Product Information: Crawler Excavator

R 960 SME

Litronic®



LIEBHERR

Crawler Excavator R 960 SME Super Mass Excavation

Safety

- Panoramic visibility with no obstructions and rear and side view monitoring cameras
- Retractable console for easy and safe access to the cab
- Emergency exit via the rear cab window, whatever the excavator's configuration
- Impact resistant windshield available as an option

Equipment

- Reinforced boom and sticks with protection on the inner face for a longer service life
- Larger diameter bucket and stick cylinders, with kinematic systems adapted to handle higher breakout and digging forces
- Different additional protection kits available as an option, for optimum adaptation to each specific application

Maintenance

- Maintenance points on the cool side of the engine
- Quick and easy cleaning and visual inspection
- Complementary radiators fitted on hinges
- Engine oil, hydraulic oil, fuel and urea (diesel exhaust fluid) levels visible on the display
- Shut-off valve to quickly and easily interrupt the circulation of oil between the tank and the hydraulic system





Comfort

- Spacious, air-conditioned work space
- Airsprung seat with vertical and longitudinal damping
- Userfriendly high resolution
 7" colour touchscreen
- New LED lighting as standard

Engine

- New engine that conforms with the Stage V European exhaust emissions standard
- Automatic engine idling/speed increase, controlled via joystick sensorssensors in the joysticks

Undercarriage

- Higher category excavator undercarriage
- Double grouser, chamfered track pads as standard for heavy duty applications
- Dual-pivot carrier rollers for increased reliability and long-term durability
- Two-tooth sprocket for a longer service life

Technical Data

Engine

Rating per ISO 9249	250 kW (340 HP) at 1,800 RPM
Torque	2,280 Nm at 1,000 RPM
Model	Liebherr D936 A7
Туре	6 cylinder in-line
Bore	130 mm
Stroke	150 mm
Displacement	10.5
Engine operation	4-stroke diesel
	Common-Rail, monoturbo
Exhaust gas treatment	Stage V
_	DOC + DPF + SCR
	Passive regeneration by thermo management
Cooling system	Water-cooled and integrated motor oil cooler,
	after-cooled and fuel cooled
Air cleaner	Dry-type air cleaner with pre-cleaner, primary
	and safety elements
Fuel tank	734
Urea tank	901
Electrical system	
Voltage	24 V
Batteries	2 x 180 Ah/12 V
Starter	24 V/7.8 kW
Alternator	Three-phase current 28 V/140 A
Engine idling	Sensor controlled
Motor management	Connection to the integrated excavator system controlling via CAN-BUS to the economical utilisation of the service that is available.
	utilisation of the service that is available

The controlling is conducted via the integrated excavator system technology, input and output modules, communicated via the CAN-BUS with the elec-

tronic central unit	
Power distribution	Via control valves in single block with integrated safety valves
Flow summation	To boom and stick
Closed-loop circuit	For uppercarriage swing drive
Servo circuit	
Equipment and swing	Proportional via joystick levers
Travel	 Proportional control via foot pedals or removable levers Speed pre-selection
Additional functions	Proportional regulation via foot pedals or mini- joystick

Hydraulic System

E Hydraulic Sys	Stelli
Hydraulic pumps	
For equipment	Liebherr, variable displacement, swashplate
and travel drive	double pump
Max. flow	2 x 380 l/min.
Max. pressure	350 bar
For swing drive	Reversible, variable displacement, swashplate pump, closed-loop circuit
Max. flow	201 l/min.
Max. pressure	375 bar
Pump regulation	Electro-hydraulic with electronic engine speed sensing regulation, pressure compensation, flow compensation
Hydraulic tank	380
Hydraulic system	743
Hydraulic oil filter	2 full flow filters in return line with integrated fine filter area (5 µm)
Cooling system	Compact cooler for water cooler, after-cooler, fuel cooler and transmission pump oil, sand-wiched with cooler for oil and condenser of air-conditioning with hydrostatically controlled fan drives
MODE selection	Adjustment of engine and hydraulic performance via a mode pre-selector to match application, e.g. for especially economical and environmentally friendly operation or for maximum digging performance and heavy-duty jobs
RPM adjustment	Stepless adjustment of engine output via RPM at each selected mode
Tool Control	10 preadjustable pump flows and pressures for add-on attachments

