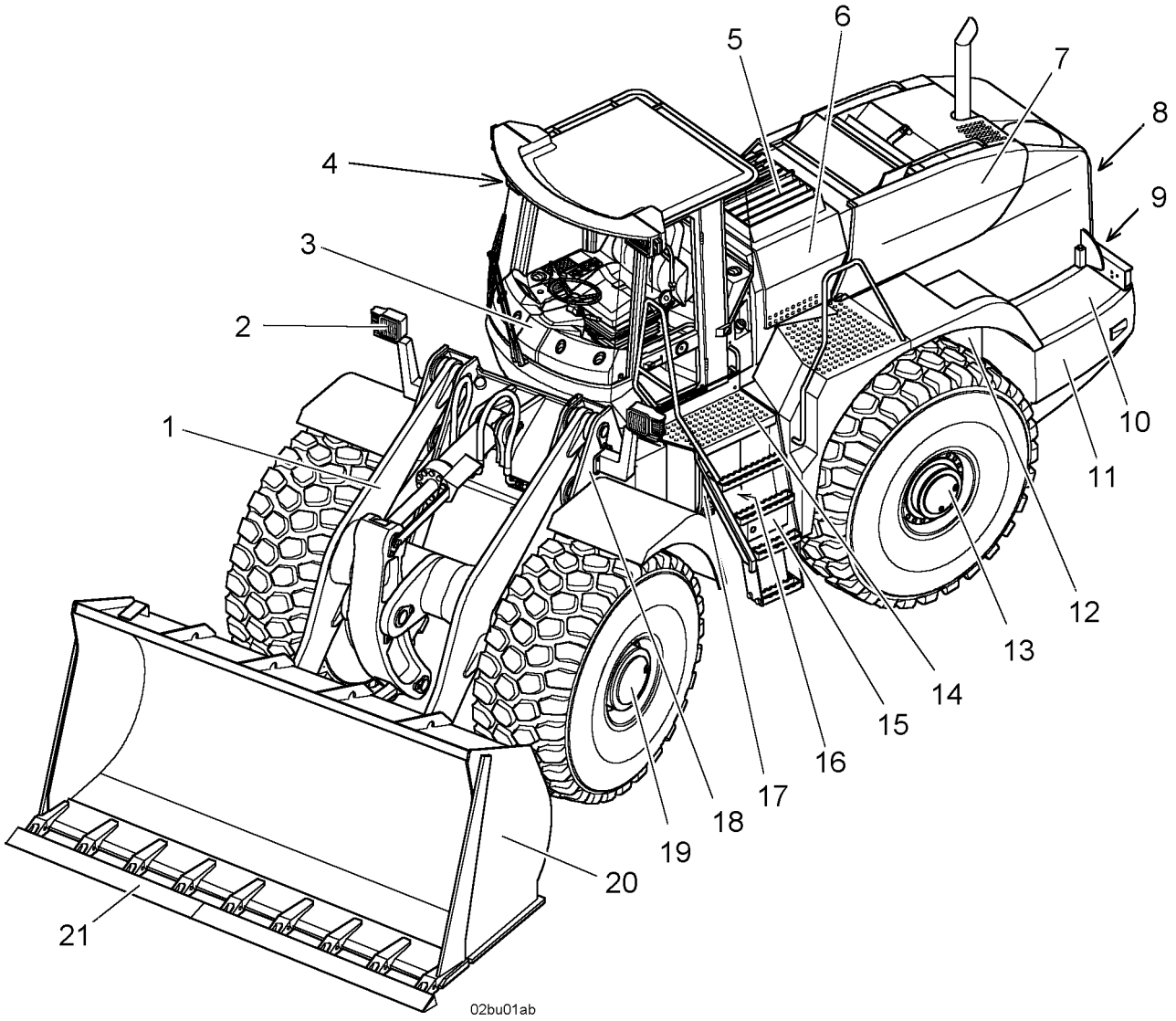
1 Product description

Equipment layout

Standard version
This section contains an overview of the machine and the names of the components shown.



