

# Technical Description Wheel Loader

# L 538

<b>Tipping Load</b>	<b>9000 kg</b>
<b>Bucket Capacity</b>	<b>2,5 - 4,0 m<sup>3</sup></b>
<b>Operating Weight</b>	<b>12,3 t</b>
<b>Engine Output</b>	<b>100 kW (136 HP)</b>



# LIEBHERR

# Technical Data



## Engine

Liebherr diesel engine	D 924 TI-E A1	
	4-cylinder, inline engine, water-cooled exhaust-turbo charged with intercooler	
Power output		
DIN/ISO 9249	100 kW (136 HP)	at 2000 RPM
Max. torque	567 Nm	at 1400 RPM
Displacement	6,64 litres	
Bore/Stroke	122/142 mm	
Air cleaner system	Dry air filter with main and safety element, pre-cleaner, service indicator on LCD display	
Electrical system		
Operating voltage	24 V	
Battery	2 x 110 Ah/12 V	
Alternator	Three-phase AC, 24 V/55 A	
Starter	24 V/5,4 kW	



## Travel Drive

Stepless hydrostatic travel drive	
Design	Swash plate type variable flow pump and two variable axial piston motors in closed loop circuit. Direction of travel in reversed by changing the flow-direction of the variable-displacement pump
Filtering system	Suction filter for closed circuit
Control	By travel and inching pedal. The inching pedal makes it possible to control the tractive and thrust forces steplessly at full engine speed. The Liebherr joystick is used to control forward and reverse travel and select the travel stages
Travel speed range	Speed range I _____ - 8,0 km/h Speed range II _____ - 34,0 km/h Forward and reverse with size 20.5R25



## Axles

Four-wheel drive	
Front axle	Fixed
Rear axle	Centre pivot, with 6° oscillating angle to each side. 470 mm in height can be driven over (with all four wheels remain in contact with the ground)
Differentials	Automatic limited-slip differentials with 45 % locking action in both axles
Reduction gear	Planetary final drive in wheel hubs
Track width	1900 mm with all types of tyres



## Brakes

Wear-free service brake	Self-locking of the hydrostatic travel drive (acting on all four wheels) and additional pump-accumulator brake system with wet multi-disc brakes located in the differential housing. Two separate brake circuits
Parking brake	Electro-hydraulically actuated spring-loaded disc brake system on the front axle
The braking system meets the requirements of the EC guidelines 91/320.	



## Tyres

Available sizes	20.5R25 Tubeless radial or cross ply tyres on well-base rims
Special tyres	By arrangement with the manufacturer



## Steering

Design	Hydraulic servo power steering. Central oscillating frame articulation with damper element
Articulation angle	40° (to each side)
Oscillating angle	6° (to each side)
Max. pressure	210 bar
Emergency steering	Electro-hydraulic emergency steering system



## Attachment Hydraulics

Design	"Load-Sensing" variable axial piston pump with output control and pressure cutoff
Max. flow	140 l/min.
Max. pressure	300 bar
Cooling	Hydraulic oil cooling using thermostatically controlled fan and oil cooler
Filtration	Return line filter in the hydraulic reservoir
Control	"Liebherr joystick" with hydrostatic servo control
Lift circuit	Lifting, neutral, lowering and float position controlled by Liebherr joystick with detent; automatic lifting-limit circuit
Tilt circuit	Tilt back, neutral, dump automatic bucket positioning



## Attachment

Geometry can be chosen	Powerful Z-bar linkage with one tilt cylinder, hydr. quick change coupler – optional equipment Parallel linkage with two tilt cylinders, hydr. quick change coupler – standard equipment
Bearings	Sealed
Cycle time at nominal load	ZK PK
Lifting	6,0 sec. 6,0 sec.
Dumping	1,6 sec. 3,0 sec.
Lowering (empty)	4,0 sec. 4,0 sec.



## Operator's Cab

Design	The cab is resiliently mounted on the rear section, with built in ROPS/ FOPS structure, tinted safety glass windows, 2 Doors open out, left door with a sliding window Adjustable steering column is standard equipment ROPS roll over protection per DIN/ISO 3471/ EN 474-3 FOPS falling objects protection per DIN/ISO 3449/EN 474-1
Liebherr Operator's seat	6-way adjustable seat with seat belt, adjustable for operator's weight.
Cab heating and ventilation	With defrosting, fresh air filter, circulation system and heater supplied from engines cooling



