

Technical Description Hydraulic Excavator

A 316
Litronic®

Machine for Industrial Applications

Operating Weight 18,9 - 21,0 t
Engine Output 86 kW (117 HP)



LIEBHERR

Technical Data



Engine

Rating per ISO 9249	86 kW (117 HP) at 1800 RPM
Model	Deutz BF4M1013EC
Type	4 cylinder in-line
Bore/Stroke	108/130 mm
Displacement	4,8 l
Engine operation	4-stroke diesel direct injection turbo-charged and after-cooler
Exhaust emissions	in accordance with EC-guidelines
Cooling system	water-cooled with stepless, thermostatic and controlled fan
Air cleaner	dry-type air cleaner with pre-cleaner and automatic 95 % dust discharge (TopAir); main and safety elements
Fuel tank	290 l
Engine idling	sensor controlled
Electrical system	
Voltage	24 V
Batteries	2 x 92 Ah/12 V
Alternator	24 V/55 A



Hydraulic System

Hydraulic pump	Liebherr, variable displacement, swash-plate pump
Max. flow	270 l/min.
Max. hydr. pressure	350 bar
Hydraulic pump regulation and control	Liebherr-Synchron-Comfort-system (LSC) with electronic engine speed sensing regulation, pressure and flow compensation, load sensing and torque controlled swing drive priority
Hydraulic tank capacity	170 l
Hydraulic system capacity	max. 350 l
Filtration	one main return filter with integrated partial micro filtration (5 µm)
Cooling	hydraulic oil radiator with stepless, thermostatic and controlled fan
Mode selector	stepless adjustment of machine performance to match application
POWER-PLUS	for maximum power and heavy duty jobs (without time limit)
POWER-range	for high power with low fuel consumption
ECO-range	for especially economical and environmentally friendly operation
Super-Finish selector	stepless adjustment of engine output – for precision work and heavy duty jobs; actuated via left joystick; possible in each selected mode
Additional function	fixed adjustable flow rates for optional accessories



Hydraulic Controls

Power distribution	via control valve with integrated safety valves, simultaneous and independent operation of travel drive, swing drive and work
Control type	
Attachment and Swing	proportional via joystick levers
Travel	proportional via foot pedal
Additional functions	via switch and/or proportional foot pedals



Swing Drive

Drive	Liebherr swashplate motor with torque control and integrated brake valve
Transmission	Liebherr compact planetary reduction gear
Swing ring	Liebherr sealed single race ball bearing swing ring, internal teeth
Swing speed	0–9,0 RPM
Swing torque	42 kNm
Holding brake	pedal controlled positioning brake



Operator Cab

Cab	largely dimensioned ergonomic cab resiliently mounted, sound insulated, tinted windows, front window stores overhead, door with sliding window, large roof window, sun visors
Operator seat	shock absorbing suspension, adjustable to operator's weight, 6-way adjustable seat, backward/forward seat adjusting with automatic height adjustment
Joysticks	integrated into adjustable seat consoles
Instrument panel	ergonomically arranged, anti-glare instrumentation; automatic monitoring, display, low engine oil pressure or low hydraulic oil level
Digital hour meter	visible from outside
Heating system	hot water heat exchanger to provide heated fresh air or circulated air, with additional front window air vents, operating unit in right console
Noise emission	
ISO 6396	L _{pA} (inside cab) = 73 dB(A)
2000/14/EC	L _{WA} (surround noise) = 99 dB(A)
Sound level in correspondence with "Blue Angel" guidelines.	