Left view of machine

1 Lift arm
2 Lighting
3 Driver's cab
4 Working floodlight
5 Cooling system
6 Cooling system hood
7 Engine compartment hood
8 Engine compartment door
9 Towing device
10 Battery compartment cover
11 Ballast weights
12 Rear section
13 Rear axle
14 Cab access
15 Tool box
16 Steering cylinder
17 Articulation lock
18 Front section
19 Front axle
20 Bucket
21 Tooth guard

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1.1 Technical data

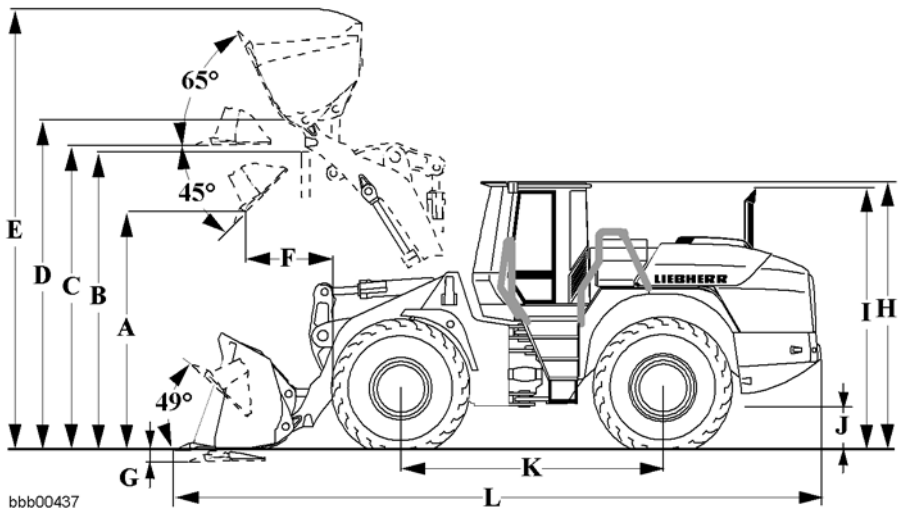
1.1.1 Complete machine with bucket

bpik0039 

The values stated refer to the machine:
– In its standard version
– With Z lift arms (2750 mm)
– Without a hydraulic quick-change device
– With 23.5R25 Michelin XHA tyres
– Including all lubricants
– With a full tank
– With ROPS/FOPS cab and driver

Tyre sizes and additional attachments affect the operating weight and tipping load.

Key to the table:
Z = Welded tooth holder with plug-in teeth
[1)]Without a hydraulic quick-change device
[2)]With hydraulic quick-change device
[3)]In practice, the bucket capacity can be around 10 % greater than as calculated using the ISO 7546 method.
This depends on the type of material.



Dimensions

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	Description	Unit	Value			
	Cutting tool		Z [1)]	Z [2)]	Z [1)]	Z [2)]
	Bucket capacity as per ISO 7546[3)]	m^3	3.0	3.0	3.3	3.3
	Bucket width	mm	2700	2700	2700	2700
	Specific material weight	t/m^3	1.8	1.7	1.6	1.5
A	Dump height at maximum lifting height and 45° tilt-out angle	mm	2920	2760	2880	2760
B	Dump height	mm	3500	3500	3500	3500
C	Maximum bucket base height	mm	3645	3655	3645	3655
D	Maximum bucket pivot point height	mm	3915	3915	3915	3915
E	Maximum bucket top height	mm	5350	5430	5395	5510
F	Reach at maximum lifting height and 45° tilt-out angle	mm	1040	1225	1085	1225
G	Digging depth	mm	85	70	85	70
H	Height above the cab	mm	3355	3355	3355	3355
I	Height above exhaust	mm	3310	3310	3310	3310
J	Ground clearance	mm	530	530	530	530
K	Wheel base	mm	3150	3150	3150	3150
L	Overall length	mm	7785	8030	7845	7950
	Turning radius over bucket outer edge	mm	6235	6300	6250	6275
	Lifting force (SAE)	kN	170	170	170	170
	Breakout force (SAE)	kN	125	105	120	101
	Tipping load when straight	kg	12020	11070	11910	11030
	Tipping load articulated at 35°	kg	10910	10060	10815	10020
	Tipping load articulated at 40°	kg	10600	9760	10500	9720
	Operating weight	kg	15300	15630	15350	15670
	Tractive force	kN	122.6	122.6	122.6	122.6

1.1.2 Engine

bpik0027 

Type: 4-cylinder in-line engine, water-cooled with turbocharger and charge air cooling.