## Noise Emission

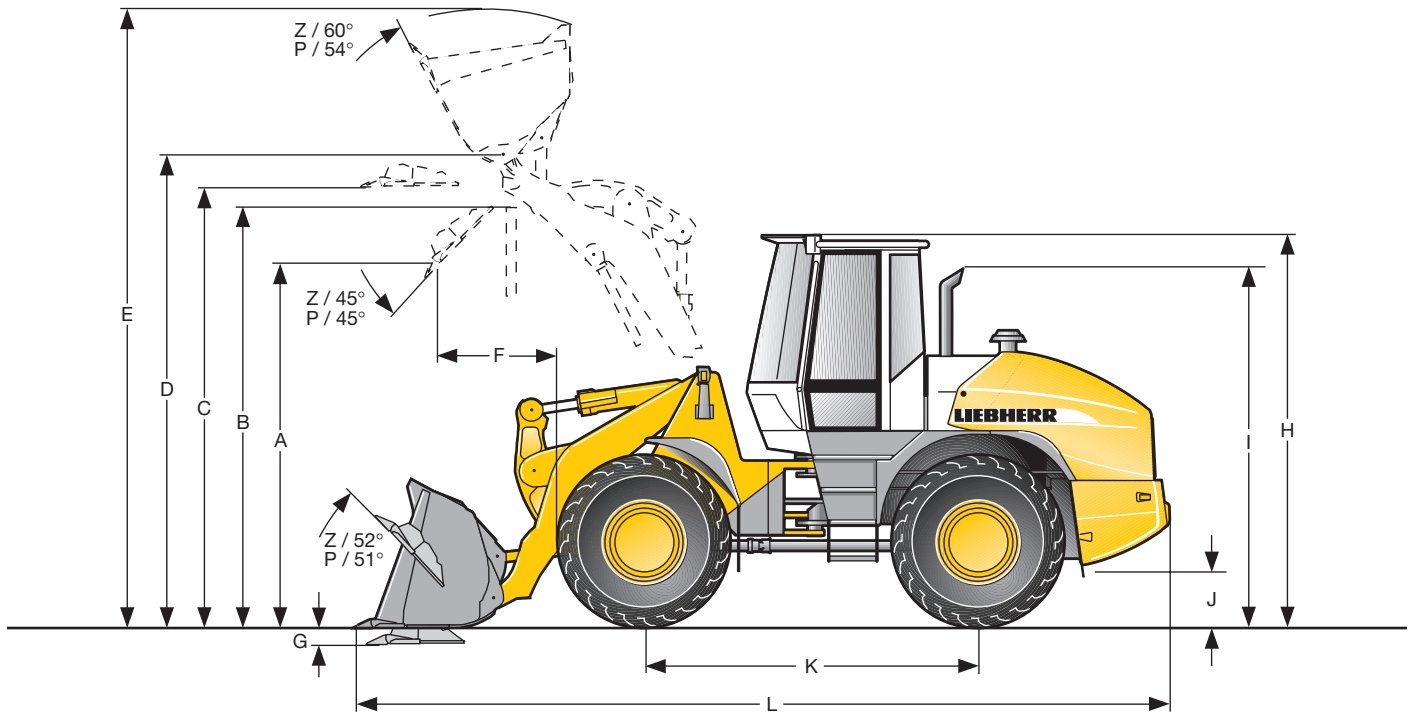
	In the operator's cab	
	Without blower	72 dB(A)
ISO 6396	Max. blower output	75 dB(A)
2000/14/EC	Outside cab	104 dB(A)



## Capacities

Fuel tank	160 l
Engine oil (inclusive filter change)	19 l
Pump distributor gears	2,5 l
Front axle/wheel hubs	15,5/5 l
Rear axle/wheel hubs	15,5/5 l
Hydraulic tank	100 l
Hydraulic system, total	130 l

# Dimensions



## Loading Bucket



		ZK	ZK	PK	ZK	PK	
Geometry		T	T	T	T	PK	
Cutting tools		T	T	T	T	PK	
Bucket capacity	m <sup>3</sup>	2,5	2,2	2,1	2,8	2,4	
Bucket width	mm	2500	2500	2500	2500	2500	
Specific material weight	t/m <sup>3</sup>	1,8	1,8	1,8	1,6	1,6	
A	Dumping height at max. lift height and 45° discharge	mm	2870	2750	2910	2780	2800
B	Dump-over height	mm	3380	3380	3470	3380	3470
C	Max. height of bucket bottom	mm	3650	3650	3730	3650	3730
D	Max. height of bucket pivot point	mm	3900	3900	3970	3900	3970
E	Max. operating height	mm	5150	5200	5230	5250	5340
F	Reach at max. lift height and 45° discharge	mm	970	1030	1075	1050	1170
G	Digging depth	mm	70	65	65	70	65
H	Height above cab	mm	3250	3250	3250	3250	3250
I	Height above exhaust	mm	3150	3150	3150	3150	3150
J	Ground clearance	mm	460	460	460	460	460
K	Wheelbase	mm	2900	2900	2900	2900	2900
L	Overall length	mm	7135	7360	7535	7420	7700
	Turning circle radius over outside bucket edge	mm	5795	5800	5880	5820	5910
	Lifting force (SAE)	kN	135	135	95	135	95
	Breakout force (SAE)	kN	105	103	100	95	91
	Tipping load, straight*	kg	10160	9240	8640	9940	8440
	Tipping load, articulated at 40°*	kg	9000	8420	7650	8790	7465
	Operating weight*	kg	12300	12560	12250	12400	12320

\* The figures shown here are valid with 20.5R25 Good Year GP2B tyres and include all lubricants, a full fuel tank, the ROPS/FOPS cab and the operator.

Different tyres and optional equipment will change the operating weight and tipping load.