Swing Drive

Liebherr swashplate motor, shockless and anti- reaction
Liebherr compact planetary reduction gears
Liebherr, sealed race ball bearing swing ring, internal teeth
0 – 5.8 RPM stepless
160 kNm
Wet multi-disc (spring applied, pressure released)

Operator's Cab

Operator's Ca	ID .
Cab	Windscreen, totally or partially retractable (only upper part), under cab roof, work headlights integrated in the ceiling, a door with a sliding window (can be opened on both sides), large storing box and several stowing possibilities, shock-absorbing suspension, sounddamping insulating, tinted laminated safety glass, separate window shades for the sunroof window and windscreen, 12 V plug, storage bins, lunchbox, cup holder
Operator's seat	Liebherr-Comfort seat, airsprung with automatic weight adjustment, vertical and longitudinal seat damping including consoles and joysticks. Seat and armrests adjustable separately and in combination, seat heating as standard
Control system	Arm consoles, swinging with the seat
Operation and displays	Large high-resolution colour display with intui- tive operation via touchscreen, video, versatile adjusting, control and monitoring facilities, e.g. climate control, implement and attachment parameters
Air-conditioning	Standard automatic air-conditioning, ambient air function, fast de-icing and demisting at the press of a button, air vents can be operated via a menu. Ambient air and fresh air filters can be easily replaced and are accessible from the outside. Heating-cooling unit, designed for extreme outside temperatures, sensors for solar radiation, inside and outside temperatures. The air conditioning system contains fluorinated greenhouse gases
Refrigerant	R134a
Global warming potential	1,430
Quantity at 25 °C*	1,260 g
CO ₂ equivalent	1.80 t
Vibration emission**	
Hand/arm vibrations	< 2.5 m/s², according with ISO 5349-1:2001
Whole-body vibrations	< 0.5 m/s ²
Measuring inaccuracy	According with standard EN 12096:1997

Undercarriage

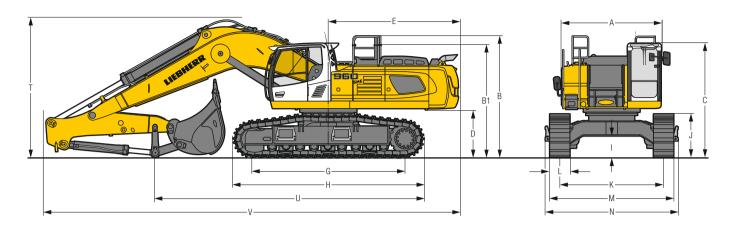
S-HD	Gauge 3,100 mm
Drive	Liebherr swashplate motor with integrated brake valve
Transmission	Liebherr compact planetary reduction gear
Maximum travel speed	Low range 3.0 km/h
	High range 3.6 km/h
Net drawbar pull	478 kN
on crawler	
Track components	D8K, maintenance-free
Track rollers/	9/2
Carrier rollers	
Tracks	Sealed and greased
Track pads	Double grouser
Holding brake	Wet multi-disc (spring applied, pressure
	released)
Brake valves	Integrated into travel motor
Lashing eyes	Integrated

Fauinment

a Equipment	
Туре	Combination of resistant steel plates and cast steel components
Hydraulic cylinders	Liebherr cylinders with seal and guidance systems and shock protection
Bearings	Sealed, low maintenance
Lubrication	Automatic central lubrication system (except link and tilt geometry)
Hydraulic connections	Pipes and hoses equipped with SAE split-flange connections
Buckets	Standard equipped with Liebherr tooth system

 $^{^{\}star}$ Valid for standard machine without operator's cab elevation and without height adjustable cab ** For the risk assessment according to 2002/44/EC see ISO/TR 25398:2006