Air filter system: Dry air filter with safety element, separator, LCD service display

The exhaust emissions are below the threshold levels in EU directive 97/68/EC – Stage II.

Name	Value	Units
Diesel engine	D 924 TI-E A2	
Number of cylinders	4	Pc.
Rated power acording to ISO 9249 at 2000 min^{-1}	145 / 198	kW / PS
Maximum torque at 1200 min^{-1}	970	Nm
Cylinder capacity	6.64	Litres
Lower idle speed	800 $^{\pm 50}$	min^{-1}
Upper idle speed	2100 $^{+80}$	min^{-1}
Longitudinal / traverse inclinability	45 / 45	°

1.1.3 Electrical system


bpik0028

Protected by:
– Main fuse
– Fuses for preglow system, starter, emergency steering pump
– Fuses on the main electronics

Batteries:
– Connected in series
– Fitted in the left and right ballast weights

Battery main switch: Rear left of engine compartment

Name	Value	Units
Battery voltage	12	V
Battery capacity	2 x 110 / 12	Ah / V
Number of batteries	2	Pc.
Operating voltage	24	V
Three-phase current alternator	28 / 55	V/ A
Starter	24 / 5.4	V / kW

Battery fastening

When fitting or changing the battery:

Name	Value	Units
Tightening torque	10	Nm

1.1.4 Travel drive


bpik0029

Continuously variable hydrostatic travel drive

Type: 2plus2:
– Swash plate variable displacement pump and two axial piston motors in a closed circuit
  With a transfer gear
– Forward and reverse travel by switching the flow direction of the variable displacement pump.

Travel drive control:
– By gas pedal and tractive force control pedal (inch pedal).
– The tractive force control pedal facilitates continuous adjustment of tractive or thrust force at full engine speed.
– Forward and reverse travel are selected using the Liebherr control lever
– The travel ranges are selected using the buttons on the control unit.

Speed data:
– For forward and reverse travel
– With standard tyres

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Name	Value	Units
Travel range 1	0–10.0	km/h
Travel range 2	0–20.0	km/h
Travel range A1–2 (automatic)	0–20.0	km/h
Travel range A1-3 (automatic)	0–40.0	km/h
Travel range A2–3 (automatic)	0–40.0	km/h

1.1.5 Axles


bpik0030

Automatically acting self-locking differential in both axles.

Front axle Rigidly mounted planetary axle

Name	Value	Units
Width	2000	mm
Differential lock	45	%

Rear axle Oscillating planetary axle

Name	Value	Units
Width	2000	mm
Differential lock	45	%
Angle of articulation to each side	13	°
Height of obstacles which can be driven over	530	mm

1.1.6 Braking


bpik0031

The braking system complies with the roadworthiness certification regulations.

Service brake Self-arrest of hydrostatic travel drive, acting on all four wheels.
Additional pump accumulator brake system with wet disc brakes in the wheel hubs (two separate brake circuits).

Parking brake Electrohydraulic spring accumulator brake system on the gearbox.

1.1.7 Ballast

The ballast delivered ex works is calculated using the order information.

Relating to installing or changing the working attachment or tyres
! See in chapter 2 “Safety regulations” in section “equipment and accessories ”.

Key:
LR = Pneumatic tyres
LR+RA = Pneumatic tyres with foam
LR+K = Pneumatic tyres with chains
x = required ballast weight

Description		LR	LR+RA	LR+K
Ballast –	Standard ballast	x	- -	- -
	Special ballast	- -	x	x

1.1.8 Tyres


bpik0032

The driving performance of the machine depends, among other things, on the tyres.