Undercarriage

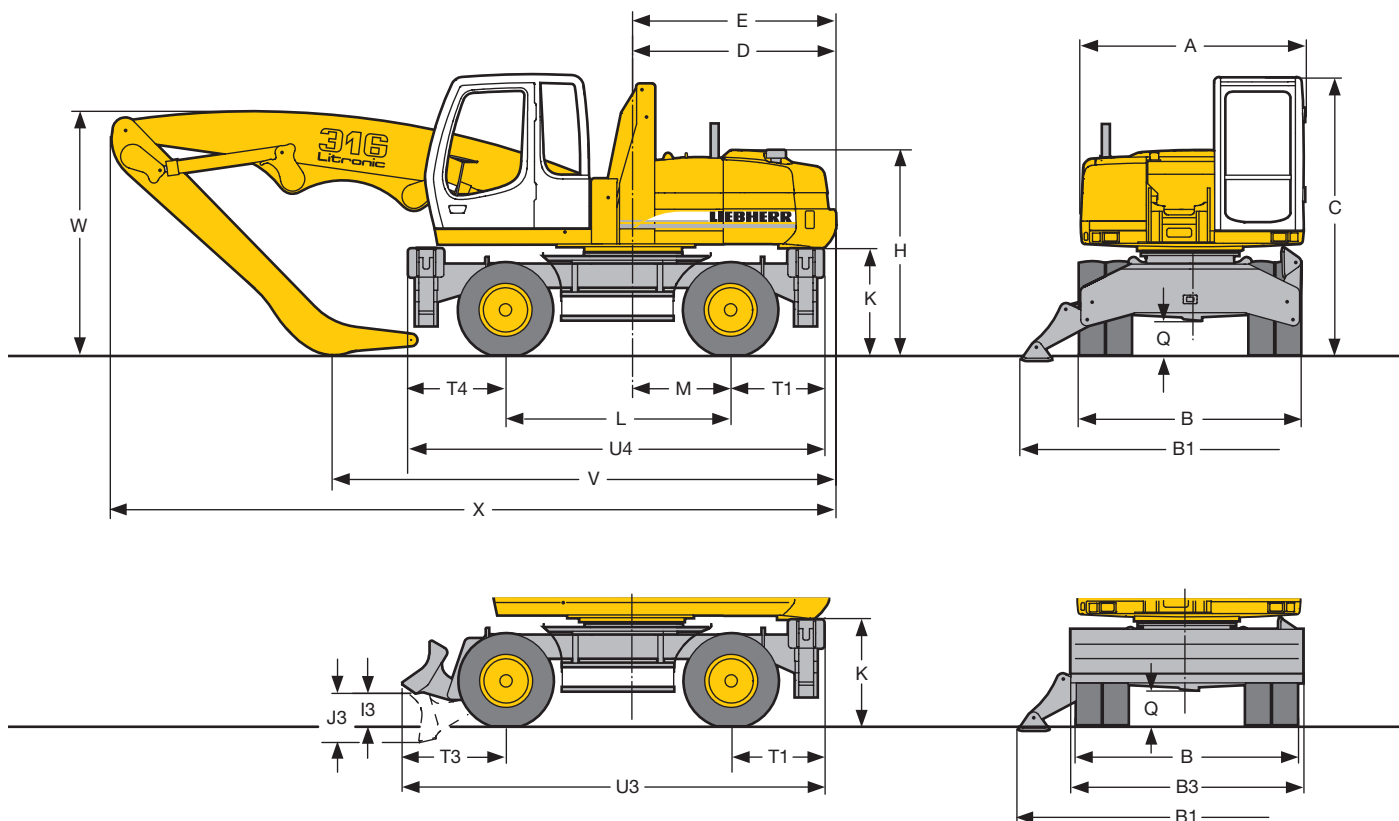
Drive	variable flow swashplate motor with automatic brake valve
Transmission	oversized two speed power shift transmission with additional creeper speed
Travel speed	0– 2,5 km/h (creeper speed off road) 0– 5,0 km/h (off road) 0– 9,0 km/h (creeper speed on road) 0–20,0 km/h (road travel) 0–30,0 km/h Speeder (Option)
Axles	38 t excavator axles; automatic or operator controlled front axle oscillation lock
Brakes	wet, maintenance-free multi disc brakes. Spring applied/pressure released parking brake integrated into gear box
Stabilization	stabilizing blade + 2 pt. outriggers 4 pt. outriggers



Attachment

Hydraulic cylinders	Liebherr cylinders with special seal system. Shock absorption
Pivots	sealed, low maintenance
Lubrication	centralized in easily accessible locations
Hydraulic connections	pipes and hoses equipped with SAE split-flange connections

Dimensions



	mm
A	2500
B	2500
B1	3800
B3	2550
C	3160
D	2290
E	2290
H	2305
I3	390
J3	545
K	1205
L	2540
M	1100
Q	390
R1	4500
R2	6830
T1	1045
T3	1155
T4	1095
U3	4745
U4	4685