Dimensions



				mm
Α	Uppercarriage width			2,970
В	Uppercarriage height			3,640
B1	Uppercarriage height (handrails folded)			3,390
C	Cab height		3,420	/3,615*
D	Counterweight ground clearance			1,440
E	Rear-end length			3,900
G	Wheelbase			4,575
Н	Undercarriage length			5,695
1	Undercarriage ground clearance			655
J	Track height			1,315
K	Track gauge			3,100
L	Track pad width	500	600	750
M	Width over tracks	3,710	3,710	3,850
N	Width over steps	3,970	3,970	3,970
+ 11	F000			

^{*} with FOPS top guard

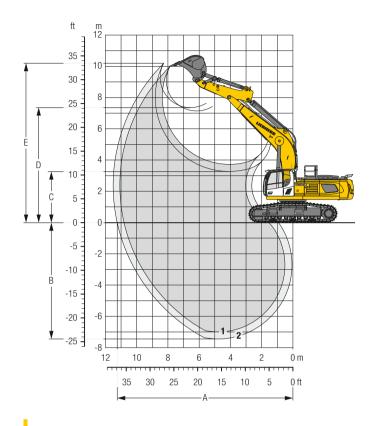
		Stick length	Mono boom SME 6.70 m direct mounting
		m	mm
T	Boom height	2.35 SME	4,200
		2.80 SME	4,200
U	Length on ground	2.35 SME	8,050
		2.80 SME	7,500
٧	Overall length	2.35 SME	12,400
		2.80 SME	12,400
	Bucket		3.25 m ³

Transport Dimensions removable elements disassembled

	Stick	Mono boom SME 6	.70 m		
	m	mm			
Pad width		500	600	750	
Transport width		3,970	3,970	3,970	
Transport length			12,400		
Transport height	2.35 SME		4,200		
	2.80 SME		4,200		
Bucket			3.25 m ³		

Backhoe Bucket

with Mono Boom SME 6.70 m and Counterweight 11.0 t



Digging Envelope

without quick coupler		1	2
Stick length	m	2.35	2.80
		SME	SME
A Max. reach at ground level	m	10.80	11.25
B Max. digging depth	m	7.00	7.45
C Min. dumping height	m	3.70	3.25
D Max. dumping height	m	7.15	7.35
E Max. cutting height	m	10.00	10.20

Forces

without quick coupler		1	2
Stick digging force (ISO 6015)	kN	321	288
Bucket digging force (ISO 6015)	kN	350	350
Stick digging force (SAE J1179)	kN	302	273
Bucket digging force (SAE J1179)	kN	304	304

Operating Weight and Ground Pressure

The operating weight includes the basic machine with counterweight 11.0 t, mono boom SME 6.70 m, stick SME 2.80 m and HD bucket 3.25 m^3 (3,400 kg).

Undercarriage			S-HD	
Pad width	mm	500	600	750
Weight	kg	60,000	60,700	61,650
Ground pressure	kg/cm ²	1.21	1.02	0.83

Buckets Machine stability per ISO 10567* (75% of tipping capacity)

	Cutting width	Capacity ISO 7451	Weight	SME-Eq (with track p	ercarriage uipment pads 600 mm) ngth (m)
	mm	m ³	kg	2.35	2.80
	2,100	3.25	3,400	A	A
후	2,250	3.50	3,550	A	
_	2,100	3.70	3,500		
2	1,950	3.00	3,800	A	<u> </u>
Ä	2,100	3.25	4,000	A	
Ξ	2,100	3.50	4,200		

^{*} Indicated loads are based on ISO 10567, at maximum reach, and may be swung 360° on firm and even ground

Max. material weight $\blacktriangle = \le 2.0 \text{ t/m}^3$, $\blacksquare = \le 1.8 \text{ t/m}^3$, $\blacksquare = \le 1.5 \text{ t/m}^3$

¹⁾ HD bucket with teeth Z 70 (appropriate for materials above classification 6, according to VOB, Section C, DIN 18300)

²⁾ HDV bucket with teeth Z 70 (appropriate for materials above classification 6, according to VOB, Section C, DIN 18300) Other buckets available upon request