The same tyre size must be used for all four wheels.

When changing the tyres or if there is increasing wear on the tyres, make sure that the difference in diameter between the tyres on the front and rear axles is no more than 3 %.

Otherwise the axles may be damaged.

The correct tyre pressure is a decisive factor for the proper performance of the machine and for a long tyre lifetime.

You will find the following specifications in the table below:
– Recommended tyre sizes
– Tyre tread
– Tyre pressure

Abbreviations:
– **p – Max.** = maximum permissible air pressure
– **VA** = front axle
– **HA** = rear axle

The air pressure specifications refer to:
– Basic air pressure recommendations - as set when delivered from the factory
– Cold tyres
– Machine ready for operation - basic machine with standard equipment and permissible load

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For special uses such as industrial timber handling or other uses where heavier loads may be expected, a higher tyre pressure is recommended, depending on the specific load. However, the tyre pressure may not be greater than the maximum permitted by the tyre manufacturer's specifications.

! Check and adjust the tyre pressure, see the maintenance tasks in chapter 5.

Michelin tyres

Air pressure table 1 for the standard machine
Air pressure table 2 for machines used for industrial timber handling

Tyre size	Tyre tread	Air pressure (bar)		
		VA	HA	p – Max.
23.5 R25EM	XHA * L3	3.00	2.00	4.50
23.5 R25EM	XLD D2A * L5	3.00	2.00	4.50
23.5 R25EM	XMine D2 * L5	3.00	2.00	4.50

Air pressure table 1

Tyre size	Tyre tread	Air pressure (bar)		
		VA	HA	p – Max.
23.5 R25EM	XHA * L3	3.80	2.50	4.50

Air pressure table 2

Goodyear tyres

Air pressure table 1 for the standard machine
Air pressure table 2 for machines used for industrial timber handling

Tyre size	Tyre tread	Air pressure (bar)		
		VA	HA	p – Max.
23.5 R25EM	GP-2P * L2	3.50	2.20	5.00
23.5 R25EM	RL-2 * +L2	3.50	2.20	5.00
23.5 R25EM	RT-3B * L3	3.50	2.20	5.00
23.5 R25EM	RL 5K * L5	3.50	2.20	5.00

Air pressure table 1

Tyre size	Tyre tread	Air pressure (bar)		
		VA	HA	p – Max.
23.5 R25EM	GP-4B* 6S	5.00	2.50	5.00

Air pressure table 2

Bridgestone tyres

Air pressure table for the standard machine

Tyre size	Tyre tread	Air pressure (bar)		
		VA	HA	p – Max.
23.5 R25EM	VMT * L3	4.00	3.00	5.00
23.5 R25EM	VSDT * L5	4.50	3.00	5.00
23.5 R25EM	VSDL * L5	4.50	3.00	5.00

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Special tyres

Air pressure table for machines with special tyres:

Tyre size	Tyre tread	Air pressure (bar)		
		VA	HA	p – Max.
1)				
2)				
2)				

The specifications should be entered in the tables as follows:

1) By the manufacturer, if the machine is delivered ex-works with special tyres.

2) By the machine operator, if the machine is retrofitted by the machine operator.

Tyres for machines with optional accessories

Table 1 is for the type of optional accessory

Air pressure table 2 is for machines with optional accessories

Specifications	Type of optional accessory
1)	
2)	
2)	

Table 1

Tyre size	Tyre tread	Air pressure (bar)		
		VA	HA	p – Max.
1)				
2)				
2)				

Air pressure table 2

The specifications should be entered in the tables as follows:

1) By the manufacturer, if the machine is delivered ex-works with optional accessories.

2) By the machine operator, if the machine is retrofitted by the machine operator.

1.1.9 Snow chains or guard chains

bpik0044 

This equipment is optional.

When snow chains or guard chains are used, they must be attached to all four wheels.

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Failure to do this can damage the drive system.
! See the section on attachments and accessories in chapter 2.

Valid for L554, L574, L580:
If you attach snow chains or guard chains, you must adjust the ballast weight.
See the section on the ballast weight in chapter 1.