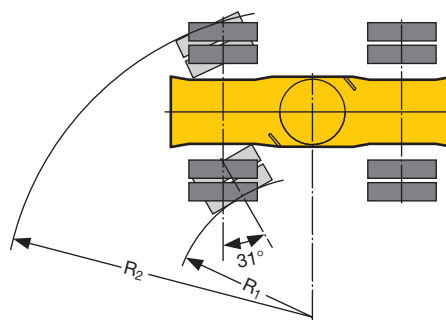
E = Tail radius

Tires 10.00-20

Industrial Stick 4,00 m	mm
V	5650
W	2850
X	8300

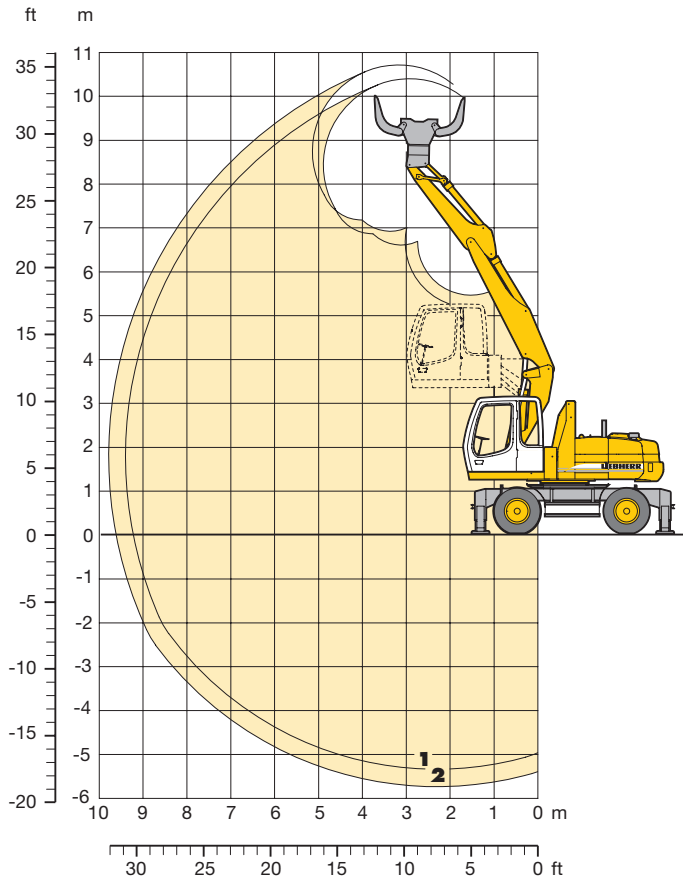
Industrial Stick 3,50 m with Backhoe Kinematic	mm
V	5650
W	2950
X	8300

Dimensions with attachment over steering axle



Attachment

with Hydr. Adjustable Boom, Backhoe Stick and Sorting Grab



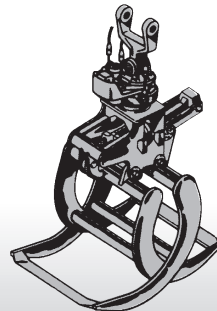
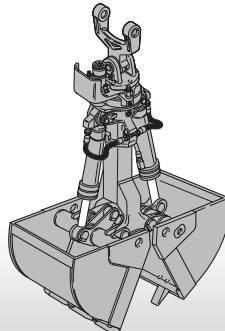
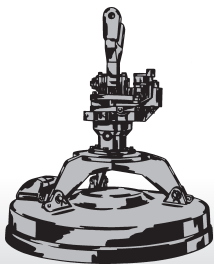
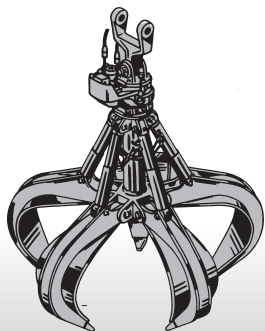
Attachment Envelope

- 1 with backhoe stick 2,25 m and sorting grab
- 2 with backhoe stick 2,65 m and sorting grab

Operating Weight

Operating weight includes basic machine A 316 with 4 pt. outriggers, hydr. adjustable operator cab, 8 tires plus spacer rings and application with hydr. adjustable boom.

	Weight
and backhoe stick 2,25 m with sorting grab	18890 kg
and backhoe stick 2,65 m with sorting grab	18990 kg