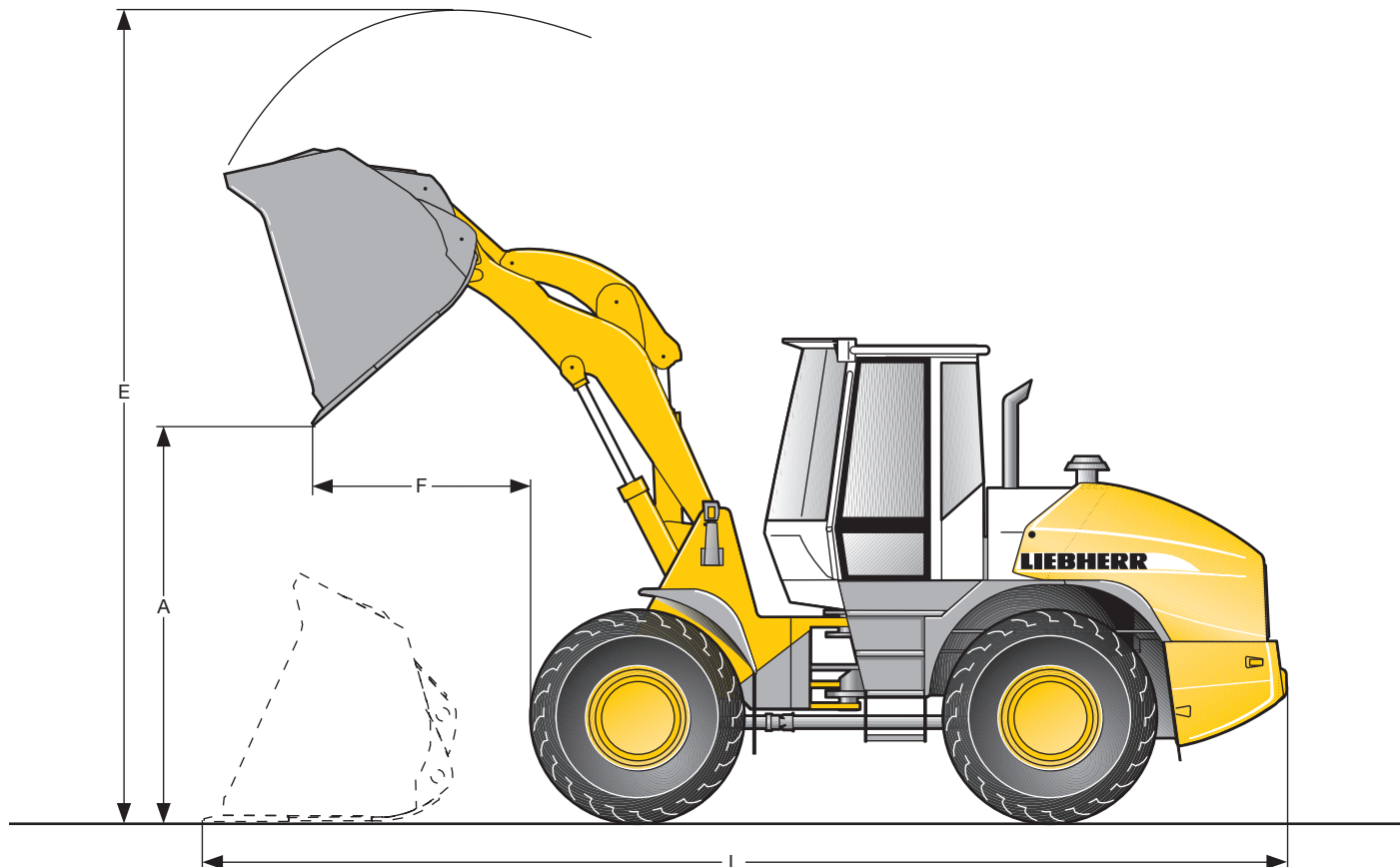
ZK = Z-bar linkage

PK = Parallel linkage with hydraulic quick coupler

T = Welded-on tooth holder with add-on teeth

# Attachment

## Light Material Bucket



### Light Material Bucket with Bolt-On Cutting Edge



		ZK	ZK	PK	PK
Geometry					
Bucket capacity	m <sup>3</sup>	4,0	3,0	4,0	3,0
Bucket width	mm	2700	2700	2700	2700
Specific material weight	t/m <sup>3</sup>	1,0	1,3	0,9	1,2
A Dumping height at max. lift height	mm	2450	2650	2580	2750
E Max. operating height	mm	5550	5360	5670	5490
F Reach at maximum lift height	mm	1270	1100	1410	1240
L Overall length	mm	7600	7330	7820	7560
Tipping load, straight*	kg	9000	9390	8350	8700
Tipping load, articulated at 40°*	kg	7980	8310	7400	7700
Operating weight*	kg	12750	12500	12700	12550