Installing or changing the working attachment or tyres.
! See the section on attachments and accessories in chapter 2.

1.1.10 Tyres with foam

This equipment is optional.

When tyres with foam are used, they must be attached to all four wheels.

Valid for L554, L574, L580:
If you fill the tyres with foam, you must adjust the ballast weight.
See the section on the ballast weight in chapter 1.

Installing or changing the working attachment or tyres.
! See the section on attachments and accessories in chapter 2.

1.1.11 Steering

Type:
– Load sensing axial piston displacement pump with pressure flow controller.
– Central articulated joint with two dual-action steering cylinders with shock absorbers.

Emergency steering: Electrohydraulic emergency steering system

Name	Value	Units
Angle of articulation to each side	40	°
Angle of articulation to each side	13	°
Maximum operating pressure	210	bar

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1.1.12 Working hydraulics


bpik0034

Type:

Load sensing axial piston displacement with power controller and pressure cut-off.

Cooling:
Hydraulic oil cooling with thermostatically controlled fan and oil cooler

Filtration:
Return filter in the hydraulic tank.

Control:
Single-lever control, hydraulic servo system.

Lifting cycle:
– Lifting, neutral, lowering
– Float position using lockable Liebherr control lever.
– Automatic lift kick-out.

Tilting cycle:
– Tilt out, neutral, tilt in
– Automatic bucket return-to-dig function.

Name	Value	Units
Maximum flow	230	l/min
Maximum operating pressure	330	bar

1.1.13 Working attachment


bpik0035

Lift arm

Z kinematics with one tilt cylinder.
Sealed bearing points.
Working cycle time at rated load:

Name	Value	Units
Lifting	5.5	sec
Tilting out	2.3	sec
Lowering (empty)	2.7	sec

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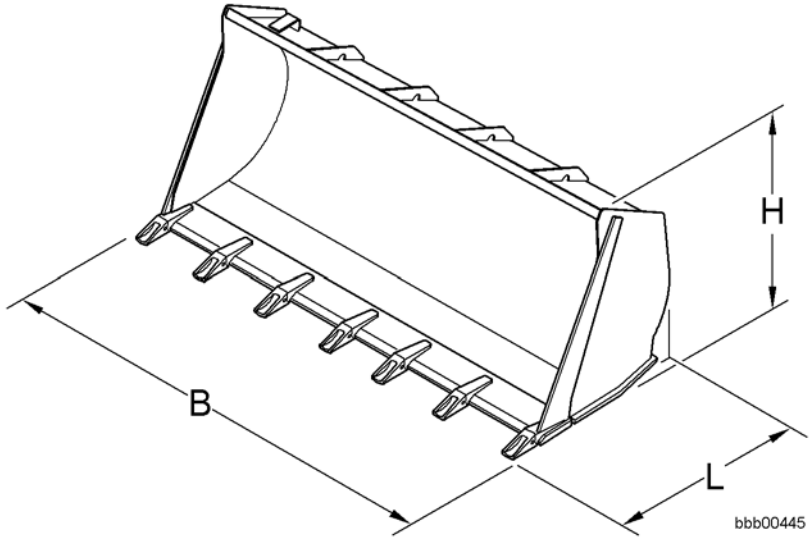
Bucket



Main dimensions

Loading bucket for lift arms without hydraulic quick-change device.

Name	Value	Units
Bucket capacity as per ISO 7546	3.5	m³
Specific material weight	1.8	t/m³
B – bucket width	2700	mm
H – height	1450	mm
L - length	1630	mm
Weight	1365	kg

Name	Value	Units
Bucket capacity as per ISO 7546	3.8	m³
Specific material weight	1.6	t/m³
B – bucket width	2700	mm
H – height	1450	mm
L - length	1730	mm
Weight	1410	kg

Loading bucket for lift arms with hydraulic quick-change device.