Lift Capacities

with Hydr. Adjustable Boom

Stick 2,25 m

Height (m)	Undercarriage	Radius of load from centerline of machine (m)			
		3,0	4,5	6,0	7,5
7,5	Stabilizers raised		3,0# (3,0#)		
	Blade + 2 pt. down		3,0# (3,0#)		
	4 pt. outriggers down		3,0# (3,0#)		
6,0	Stabilizers raised		4,6# (4,6#)	2,6# (2,6#)	
	Blade + 2 pt. down		4,6# (4,6#)	2,6# (2,6#)	
	4 pt. outriggers down		4,6# (4,6#)	2,6# (2,6#)	
4,5	Stabilizers raised	6,5# (6,5#)	4,6 (5,8#)	3,0 (4,6)	
	Blade + 2 pt. down	6,5# (6,5#)	5,8# (5,8#)	4,8# (4,8#)	
	4 pt. outriggers down	6,5# (6,5#)	5,8# (5,8#)	4,8# (4,8#)	
3,0	Stabilizers raised	7,9 (11,6#)	4,6 (7,0)	3,0 (4,6)	
	Blade + 2 pt. down	11,6# (11,6#)	7,3 (8,4#)	4,8 (6,4#)	
	4 pt. outriggers down	11,6# (11,6#)	8,4# (8,4#)	5,7 (6,4#)	
1,5	Stabilizers raised	7,8 (12,3#)	4,5 (7,0)	2,9 (4,5)	
	Blade + 2 pt. down	12,3# (12,3#)	7,3 (8,9#)	4,7 (6,5#)	
	4 pt. outriggers down	12,3# (12,3#)	8,6# (8,9#)	5,6 (6,5#)	
0	Stabilizers raised	7,7 (13,4#)	4,4 (7,1)	2,7 (4,4)	
	Blade + 2 pt. down	13,4# (13,4#)	7,4 (9,0#)	4,6 (6,6#)	
	4 pt. outriggers down	13,4# (13,4#)	8,7# (9,0#)	5,5 (6,6#)	
- 1,5	Stabilizers raised	7,5 (13,8)	4,1 (6,8)	2,6 (4,3)	
	Blade + 2 pt. down	14,3# (14,4#)	7,0 (9,2#)	4,5 (5,5#)	
	4 pt. outriggers down	14,4# (14,4#)	8,7 (9,2#)	5,4 (5,5#)	
- 3,0	Stabilizers raised	7,3 (12,8#)			
	Blade + 2 pt. down	12,8# (12,8#)			
	4 pt. outriggers down	12,8# (12,8#)			

Stick 2,65 m

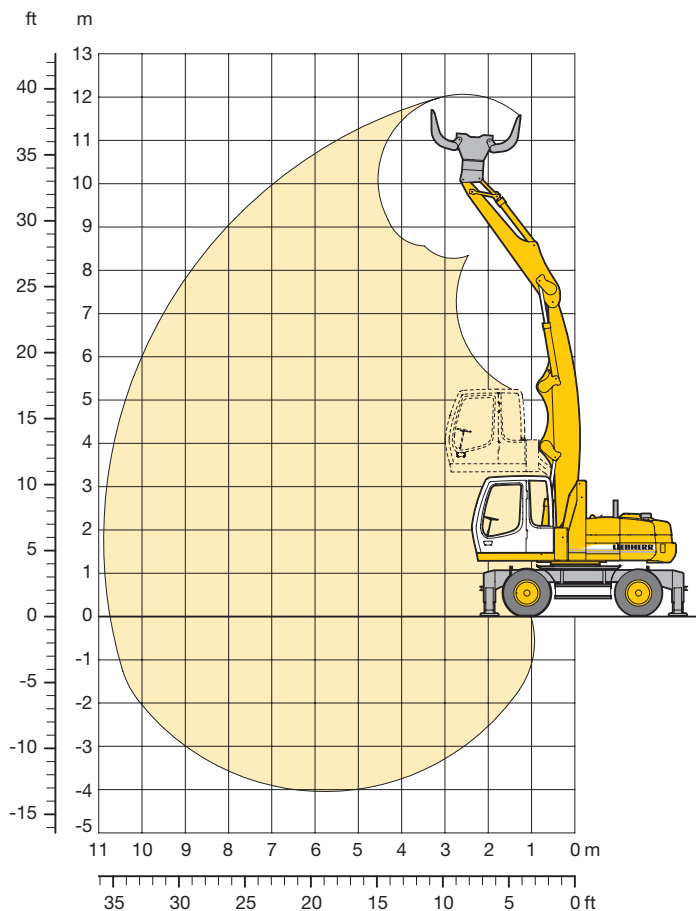
Height (m)	Undercarriage	Radius of load from centerline of machine (m)			
		3,0	4,5	6,0	7,5
7,5	Stabilizers raised		3,4# (3,4#)		
	Blade + 2 pt. down		3,4# (3,4#)		
	4 pt. outriggers down		3,4# (3,4#)		
6,0	Stabilizers raised		3,8# (3,8#)	3,0 (3,2#)	
	Blade + 2 pt. down		3,8# (3,8#)	3,2# (3,2#)	
	4 pt. outriggers down		3,8# (3,8#)	3,2# (3,2#)	
4,5	Stabilizers raised		4,5# (4,5#)	3,0 (4,1#)	
	Blade + 2 pt. down		4,5# (4,5#)	4,1# (4,1#)	
	4 pt. outriggers down		4,5# (4,5#)	4,1# (4,1#)	
3,0	Stabilizers raised	7,9 (11,6#)	4,5 (7,1#)	3,0 (4,5)	2,0 (2,8#)
	Blade + 2 pt. down	11,6# (11,6#)	7,3 (8,0#)	4,7 (5,6#)	2,8# (2,8#)
	4 pt. outriggers down	11,6# (11,6#)	8,0# (8,0#)	5,6# (5,6#)	2,8# (2,8#)
1,5	Stabilizers raised	7,9 (12,1#)	4,4 (6,9#)	2,9 (4,5)	2,0 (3,1)
	Blade + 2 pt. down	12,1# (12,1#)	7,2 (8,8#)	4,7 (6,4#)	3,2 (3,4#)
	4 pt. outriggers down	12,1# (12,1#)	8,6 (8,8#)	5,6 (6,4#)	3,4# (3,4#)
0	Stabilizers raised	7,8 (13,1#)	4,3 (7,1#)	2,7 (4,4)	1,9 (2,8#)
	Blade + 2 pt. down	13,1# (13,1#)	7,3 (8,8#)	4,5 (6,5#)	2,8# (2,8#)
	4 pt. outriggers down	13,1# (13,1#)	8,6 (8,8#)	5,5 (6,5#)	2,8# (2,8#)
- 1,5	Stabilizers raised	7,4 (13,6#)	4,1 (6,8)	2,6 (4,3)	
	Blade + 2 pt. down	14,0 (14,2#)	7,1 (9,0#)	4,4 (6,1#)	
	4 pt. outriggers down	14,2# (14,2#)	8,8# (9,0#)	5,4 (6,1#)	
- 3,0	Stabilizers raised	7,3 (13,5)	3,9 (6,5)		
	Blade + 2 pt. down	14,0# (14,0#)	6,8 (7,8#)		
	4 pt. outriggers down	14,0# (14,0#)	7,8# (7,8#)		