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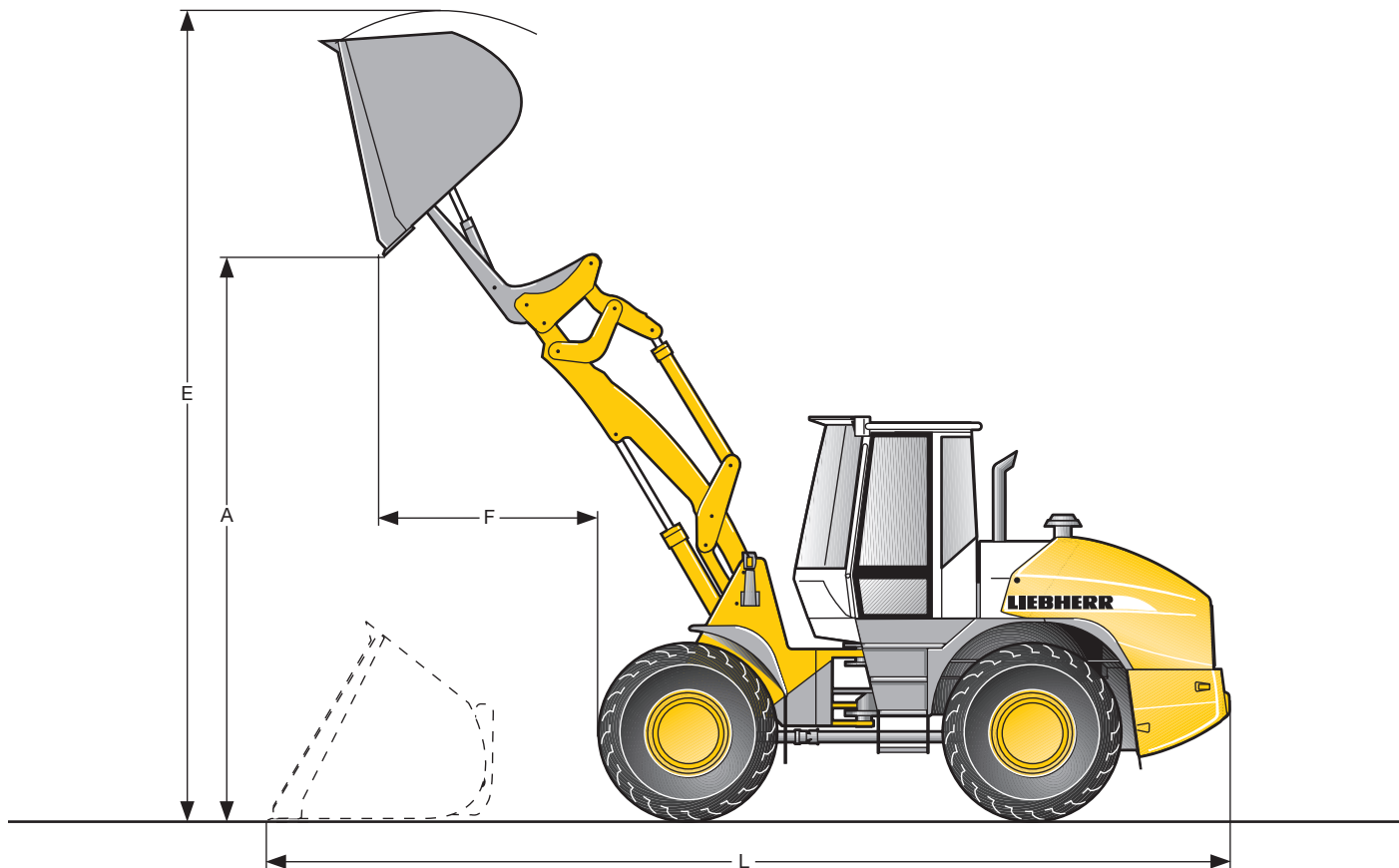
Different tyres and optional equipment will change the operating weight and tipping load.

ZK = Z-bar linkage with hydraulic quick coupler

PK = Parallel linkage with hydraulic quick coupler

# Attachment

## High-Dump Bucket



### High-Dump Bucket with Bolt-On Cutting Edge



	Geometry		PK	PK
	Bucket capacity	m <sup>3</sup>	3,0	4,0
	Bucket width	mm	2700	2720
	Specific material weight	t/m <sup>3</sup>	1,1	0,8
A	Dumping height at max. lift height	mm	4350	4200
E	Max. operating height	mm	5530	5920
F	Reach at maximum lift height	mm	1600	1940
L	Overall length	mm	7790	8150
	Tipping load, straight *	kg	8200	7080
	Tipping load, articulated at 40° *	kg	7270	6290
	Operating weight *	kg	12720	13220