Lift Capacities

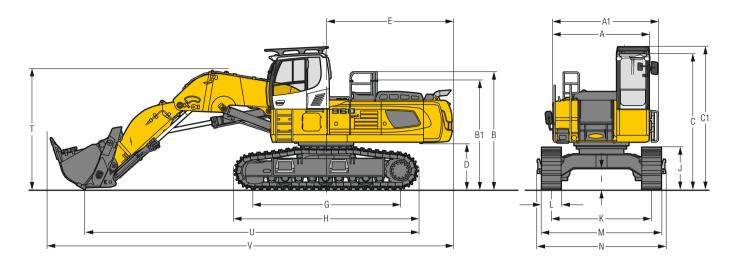
with Mono Boom SME 6.70 m, Counterweight 11.0 t and Track Pads 600 mm

age	‡	3.0) m	4.5	5 m	6.0) m	7.5	5 m	9.0) m		THE STATE OF THE S		age	1	3.0) m	4.5	m	6.0	m	7.5	5 m	9.0	m		THE PERSON NAMED IN COLUMN TO PE	5
carriage	m	- -5	<u>L</u>	5	ď	5	ď	<u></u> 3	ď		<u>L</u>	5	<u>L</u>	m	Under- carriage	m	5	<u>L</u>	5	<u>L</u>	5	ď	5	<u>L</u>	5	<u>L</u>	5	ď	r
	9.0											11.7*	11.7*	6.3		9.0											10.1*	10.1*	6
	7.5							11.0*	11.0*			11.0*	11.0*	7.6		7.5							10.1*	10.1*			9.2*	9.2*	8
	6.0					12.5*	12.5*	11.1*	11.1*			10.8*	10.8*	8.5		6.0							10.5*	10.5*			8.9*	8.9*	8
	4.5			20.5*	20.5*	14.4*	14.4*	11.9*	11.9*			10.2	10.8*	9.0		4.5			18.6*	18.6*	13.6*	13.6*	11.3*	11.3*	10.2*	10.2*	8.9*	8.9*	(
	3.0					16.3*	16.3*	12.9*	12.9*	9.9	11.1*	9.5	11.0*	9.2	문	3.0					15.6*	15.6*	12.4*	12.4*	9.9	10.7*	8.9	9.2*	9
5	1.5					16.8	17.6*	12.4	13.6*	9.7	11.4*	9.4	11.2*	9.2	<u>-</u>	1.5			13.9*	13.9*	16.9	17.1*	12.4	13.3*	9.6	11.1*	8.8	9.8*	!
	0			20.2*	20.2*	16.5	17.8*	12.1	13.9*			9.7	11.4*	8.9		0			23.3*	23.3*	16.4	17.7*	12.1	13.8*	9.5	11.3*	9.0	10.8*	1
	-1.5	19.7*	19.7*	22.2*	22.2*	16.5	17.2*	12.1	13.5*			10.6	11.7*	8.4		-1.5	20.2*	20.2*	23.0*	23.0*	16.3	17.4*	12.0	13.6*			9.7	11.0*	
	-3.0	24.3*	24.3*	19.7*	19.7*	15.4*	15.4*					11.7*	11.7*	7.4		-3.0	27.3*	27.3*	20.8*	20.8*	16.0*	16.0*	12.2	12.3*			11.2*	11.2*	ľ
	-4.5			15.0*	15.0*							11.0*	11.0*	6.0		-4.5	21.6*	21.6*	16.8*	16.8*	12.7*	12.7*					10.9*	10.9*	

The load values are quoted in tons (t) at stick end (without bucket), and may be swung 360° on firm and even ground. Adjacent values are valid for the undercarriage when in the longitudinal position. Capacities are valid for 600 mm wide track pads. Indicated loads are based on ISO 10567 standard and do not exceed 75% of tipping or 87% of hydraulic capacity (indicated via *). Without bucket cylinder, link and lever the lift capacities will increase by 950 kg. Lifting capacity of the excavator is limited by machine stability and hydraulic capacity.