The lift capacities are stated in metric tonnes (t) on the lifting gear's stick tip, and can be lifted 360° on firm, level supporting surface with closed steering axle. Capacities shown in brackets are valid when the undercarriage is in longitudinal position and are established over the steering axle (travel position) with stabilizers raised, and over rigid axle with stabilizers down. Capacities are valid with adjusting cylinder(s) in optimal position. Indicated loads are based on ISO 10567 standard and do not exceed 75 % of tipping or 87 % of hydraulic capacity (#). Lift capacities do not include the weight of a grapple, clamshells, magnet or other lifting devices, which must be deducted from the above figures. Lifting capacity of the excavator is limited by machine stability, hydraulic capacity and maximum permissible load of the load hook.

According to European Standard, EN 474-5: In the European Union excavators have to be equipped with an overload warning device and automatic check valves on the hoist cylinders, when they are used for lifting operations which require the use of lifting accessories.

Attachment

with Ind.-Type Gooseneck Boom 5,50 m, Ind.-Type Stick 3,50 m and Sorting Grab



Attachment Envelope

1 with industrial stick 3,50 m and sorting grab

Operating Weight

Operating weight includes basic machine A 316 with 4 pt. outriggers, hydr. adjustable operator cab, 8 solid tires plus spacer rings and industrial-type gooseneck boom 5,50 m.

with sorting grab	Weight
on industrial-type gooseneck boom 3,50 m with backhoe kinematic	21000 kg