Name	Value	Units
Bucket capacity as per ISO 7546	3.5	m³
Specific material weight	1.6	t/m³
B – bucket width	2700	mm
H – height	1490	mm
L - length	1600	mm
Weight	1290	kg

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Name	Value	Units
Bucket capacity as per ISO 7546	3.8	m³
Specific material weight	1.4	t/m³
B – bucket width	2700	mm
H – height	1490	mm
L - length	1700	mm
Weight	1310	kg

Hydraulic quick-change device

This equipment is optional.

Alternative versions:

– Hydraulic quick-change device for Z lift arms.
– Combined electrohydraulic quick-change device for Z lift arms.
– Combined electrohydraulic quick-change device with comfort control for Z lift arms.

1.1.14 Driver's cab


bpik0036

On elastic bearing on rear section, soundproof ROPS/FOPS cab.

Design:

– Detachable left door with sliding window.
– The right door is the emergency exit.
– Tinted windows made of hardened single-glazed safety glass
– Adjustable steering column.
– ROPS rollover protection in accordance with DIN/ISO 3471/ EN 474-3.
– FOPS stone impact protection in accordance with DIN/ISO 3449/ EN 474-1.

Driver's seat

Alternative versions:

– Driver's seat with gas-filled spring suspension.
– Driver's seat with pneumatic suspension.
  This equipment is optional.

1.1.15 Sound emission


bpik0037

Sound pressure

Name	Value	Units
ISO 6396 – LpA (in driver's cab)	69	dB (A)

Sound output

Name	Value	Units
2000/14/EG – LwA (outside)	105	dB (A)

1.1.16 Towing device

bpik0041 

The towing device is attached to the back of the machine.

Purpose:
- For towing the machine out of a danger area
  See the section on emergency operation in chapter 3.
- For lifting the machine by crane
  See the section on transporting the machine in chapter 3.

It may not be used for attaching a trailer. The manufacturer/supplier will not be held liable for damage resulting from this.

! See the instructions on proper use and safely towing the machine in chapter 2.

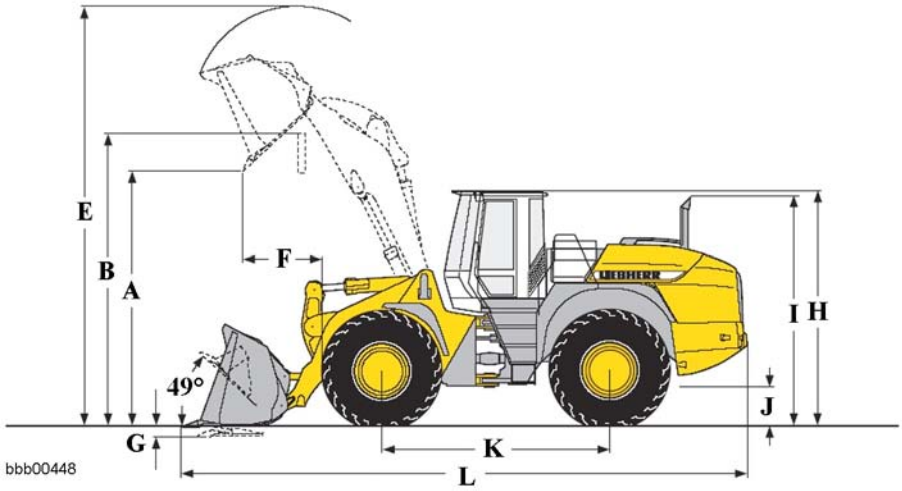
1.1.17 Complete machine in high lift version

bpik0039 

The values stated refer to the machine:
- With Z lift arms (3050 mm)
- Without a hydraulic quick-change device
- With 23.5 R25 Michelin XHA tyres.
- Including all lubricants
- With a full tank
- With ROPS/FOPS cab and driver

Tyre sizes and additional attachments affect the operating weight and tipping load.
In practice, the bucket capacity can be around 10 % greater than as calculated using the ISO 7546 method.
This depends on the type of material.

Key to the table:
Z = Welded tooth holder with plug-in teeth.