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

Dimensions Front Shovel



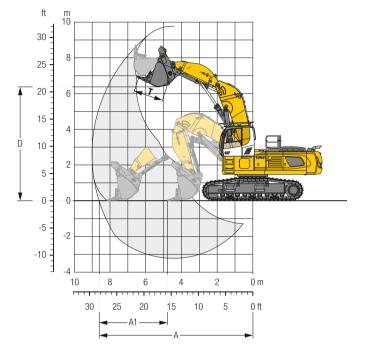
		mm
Α	Uppercarriage width	2,970
A1	Uppercarriage width with catwalks	3,030
В	Uppercarriage height	3,640
B1	Uppercarriage height (handrails folded)	3,390
C	Cab height	4,220
C1	Cab height with FOPS top guard	4,420
D	Counterweight ground clearance	1,440
E	Rear-end length	3,900
G	Wheelbase	4,575
Н	Undercarriage length	5,695

			mm
1	Undercarriage ground clearance		655
J	Track height		1,315
K	Track gauge		3,100
L	Track pad width	500 600	750
M	Width over tracks	3,710 3,710	3,850
N	Width over steps	3,970 3,970	3,970
T	Boom height		3,750
U	Length on ground		10,350
V	Overall length		12,450

Transport Dimensions removable elements disassembled

		Shovel Equipment mm	
Pad width	500	600	750
Transport width	3,970	3,970	3,970
Transport length		12,450	
Transport height		4,420	
Shovel		3.50 m ³	

Front Shovel



Digging Envelope

A Max. reach at ground level	m	8.60
A1 Max. crowd length	m	3.40
D Max. dumping height	m	6.35
T Rucket opening width	mm	1 650

Forces

Ī	Max. crowd force	kΝ	435
	Max. crowd force at ground level	kN	275
	Max. breakout force	kΝ	355

Operating Weight and Ground Pressure

The operating weight includes the basic machine with cab elevation, shovel equipment and front shovel 3.50 m³ (6,150 kg), level II.

Undercarriage		S-	HD
Pad width	mm	500	600
Weight	kg	62,150	62,850
Ground pressure	kg/cm ²	1.25	1.05

Front Shovels

g _	city 451	Ħ	ķi	S-HD-Undercarriage
Cutti	Capa ISO 7	Weig	Wear	Shovel Equipment
mm	\mathbf{m}^3	kg		
2,450	3.50	5,650	1	•
2,450	3.50	6,150	Ш	•
2,450		6,600	III	

Level I: For non-abrasive materials, such as limestone without flint inclusion, shot material or easily breakable rock, i.e., deteriorated rock, soft limestone, shale, etc.

Level II: For pre-blasted heavy rock, or deteriorated, cracked material (classification 3 to 4, accord. to DIN 18300)

Level III: For highly-abrasive materials such as rock with a high silica content, sandstone etc.

Max. material weight $\blacksquare = \le 1.8 \text{ t/m}^3$

Serial Equipment

Undercarriage

Lashing eyes

Sprocket with dirt ejector

Track and carrier rollers, sealed and lifetime-lubricated

Travel motor housing protection

Undercarriage S-HD

Uppercarriage

Access platforms without protruding parts

Anti-skid surfaces

Automatic swing brake lock

Centralised lubrication system (automatic)

Counterweight heavy 11.0 t

DEF tank filling indicator

DEF tank lockable access hatch

Engine hood with gas spring opening

Extended tool set including tool box

Handrails

Lockable fuel tank cap with padlock

Lockable service doors

Lockable storage box

Main switch, manual, lockable

Protection grid on radiator fan

Sound insulation

Swing-out radiators



Hydraulic System

Dedicated swing circuit

Filter with integrated fine filters

Hydraulic pressure measuring ports

Hydraulic tank shut-off valve Magnetic rod

Pressure accumulator for controlled lowering of equipment with engine turned off



Engine

Air filter with automatic dust ejector

Automatic engine idling/speed increase, controlled via joystick sensors

Common-Rail injection system Exhaust gas after-treatment system - DOC + DPF + SCR