Lift Capacities

Industrial Stick 3,50 m

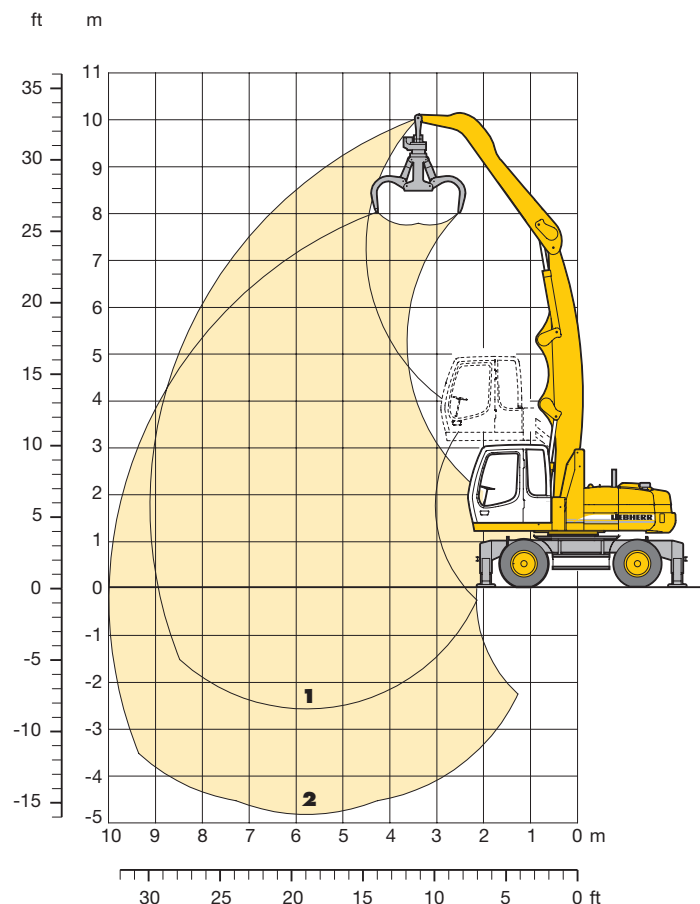
Height (m)	Undercarriage	Radius of load from centerline of machine (m)				
		3,0	4,5	6,0	7,5	9,0
9,0	Stabilizers raised 4 pt. outriggers down		4,6 (5,6#) 5,6# (5,6#)			
7,5	Stabilizers raised 4 pt. outriggers down		4,8 (7,1#) 7,1# (7,1#)	2,9 (4,5) 5,8# (5,8#)		
6,0	Stabilizers raised 4 pt. outriggers down		4,7 (7,3#) 7,3# (7,3#)	2,9 (4,5) 5,8 (5,9#)	2,0 (3,1) 3,9 (4,7#)	
4,5	Stabilizers raised 4 pt. outriggers down	8,5 (11,0#) 11,0# (11,0#)	4,4 (7,1) 7,8# (7,8#)	2,8 (4,4) 5,6 (6,0#)	1,9 (3,0) 3,9 (4,9#)	
3,0	Stabilizers raised 4 pt. outriggers down		4,0 (6,6) 8,4# (8,4#)	2,6 (4,2) 5,4 (6,2#)	1,8 (3,0) 3,8 (4,8#)	
1,5	Stabilizers raised 4 pt. outriggers down		3,6 (6,1) 8,1 (8,5#)	2,4 (4,0) 5,2 (6,1#)	1,7 (2,8) 3,7 (4,6#)	
0	Stabilizers raised 4 pt. outriggers down		3,3 (5,8) 7,6# (7,6#)	2,3 (3,8) 5,0 (5,6#)	1,6 (2,8) 3,6 (4,1#)	
-1,5	Stabilizers raised 4 pt. outriggers down		3,2 (5,7) 5,7# (5,7#)	2,2 (3,7) 4,4# (4,4#)	1,6 (2,7) 3,0# (3,0#)	

The lift capacities are stated in metric tonnes (t) on the lifting gear's stick tip, and can be lifted 360° on firm, level supporting surface with closed steering axle. Capacities shown in brackets are valid when the undercarriage is in longitudinal position and are established over the steering axle (travel position) with stabilizers raised, and over rigid axle with stabilizers down. Indicated loads are based on ISO 10567 standard and do not exceed 75 % of tipping or 87 % of hydraulic capacity (#). Lift capacities do not include the weight of a grapple, clamshells, magnet or other lifting devices, which must be deducted from the above figures. Lifting capacity of the excavator is limited by machine stability, hydraulic capacity and maximum permissible load of the load hook.

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Attachment

with Ind.-Type Gooseneck Boom 5,50 m, Ind.-Type Stick 4,00 m and Grapple Model GM 55



Attachment Envelope

- 1** with industrial stick 4,00 m
- 2** with industrial stick 4,00 m and grapple model GM 55

Operating Weight

Operating weight includes basic machine A 316 with 4 pt. outriggers, hydr. adjustable operator cab, 8 solid tires plus spacer rings and industrial-type gooseneck boom 5,50 m.