Dimensions

	Description	Unit	Value	
	Cutting tool		Z	Z
	Bucket capacity as per ISO 7546	m^3	3.0	4.0
	Bucket width	mm	2700	2700
	Specific material weight	t/m^3	1.6	1.2
A	Dump height at maximum lifting height and 45° tilt-out angle	mm	3630	3330
B	Dump height	mm	4000	4000
C	Maximum bucket base height	mm	4330	4330
D	Maximum bucket pivot point height	mm		
E	Maximum bucket top height	mm	6040	6250
F	Reach at maximum lifting height and 45° tilt-out angle	mm	915	1200
G	Digging depth	mm	130	130
H	Height above the cab	mm	3355	3355
I	Height above exhaust	mm	3310	3310
J	Ground clearance	mm	530	530
K	Wheel base	mm	3150	3150
L	Overall length	mm	8360	8630
	Turning radius over bucket outer edge	mm	6500	6600
	Lifting force (SAE)	kN	130	130
	Breakout force (SAE)	kN	125	90
	Tipping load when straight	kg	11180	10530
	Tipping load articulated at 35°	kg	10155	9570
	Tipping load articulated at 40°	kg	9850	9280
	Operating weight	kg	17350	17640

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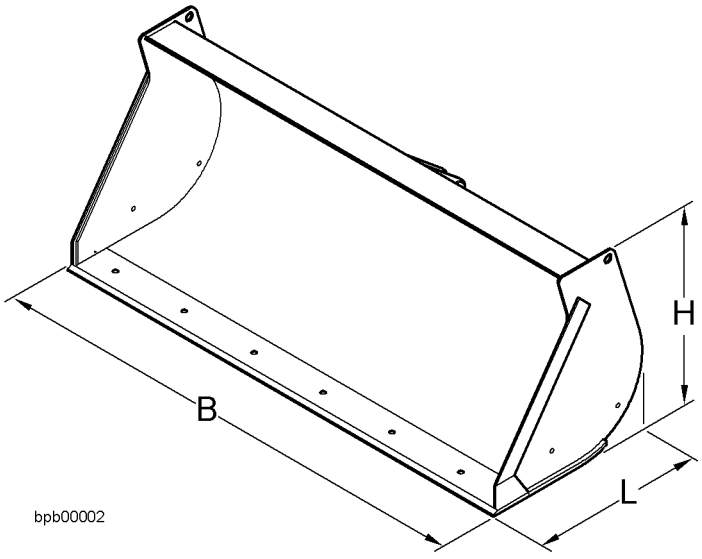
1.1.18 Light material bucket

This equipment is optional.
Version with undercut blade.



Main dimensions

Light material bucket for direct attachment:

Name	Value	Units
Bucket capacity as per ISO 7546	5.0	m³
Specific material weight	1.1	t/m³
B – bucket width	2950	mm
H – height	1580	mm
L - length	1785	mm
Weight	1780	kg

Name	Value	Units
Bucket capacity as per ISO 7546	6.0	m³
Specific material weight	0.8	t/m³
B – bucket width	2950	mm
H – height	1705	mm
L - length	1985	mm
Weight	1925	kg

Light material bucket for quick-change device:

Name	Value	Units
Bucket capacity as per ISO 7546	5.0	m³
Specific material weight	1.0	t/m³
B – bucket width	2950	mm

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Name	Value	Units
H – height	1600	mm
L - length	1700	mm
Weight	1645	kg