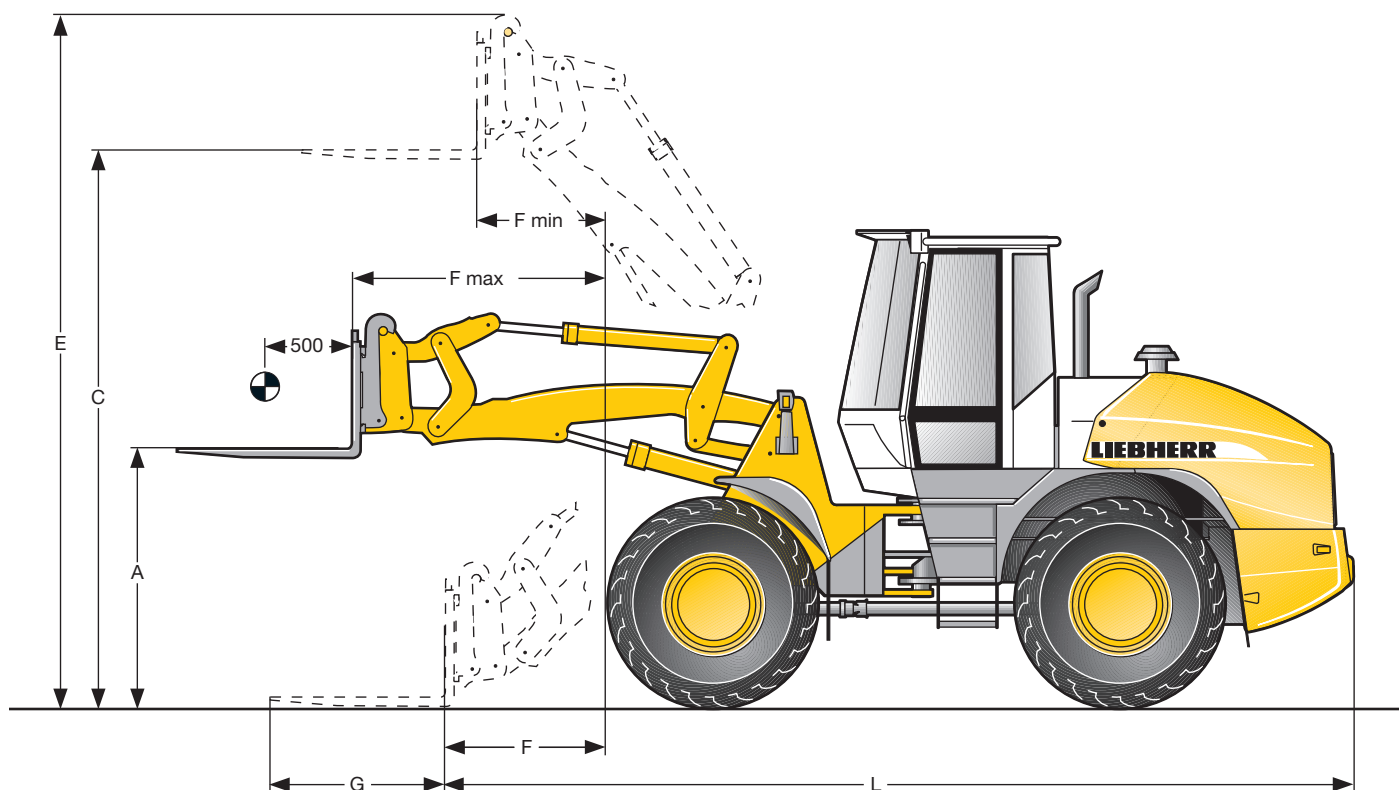
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Different tyres and optional equipment will change the operating weight and tipping load.

PK = Parallel linkage with hydraulic quick coupler

# Attachment

## Fork Carrier and Fork



### FEM III Fork Carrier and Fork with Quick Change Device

	Geometry		ZK	PK
A	Lifting height at max. reach	mm	1770	1770
C	Max. lifting height	mm	3700	3790
E	Max. operating height	mm	4640	4710
F	Reach at loading position	mm	960	1100
F max.	Max. reach	mm	1640	1750
F min.	Reach at max. lifting height	mm	710	795
G	Fork length	mm	1200	1200
L	Length - basic machine	mm	6325	6565
	Tipping load, straight*	kg	7340	7245
	Tipping load, articulated at 40°**	kg	6490	6412
	Recommended payload for uneven ground = 60 % of tipping load (articulated at 40°)***	kg	3894	3850
	Recommended payload for smooth surfaces = 80 % of tipping load (articulated at 40°)***	kg	5000**	5000**
	Operating weight *	kg	12107	12260

\* The figures shown here are valid with 20.5R25 Good Year GP2B tyres and include all lubricants, a full fuel tank, the ROPS/FOPS cab and the operator.