Fixed geometry turbocharger

Fuel fine filter

Fuel pre-filter and water separator

Fuel priming pump

Intercooler

Power Pack EU Stage V

Stepless adjustable engine speed



Operator's Cab

7" multifunction colour touchscreen

Air conditioning, automatic, tri-zone, controlled via display

Armrests adjustable in width, height and inclination

Bottle holder

Cab air filters housing, accessible from ground level

Cab door sliding windows

Cigarette lighter

Coat hook

DEF consumption on touchscreen

DEF level on touchscreen

Electric socket in cabin (12 V)

Electric socket in cabin (24 V)

Emergency hammer

Engine oil level on touchscreen

Footrest

Fuel consumption on touchscreen

Fuel level on touchscreen

Interior lighting

Laminated right hand side window

LiDAT Plus (Liebherr data transfer system) *

Mechanical hour meters, visible from ground level

Movement priority between swing and boom, adjustable via touchscreen

Rain hood over front window opening

Rearview mirror

Rear view monitoring camera

Rear window emergency exit

Right hand side view monitoring camera

Roll-down sun blinds for windscreen and roof window

Rubber floor mat, fixed on floor and removable

Storage box

Storage nets

Storage spaces

Tiltable console left Tinted windows

Visco-elastic damping

Windscreen wiper and washer

Work mode selector



Equipment

Anti-drift system boom cylinders

Anti-drift system stick cylinder

Boom bottom protection

Boom cylinders regeneration

Pipe fracture safety valves for boom cylinders Pivot points made of cast steel

SAE split flanges on high pressure lines

Stick bottom protection

Stick cylinder regeneration

^{*} optionally extendable after one year

Equipment Standard/Option

Undercarriage

Chain guide 3 pieces	•
Chain guide 4 pieces	+
Chain guide full length	+
Reinforced cover and base plate for undercarriage centre section	+
Special painting	+
Track pads double grouser 500 mm, chamfered	+
Track pads double grouser 600 mm, chamfered	•
Track pads double grouser 750 mm, chamfered	+
Travel drive gearbox protection	+
Undercarriage protection plate for drop-ball application	+

Uppercarriage

Air pre-filter with cyclonical dust trap	+
Boxing ring	+
Catwalk tiltable front left	+
Catwalks tiltable left and right	+
Electric socket on uppercarriage (24 V)	+
Fixed cab riser 800 mm	+
Headlight on uppercarriage, lateral left, LED+, 1 piece	+1)
Headlight on uppercarriage, lateral right, LED+, 1 piece	+1)
Headlights on uppercarriage, front, LED, 2 pieces, protections included	•1)
Headlights on uppercarriage, front, LED+, 2 pieces, protections included	+1)
Headlights on uppercarriage, rear, LED+, 2 pieces	+1)
Lighting for tank area 1)	+
Lighting for uppercarriage access 1)	+
Pre-heating system for fuel	+
Radiator fine mesh protection grid	+
Reversible fan drive	+
Skyview 360°	+
Special painting	+
Swing ring and lubrication hoses protection	+
Tank refilling pump fuel	+
Uppercarriage bottom and side protection	+
Wiggins coupling for fuel	+

Hydraulic System

Bypass filter for hydraulic oil	+
Liebherr hydraulic oil	•
Liebherr hydraulic oil, adapted for extreme climate conditions	+
Liebherr hydraulic oil, biodegradable	+

Engine

Automatic engine shutdown after idling	+
Engine shut-down with overrun	+
Lighting for engine compartment 1)	+