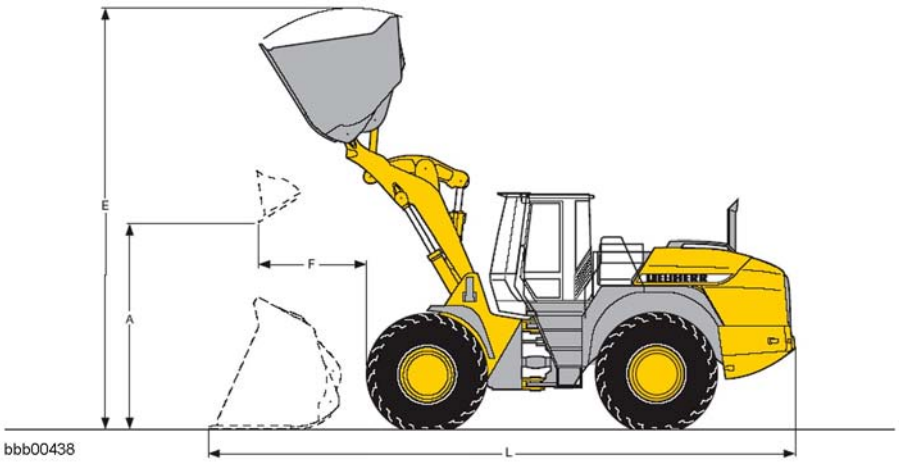
Name	Value	Units
Bucket capacity as per ISO 7546	6.0	m³
Specific material weight	0.7	t/m³
B – bucket width	2950	mm
H – height	1710	mm
L - length	1890	mm
Weight	1785	kg

Complete machine with light material bucket

The values stated refer to the machine:
– With Z lift arms (2750 mm)
– With 23.5R25 Michelin XHA tyres
– Including all lubricants
– With a full tank
– With ROPS/FOPS cab and driver

Tyre sizes and additional attachments affect the operating weight and tipping load.

Key to the table:
[1)]Without a hydraulic quick-change device
[2)]With hydraulic quick-change device



Dimensions

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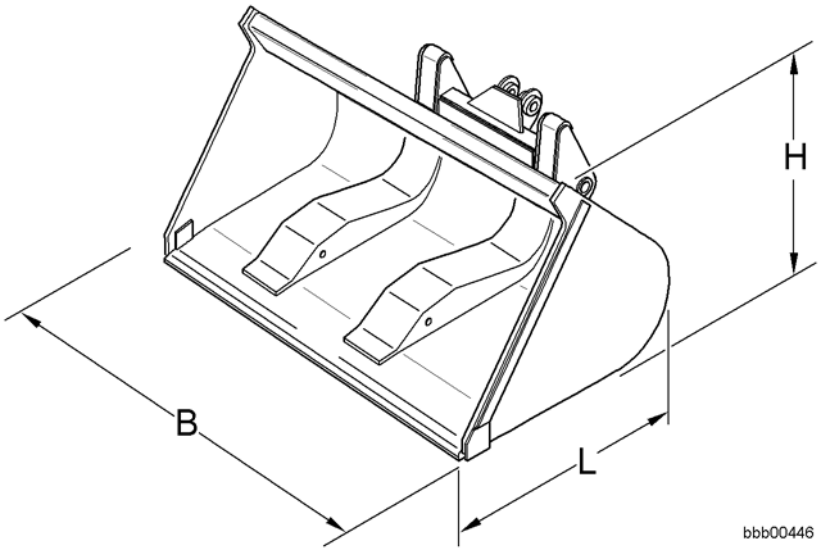
	Description	Unit	Value			
	Bucket capacity as per ISO 7546		5.0 [1)]	5.0 [2)]	6.0 [1)]	6.0 [2)]
	Bucket width	mm	2950	2950	2950	2950
	Specific material weight	t/m ^{3}	1.1	1.0	0.8	0.7
A	Dump height at maximum lifting height	mm	2855	2755	2715	2630
E	Maximum bucket top height	mm	5850	5955	6050	6155
F	Reach at maximum lifting height	mm	1265	1425	1410	1560
L	Overall length	mm	8320	8470	8520	8650
	Tipping load when straight	kg	12570	12200	12280	11910
	Articulated tipping load	kg	11080	10750	10820	10490
	Operating weight	kg	17520	17920	17720	18120

1.1.19 High dump bucket

This equipment is optional.

Version with undercut blade.



Main dimensions

High dump bucket for direct attachment:

Name	Value	Units
Bucket capacity as per ISO 7546	4.5	m³
Specific material weight	1.0	t/m³
B – bucket width	2700	mm
H – height	1660	mm
L – length with blade	2030	mm
Weight	2000	kg
Maximum operating pressure for attachment hydraulics	250	bar

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