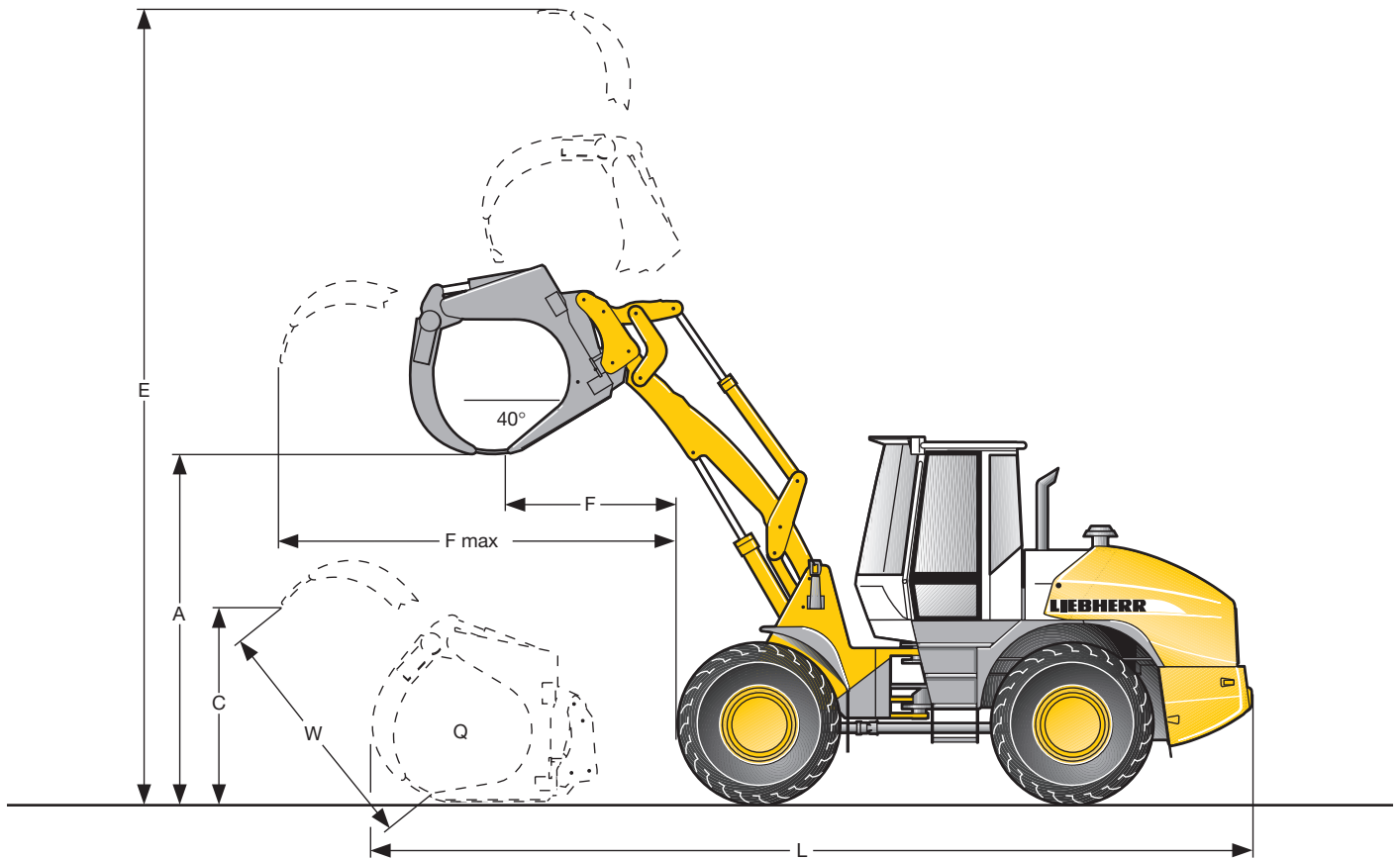
Different tyres and optional equipment will change the operating weight and tipping load.

\*\* Payload on forks is limited by tilt cylinder

\*\*\* According to EN 473-3 and ISO 8313

# Attachment

## Log Grapple



### Log Grapple

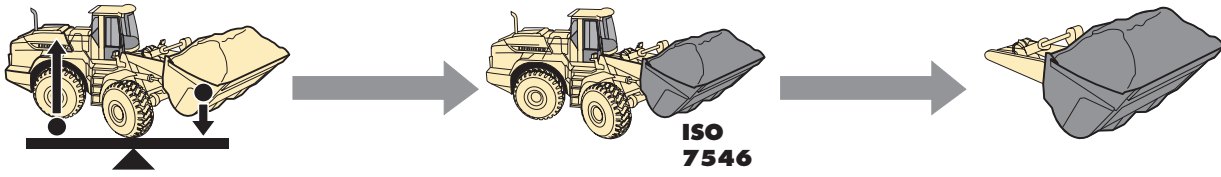
	Geometry		PK
A	Discharge height at 40°	mm	3000
C	max. grapple opening	mm	1760
E	Max height	mm	6000
F	Reach at max. lifting height at 40° discharge	mm	1550
L	Overall length	mm	7810
Q	Grapple diameter	m <sup>2</sup>	1,3
W	Max. grapple opening	mm	2060
	Grapple width	mm	1690
	Pay load	kg	3950
	Operating weight	kg	13200

The figures shown here are valid with 20.5R25 Good Year GP2B tyres and include all lubricants, a full fuel tank, the ROPS/FOPS cab and the operator.

PK = Parallel linkage with hydraulic quick coupler



# Tipping Load



## What is tipping load?

Load at centre of gravity of working equipment, so that the wheel loader just begins to tip over the front axle. This is the most unfavourable static-load position for the wheel loader. Liftings arms horizontal, wheel loader fully articulated at centre pivot.

## Pay load.

The pay load must not exceed 50 % of the tipping load when articulated. This is equivalent to a static stability-margin factor of 2,0.

## Bucket capacity.

The bucket volume is determined from the pay load.

$$\text{Pay load} = \frac{\text{Tipping load, articulated}}{2}$$

$$\text{Bucket capacity} = \frac{\text{Pay load (kg)}}{\text{Specific bulk weight of material (t/m}^3\text{)}}$$

## Selection of Buckets



### Loading Buckets

2,5 m <sup>3</sup> ZK	
2,1 m <sup>3</sup> PK	
2,8 m <sup>3</sup> ZK	
2,4 m <sup>3</sup> PK	

