

# Technical Description

## Wheel Loader L 531



**Bucket capacity**  
**Operating weight**  
**Engine output**

**2.0 – 3.0 m<sup>3</sup> / 2.5 – 4.0 cuyd**  
**11.3 – 12.0 t / 24,900 – 26,500 lb**  
**100 kW / 136 hp**



### **Economy through low operating costs**

Liebherr has further improved the hydrostatic travel drive system for its range of wheel loaders. This drive system has proven itself in hard applications over and over and its main advantage has proven to be its excellent economy.

- **Low fuel consumption** – due to the low diesel engine rpm and improved utilization of the available engine power.
- **Reduced brake wear** – due to the use of hydrostatic travel drive, the wet multi-disk brakes are virtually wear free.
- **Reduced tire wear** – due to the sensitive drive system and the standard limited slip differentials.

### **Safety and comfort**

Due to the logical control of the travel drive system and attachments. The low noise level and the reliable monitoring system increase both driving comfort and productivity.

### **Improved environmental protection**

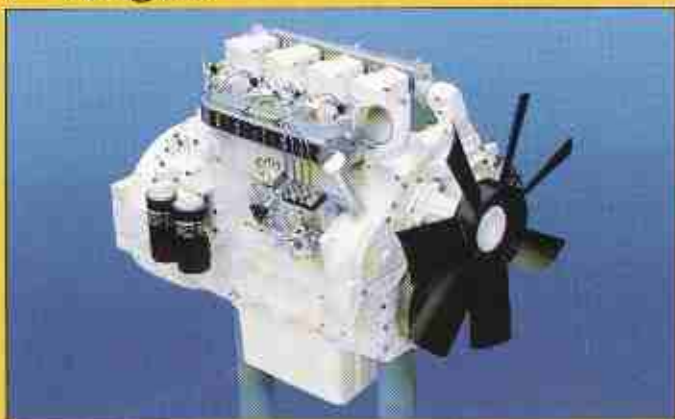
The noise emission of the hydrostatically driven Liebherr wheel loader is kept at a low level by the low engine speed of 2000 rpm. Low exhaust emission levels are produced by the lower engine speed.

# LIEBHERR

The Better Machine.



## Engine



### Liebherr diesel engine

Model	D 904 T
Type	4 cylinder water cooled in-line engine with direct injection; turbocharged
Power output	
SAE	143 hp at 2000 rpm
DIN/ISO 3046-1	100 kW (136 hp) at 2000 rpm
Max. torque	528 Nm (54 kpm) at 1500 rpm
Displacement	5.6 l
Bore/stroke	115/135 mm / 4.69"/5.51"
Lubrication	Pressure lubrication system with main flow filter and oil cooler.
Air cleaner	Dry-type air cleaner with main and safety element. Cyclon pre-cleaner.
Electrical system	
Voltage	24 V
Battery	2 x 110 Ah/12 V
Alternator	24 V/27 A

### Regulation

Control of speed and tractive force by controlling of the engine rpm and by automatic engine speed sensing regulation.

Pressure compensation for constant operating temperature of the hydraulic oil.

### Control

Travel drive control by drive and inch pedals. Stepless control of tractive force and travel speed by using the inch pedal, independently of the engine speed. Forward, reverse and speedranges are controlled by the joystick.

### Speed ranges

Forward and reverse with 20.5 R 25 tires

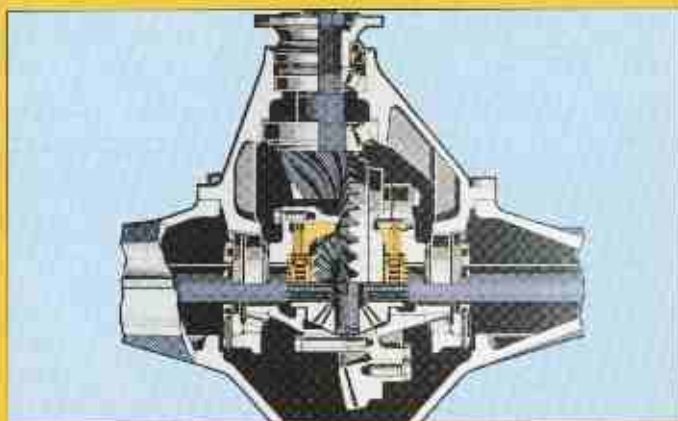
Range 1 \_\_\_\_\_ - 7 km/h / 4.3 MPH

Range 2 \_\_\_\_\_ - 17 km/h / 10.5 MPH

Range 3 (automatic) \_\_\_\_\_ - 39 km/h / 24 MPH



## Axles



### Four wheel drive

Fixed front axle

Oscillating rear axle

Oscillation angle \_\_\_\_\_ + 13°

Max. obstacle height \_\_\_\_\_ 400 mm / 15.7"  
(all wheels remain in contact with the ground)

### Differentials

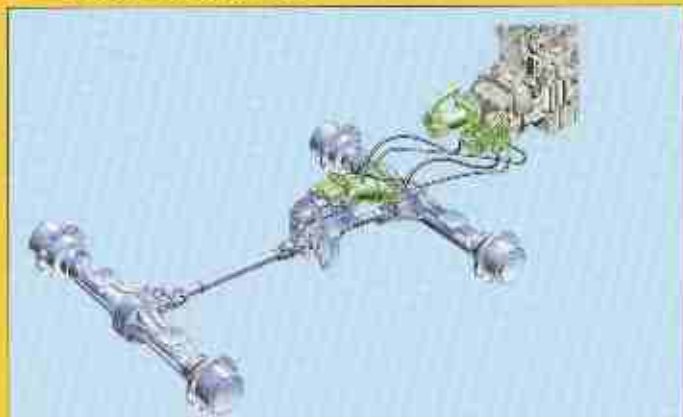
Automatic limited slip differentials with 45 % locking value in both axles.