with grapple model GM 55/0,40 m ³	Weight
on industrial stick 4,00 m	19710 kg

Lift Capacities

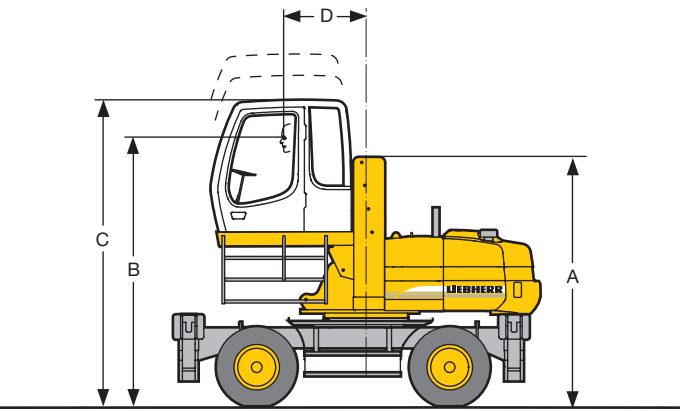
Industrial Stick 4,00 m

Height (m)	Undercarriage	Radius of load from centerline of machine (m)				
		3,0	4,5	6,0	7,5	9,0
9,0	Stabilizers raised		4,9 (4,9#)			
	4 pt. outriggers down		4,9# (4,9#)			
7,5	Stabilizers raised			3,1 (4,7)		
	4 pt. outriggers down			5,1# (5,1#)		
6,0	Stabilizers raised		4,9 (7,0#)	3,1 (4,7)	2,1 (3,2)	
	4 pt. outriggers down		7,0# (7,0#)	5,8# (5,8#)	4,1 (4,4#)	
4,5	Stabilizers raised		4,7 (7,3)	3,0 (4,6)	2,0 (3,2)	
	4 pt. outriggers down		7,5# (7,5#)	5,8 (6,0#)	4,0 (4,9#)	
3,0	Stabilizers raised	7,8 (12,5#)	4,2 (6,8)	2,8 (4,3)	2,0 (3,1)	1,4 (2,3)
	4 pt. outriggers down	12,5# (12,5#)	8,3# (8,3#)	5,6 (6,2#)	3,9 (5,0#)	3,0 (3,3#)
1,5	Stabilizers raised		3,8 (6,3)	2,5 (4,1)	1,8 (3,0)	1,4 (2,3)
	4 pt. outriggers down		8,3 (8,7#)	5,3 (6,3#)	3,8 (4,8#)	2,9 (3,6#)
0	Stabilizers raised	6,0 (6,9#)	3,5 (5,9)	2,4 (3,9)	1,8 (2,9)	
	4 pt. outriggers down	6,9# (6,9#)	7,9 (8,1#)	5,1 (6,0#)	3,7 (4,5#)	
-1,5	Stabilizers raised		3,3 (5,8)	2,3 (3,8)	1,7 (2,8)	
	4 pt. outriggers down		6,6# (6,6#)	5,0# (5,0#)	3,6# (3,6#)	

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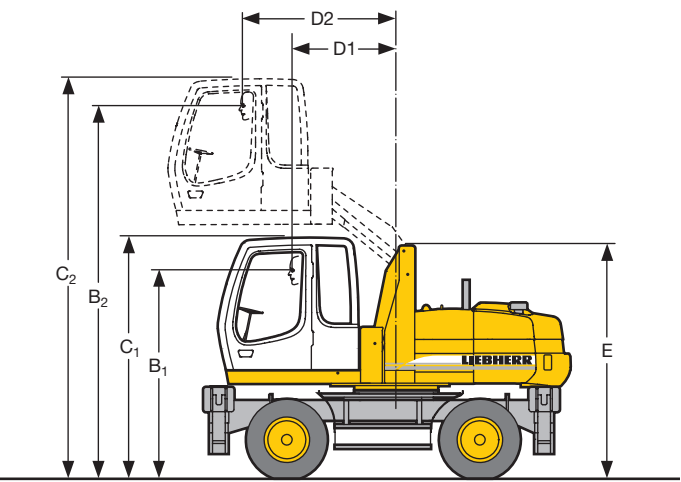
Choice of Cab Elevations



Mechanical Cab Elevation

Height	mm	900	1200	1500
A	mm	3250	3250	3250
B	mm	3520	3225	4130
C	mm	4025	4330	4635
D	mm	1065	1110	1155

A rigid cab elevation has a fixed eye level height. For a lower transport height the shell of the cab can be removed. The overall height is then dimension A.

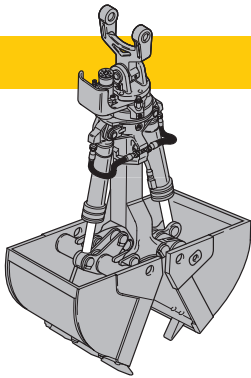


Hydraulic Cab Elevation

B1		2670 mm
B2		4770 mm
C1		3160 mm
C2		5260 mm
D1		1365 mm
D2		2015 mm
E		3055 mm

The parallelogram cab raiser allows the operator to choose his eye level between dimensions B1 and B2. For a transport height lower than C1 the shell of the cab can be removed. The overall height is then dimension E.