### Light Material Buckets

3,0 m <sup>3</sup> ZK	
4,0 m <sup>3</sup> ZK	
3,0 m <sup>3</sup> PK	
4,0 m <sup>3</sup> PK	

t/m<sup>3</sup> 0,6 0,8 1,0 1,2 1,4 1,6 1,8 2,0 2,2

## Bulk Material Densities and Bucket Filling Factors

	t/m <sup>3</sup>	%		t/m <sup>3</sup>	%		t/m <sup>3</sup>	%
Gravel, moist	1,9	105	Clay, natural	1,6	110	Granite	1,8	95
dry	1,6	105	dry	1,4	110	Limestone, hard	1,65	95
wet, 6–50 mm	2,0	105	wet	1,65	105	soft	1,55	100
dry, 6–50 mm	1,7	105	Clay and gravel, dry	1,4	110	Sandstone	1,6	100
crushed stone	1,5	100	wet	1,6	100	Slate	1,75	100
Sand, dry	1,5	110	Earth, dry	1,3	115	Bauxite	1,4	100
moist	1,8	115	wet excavated	1,6	110	Gypsum, broken	1,8	100
wet	1,9	110	Topsoil	1,1	110	Coke	0,5	110
Gravel and sand, dry	1,7	105	Weathered rock			Slag, broken	1,8	100
wet	2,0	100	50 % rock, 50 % earth	1,7	100	Coal	1,1	110
Sand and clay	1,6	110	Basalt	1,95	100			

## Tyre Sizes

		Width over tyres	Change in vertical dimensions	Use
		mm	mm	
20.5-25 Dunlop E91	L2	2480	+ 25	Clay
20.5R25 Dunlop SP T9	L2	2490	+ 10	Gravel, Landscaping
20.5R25 Good Year GP2B	L2	2480	0	Sand, Gravel
20.5R25 Good Year RL5K	L5	2490	+ 40	Waste, Industry, Stone
20.5R25 Michelin XHA	L3	2480	- 5	Gravel
20.5R25 Michelin XLD D2	L5	2490	+ 25	Stone, Mining spoil, Recycling
20.5R25 Michelin X-Mine D2	L5	2480	+ 40	Stone, Scrap material, Waste

Before operating the vehicle with tire foam filling or tire protection chains, please discuss this with Liebherr-Werk Bischofshofen.



# Equipment



## Basic Machine

	S	O
Liebherr travel gear	•	
Ride control		•
Liebherr shock absorbing element	•	
Automatic travel mode	•	
20 km/h speed limiting		•
Electronical theft protection		•
Creep speed/Cruise control		x
Electronic crowding force control		x
Combined inching-braking system	•	
Multi-disc limited slip differentials in both axles	•	
Air cleaner system with pre-filter	•	
Particle protection for radiator		•
Reversible fan drive		•
Emergency steering system	•	
Headlights	•	
Tail lights	•	
Working area lights at front	•	
Working area lights at rear		•
Battery master switch	•	
Pre-heat system for cold starting	•	
Towing hitch	•	
Lockable doors, service flap an engine hood	•	
Toolbox with toolkit	•	
Dust filter system		•
Protective ventilation system		•
Amber beacon		•
Warning device for travel in reverse		•
Exhaust pipe – special steel		•
Automatic central lubrication system		•



## Operator's Cab

	S	O
Cab with reduced height – 90 mm		•
Noise-damped ROPS/FOPS cab with tinted safety glass	•	
Joystick steering		•
2in1 steering system – changeable		x
Hot-water heater with defroster and recirculated-air system	•	
Adjustable steering column	•	
Liebherr-joystick control	•	
Air conditioning system		•
Liebherr operator's seat – adjustable in 6 ways	•	
Air sprung operator's seat with seat belt		•
Sliding window	•	
Emergency exit	•	
Floor mat	•	
Wash/wipe system for windscreen and rear window	•	
Interior rear-view mirror	•	
Sun visor	•	
Bottle holder	•	
Clothes hook	•	
Storage box	•	
Storage compartment	•	
Plug	•	
Ashtray	•	
Horn	•	
Provision for radio including loudspeaker		•
Radio set		•
Operator's package	•	



## Instruments for:

	S	O
Diesel engine pre-heat	•	
Engine oil temperature	•	
Fuel reserve	•	
Timer for hours of operation	•	
Speedometer	•	
Travel speed ranges and gear selected	•	
Forward – reverse travel	•	
Forward travel	•	
Reverse travel	•	
Speedometer	•	
Rev. counter		x
Clock	•	

Safety belt	•	
Flashing turn indicators	•	
High-beam headlights	•	
Diagnosis system		x



## Warning Lights for:

	S	O
Engine oil pressure	•	
Engine overheat	•	
Parking brake	•	
Hydraulic oil temperature	•	
Air cleaner blockage	•	
Battery charge	•	
Flow through emergency steering system	•	
Road travel	•	



## Audible Warnings for:

	S	O
Engine oil pressure	•	
Engine overheat	•	
Overheat of hydraulic fluid	•	
Emergency steering system	•	



## Function Keys for:

	S	O
Air conditioning		•
Hazard warning flashers	•	
Parking brake	•	
Electronic tractive force adaptation		x
Creep speed		x
Ride control		•
Automatic bucket positioner	•	
Hoist kick-out	•	
Additional hydraulics	•	
Float position	•	
Headlights	•	
Working lights front	•	
Working lights rear	•	
Road travel	•	
Wash/wipe system for rear window	•	
Amber beacon	•	
Mode switch	•	



## Rotary Switches for:

	S	O
Blower	•	
Heater	•	
Fresh air or recirculated air	•	
Adjusting the crowding force counter		x