Equipment Standard/Option

Operator's Cab

Operator s can	
2" seat belt with retractor	•
3" seat belt with retractor, orange colour	+
4-points seat belt	+
Acoustic travel alarm deactivatable	+
Auxilary heater programmable	+
Bottom windscreen wiper	+
Cool box (12 V)	+
Dark tinted windows	+
Electrically adjustable and heated outside rear-view mirrors	+
Electronic immobiliser	+
Emergency stop in cab	+
FGPS front guard	+
FGPS front guard tiltable	+
Filter for hydraulic hammer return flow	+
Fire extinguisher	+
First-aid box	+
Follow me home	+
FOPS top guard	+
Handrests elevated for joysticks	+
Headlights on cab, front, LED, 2 pieces	● 1)
Headlights on cab, front, LED+, 2 pieces	+1)
Headlights on cab roof, front, LED+, 2 pieces	+1)
High pressure circuit switchable on pedals or mini-joystick	+
High pressure circuit with Tool Control (20 attachment adjustments on display)	+
Impact resistant one-piece windscreen	+
Impact resistant roof window	+
Integral protection guard	+
Laminated roof window	•
Lighting for cabin access 1)	+
Luminosity control (LED+ headlights) 1)	+
Medium pressure circuit	+
Mini-joysticks proportional	+
Movement restriction for boom	+
Movement restriction for stick	+
Operator seat Comfort	•
Operator seat Premium	+
Overload warning system	+
Radio Comfort	+
Radio pre-installation	•
Retractable laminated two-piece windscreen	•
Roof sun shield	+
Roof window wiper	+
Rotating beacon on cabin, LED, 1 piece	+
Seat belt reminder	+
Shortkey button on joystick configurable	•
Special painting	+
Sun visor	+
Windscreen bottom protection grid	+

Equipment

_	Boom cylinder rods protection	+
	Bucket cylinder rod protection	+
	Centralised lubrication extended for connecting link	+
	Floating boom	+
	Headlights on boom, LED, 2 pieces, protections included	●1)
	Headlights on boom, LED+, 2 pieces, protections included	+1)
	Mono boom SME 6.70 m	+
	Pipe fracture safety valve for stick cylinder	+
	Preparation for ripper tooth	+
	Quick coupler SWA 77 hydraulic	+
	Shovel boom 4.20 m	+
	Shovel stick 2.78 m	+
	Special painting	+
	Stick SME 2.35 m	+
	Stick SME 2.80 m	+

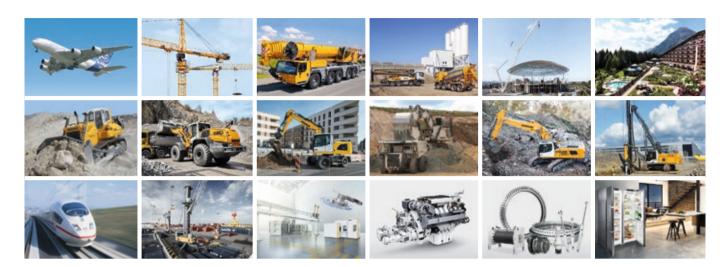
Options and/or special equipments, supplied by vendors other than Liebherr, are only to be installed with the knowledge and approval of Liebherr in order to retain warranty.

^{• =} Standard, + = Option

¹⁾ Equipment not individually available, but only as predefined lighting packages
Non-exhaustive list, please contact us for further information.

Notes

The Liebherr Group of Companies



Wide Product Range

The Liebherr Group is one of the largest construction equipment manufacturers in the world. Liebherr's high-value products and services enjoy a high reputation in many other fields. The wide range includes domestic appliances, aerospace and transportation systems, machine tools and maritime cranes.

Exceptional Customer Benefit

Every product line provides a complete range of models in many different versions. With both their technical excellence and acknowledged quality, Liebherr products offer a maximum of customer benefits in practical applications.

State-of-the-art Technology

To provide consistent, top quality products, Liebherr attaches great importance to each product area, its components and core technologies. Important modules and components are developed and manufactured in-house, for instance the entire drive and control technology for construction equipment.

Worldwide and Independent

Hans Liebherr founded the Liebherr family company in 1949. Since then, the family business has steadily grown to a group of more than 130 companies with nearly 44,000 employees located on all continents. The corporate headquarters of the Group is Liebherr-International AG in Bulle, Switzerland. The Liebherr family is the sole owner of the company.

www.liebherr.com