Variety of Tools

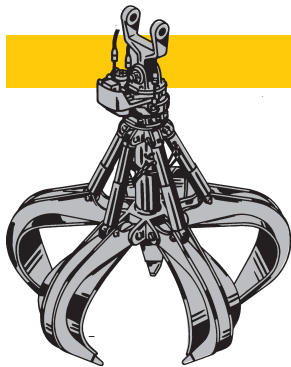


Shells for Loose Material

Clamshell Model 10 B

Shells for loose material with cutting edge (without teeth)

Cutting width of shells	mm	1000	1500	1800
Capacity	m ³	1,00	1,50	1,80
For loose material, specific weight up to	t/m ³	1,5	1,5	1,5
Total weight	kg	1000	1130	1250



Multiple Tine Grapples

open tines

semi-closed tines

closed tines

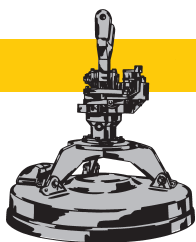
Grapple Model GM 55 (5 tines)

Capacity	m ³	0,40	0,40	0,40
Weight	kg	955	1030	1080



Crane Hook with Suspension

Max. load	t	12,5
Height with suspension	mm	1000
Total weight	kg	130



Electro Magnet with Suspension

Generator	kW	10
Dia of magnet	mm	1100
Height with suspension	mm	1470
Total weight	kg	1330

For further information see "Attachment-Information – Liebherr Hydraulic Clamshells and Grapples".

Equipment



Undercarriage

	s	o
Two circuit travel brake with accumulator	•	
Travel motor protection		•
Outrigger cylinder rod guards		•
Creeper speed electrically switchable from cab	•	
New tires	•	
Service free parking brake	•	
Independent outrigger control		•
Choice of tires		•
Auto check valve directly on each stabilizer cylinder	•	
Proportional power steering with mechanical back up	•	
Customized colors		•
Two lockable storage boxes	•	
Lockable storage box additional		
Two-speed power shift transmission	•	



Upper Carriage

	s	o
Electric fuel tank filler pump		•
Maintenance-free swing brake lock	•	
Handrails, Non slip surfaces	•	
Main switch for electric circuit	•	
Engine hood with lift help	•	
Pedal controlled positioning swing brake	•	
Reverse travel warning system		•
Sound insulation	•	
Customized colors		•
Pin lock upper/lower	•	
Maintenance-free HD-batteries	•	
Extended tool kit		•
Lockable tool box	•	
Tool kit	•	



Hydraulics

	s	o
Hydraulic tank shut-off valve	•	
Extra hydr. control for hydr. swivel	•	
Pressure compensation	•	
Hook up for pressure checks	•	
Pressure storage for controlled lowering of attachments with engine turned off	•	
Filter with partial micro filtration (5 µm)	•	
Electronic pump regulation	•	
Stepless mode system (ECO)	•	
Flow compensation	•	
Four mixed modes, can also be adjusted	•	
Full flow micro filtration		•
Bio degradable hydraulic oil	•	
Pressure compensation		
Flow summation		
Additional hydraulic circuits		•



Engine

	s	o
Turbo charger	•	
Direct injection	•	
Cold start aid		•
Sensor controlled engine idling	•	
Air filter with pre-cleaner main- and safety element	•	



Operator's Cab

	s	o
Storage tray	•	
Displays for engine operating condition	•	
Mechanical hour meters, readable from outside the cab	•	
Roof hatch	•	
All-round adjustable roof vent		
6-way adjustable seat	•	
Airpressure operator seat with heating and head-rest		•
Seat and consoles independently adjustable	•	
Extinguisher		•
FOPS		•
Removable customized foot mat	•	
Dome light	•	
Inside rear mirror	•	
Hydraulic cab elevation		•
Mechanical cab elevation		•
Cab heater with defroster	•	
Cloth hook	•	
Air conditioning		•
Electric cool box		•
Steering wheel adjustable	•	
Bullet proof window (fixed installation – can not be opened)		•
Stereo radio		•
Preparation for radio installation		•
Rain hood over front window opening	•	
Beacon		•
All tinted windows	•	
Door with sliding window	•	
Optical and acoustical warning if outriggers are not fully retracted		•
Auxiliary heating		•
Sun shade	•	
Sun roller blind	•	
Electronic drive away lock		•
Wiper/washer	•	
Cigarette lighter and ashtray	•	
Additional flood lights		•



Attachment

	s	o
Flood lights	•	
Hydr. lines for clam operation in stick	•	
Industrial-type gooseneck sticks with remote hydraulic pin puller		•
Sealed pivots	•	
Safety lift hook	•	
Liebherr line of clams		•
Safety check valves on hoist cylinder		•
Safety check valves on stick cylinder		•
Hose quick connection	•	
Centralized lube point (uppercarriage/attachment)	•	
Manual/hydraulic quick change tool adapter		•
Customized colors		•
Special buckets and other tools		•
Stick cylinder limit switch	•	
Overload warning device		•
Two way valves for bucket/clam use	•	
Locking of connections for clam operation	•	
Cylinders with shock absorber	•	

S = Standard, O = Option

Options and/or special attachments, supplied by vendors other than Liebherr, are only to be installed with the knowledge and approval of Liebherr to retain warranty.

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