## Equipment

	S	O
Z-bar linkage	•	
Industrial Z-bar linkage		x
Parallel linkage	•	
Hydraulic servo control of working hydraulics	•	
Automatic bucket positioner – adjustable	•	
Automatic hoist kick out – adjustable	•	
Float position	•	
Loading buckets with and without teeth, or bolt-on cutting edge	•	
High-dump bucket	•	
Light material bucket	•	
Fork carrier and lift forks	•	
Hydraulic quick-change device	• PK	• ZK
3rd hydraulic control circuit	•	
3rd and 4th hydraulic control circuits	•	
Comfort control	•	
20 km/h speed limiting	•	
Automatic acting central lubrication system	•	
Country-specific versions	•	

S = Standard, O = Option, X = not available, PK = Parallel-Kinematic, ZK = Z-Kinematic

# The Liebherr Wheel Loaders

## Stereoloader



		<b>L 506</b>	<b>L 507</b>	<b>L 508</b>	<b>L 509</b>	<b>L 512</b>	<b>L 514</b>
Tipping load	kg	3215	3465	3895	4440	4615	5305
Bucket capacity	m <sup>3</sup>	0,8	0,9	1,0	1,1	1,3	1,5
Operating weight	kg	4810	4930	5310	5740	7000	7700
Engine output	kW/HP	44/60	46/63	49/67	52/71	59/80	72/98

## Wheel Loader



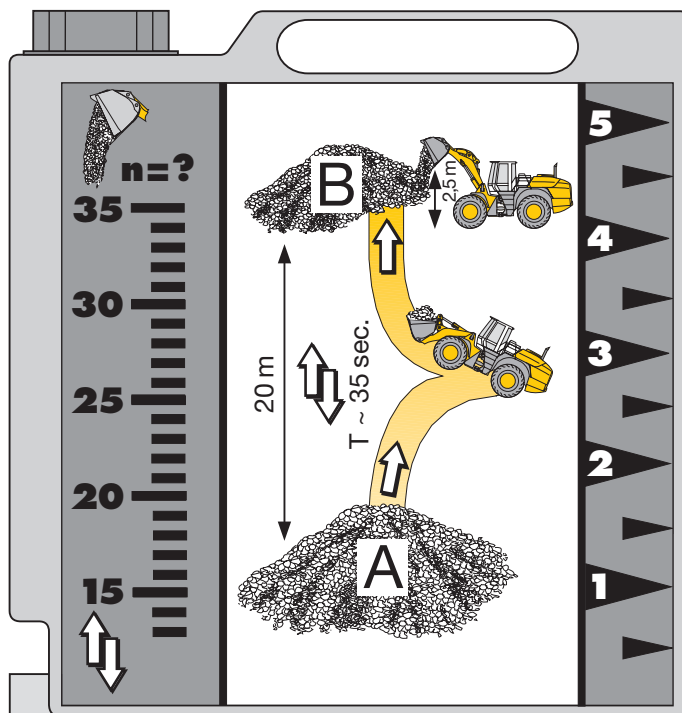
		<b>L 524</b>	<b>L 534</b>	<b>L 538</b>	<b>L 544 2plus2</b>
Tipping load	kg	7005	8625	9000	10600
Bucket capacity	m <sup>3</sup>	2,0	2,4	2,5	3,0
Operating weight	kg	10100	12100	12380	15300
Engine output	kW/HP	81/110	100/136	100/136	121/165



		<b>L 554 2plus2</b>	<b>L 564 2plus2</b>	<b>L 574 2plus2</b>	<b>L 580 2plus2</b>
Tipping load	kg	12270	15285	16690	17850
Bucket capacity	m <sup>3</sup>	3,5	4,0	4,5	5,0
Operating weight	kg	17300	22450	24220	24740
Engine output	kW/HP	145/198	183/249	195/265	195/265

01.03

## Environmental protection can help you earn money!



### The Liebherr Standard Consumption Test - easy to reproduce and practical.

Every Liebherr dealer will provide you with this measuring-tank kit free of charge or, on request, will carry out the standard fuel consumption test on your premises. It's so easy: you simply determine the number of loading cycles that can be carried out with 5 litres of diesel. The material is taken from pile A and carried over a distance of 20 metres to point B. The time needed for each working cycle should be 35 seconds. Discharge at point B should take place from a height of 2,5 m. The working cycles continue until the 5 litres of diesel in the external measuring tank have been used up. The loader's fuel consumption per operating hour is calculated as follows:

$$\frac{400}{\text{Number of loading cycles}} = \text{consumption per hour}$$

### Values for the Liebherr Wheel Loaders

	Numbers of working cycles	Litres/100 tons	Litres/hour
L 524: 2,0 m <sup>3</sup>	n = 48	2,9	8,3
L 534: 2,4 m <sup>3</sup>	n = 40	2,8	10,0
L 538: 2,5 m <sup>3</sup>	n = 40	2,8	10,0
L 544: 3,0 m <sup>3</sup>	n = 35	2,6	11,4
L 554: 3,5 m <sup>3</sup>	n = 33	2,4	12,1
L 564: 4,0 m <sup>3</sup>	n = 24	2,9	16,7
L 574: 4,5 m <sup>3</sup>	n = 23	2,7	17,4
L 580: 5,0 m <sup>3</sup>	n = 22	2,7	18,2

Liebherr-Werk Bischofshofen GmbH

Postfach 49, A-5500 Bischofshofen

+43 (0)6462 888-0, Fax +43 (0)6462 888-385

www.liebherr.com, E-Mail: info@lbh.liebherr.com