### Reduction gear

Planetary final drive in the wheel hubs.



## Travel Drive



### Hydrostatic travel drive system

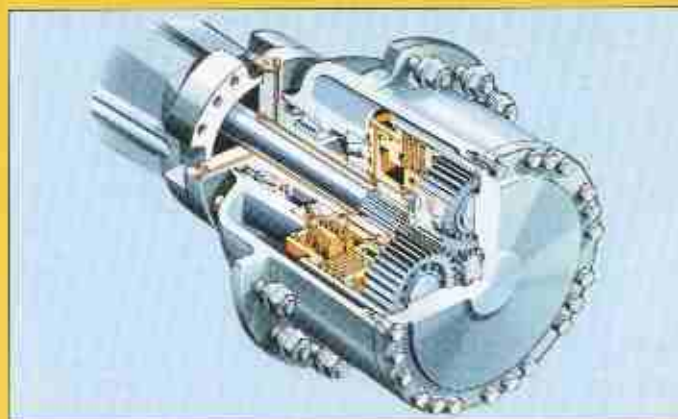
#### Type

Closed circuit variable displacement swash plate pump and axial piston motor with 3-speed planetary transmission. Forward and reversing by the flow direction of the travel pump.

Filter \_\_\_\_\_ separate filtration for closed circuit system



## Brakes



# Technical Data

### Hydrostatic drive

The hydrostatic drive system provides a wear-free brake operation on all four wheels.

### Wet multi-disk brakes

Hydraulic servo brake system with accumulator back up. Wet, oil cooled multi-disk brakes in the wheel hubs. Separate brake circuits for front and rear axle.

### Parking brake

Spring applied, servo pressure released, wet multi-disk brake on transmission.

The braking system meets the requirements of the EC guidelines 71/320.



## Tires

### Tire selection

Tubeless radial or cross ply tires on three piece rims in the following sizes:

20.5-25  
20-24

### Special tires

Please contact factory for special application tires.



## Steering

### Type

Center articulation with adjustment-free spherical bearings and two double acting hydraulic cylinders.

Articulation angle (to each side)  $\pm 40^\circ$

### Power supply

Hydraulic servo power steering.  
Priority supply from the attachment pump through a flow distribution valve.

Max. pressure \_\_\_\_\_ 180 bar

### Emergency steering

Separate pump driven by the travel transmission.



## Attachment Hydraulics

Axial piston pump with engine speed sensing regulation and pressure compensation for optimum utilization of available engine output.

Max. flow \_\_\_\_\_ 160 l/min.  
Max. pressure \_\_\_\_\_ 270 bar

### Cooling

Hydraulic oil cooling by fan and oil cooler.

### Filtration

Return line filter in the hydraulic reservoir.

### Control

Servo controlled joystick lever. The position of the control panel can be adjusted individually to suit the driver.

### Lift circuit

Lift, neutral, lower.

Floating position controlled by a separate switch.

### Tilt circuit

Tilt back, neutral, dump.

Automatic bucket positioner with adjustable dig-in angle.



## Attachment



### Geometry

Z-bar linkage with one tilt cylinder

Sealed bearings for longer lubrication intervals.

Hydraulic cycle time at rated load

Lift \_\_\_\_\_ 5.3 sec.  
Dump \_\_\_\_\_ 0.9 sec.  
Lower (empty) \_\_\_\_\_ 3.5 sec.



## Operator's Cab



### Design

Sound-suppressed ROPS/FOPS cab, rubber mounted on the front frame, 2 doors and 4 sliding windows. Safety glass.

ROPS rollover protection per

DIN/ISO 3471/SAE 1040 C

FOPS falling objects protection per

DIN/ISO 3449/SAE J 231

Operator's seat

6-way adjustable, suspended seat equipped with right hand armrest and seatbelt.

Seat is adjustable for operator's weight.

Heating and ventilation

Water heating system with defroster and

2-stage fan. Fresh air intake through a filter system.

Pressurization standard.

Noise Levels

Noise levels meet the requirements of EEC guideline 86/662/EEC.



## Capacities

Fuel tank	205 l	54 gal
Engine oil (with filter)	18.5 l	4.9 gal
Pump distributor gear	2.0 l	0.5 gal
Transmission	5.0 l	1.3 gal
Front axle/wheel hubs	15/9 l	4/2.4 gal
Rear axle/wheel hubs	11/9.5 l	2.9/2.5 gal
Hydraulic tank	150 l	40 gal
Hydraulic system	200 l	53 gal

## Safety and Operator Comfort

Elastically mounted cab with integrated ROPS/FOPS. The sound level is below the most stringent sound level standards which make this cab one of the "quietest" cabs installed on wheel loaders. Acoustical and optical warning devices protect drive components and assure extended operating safety.

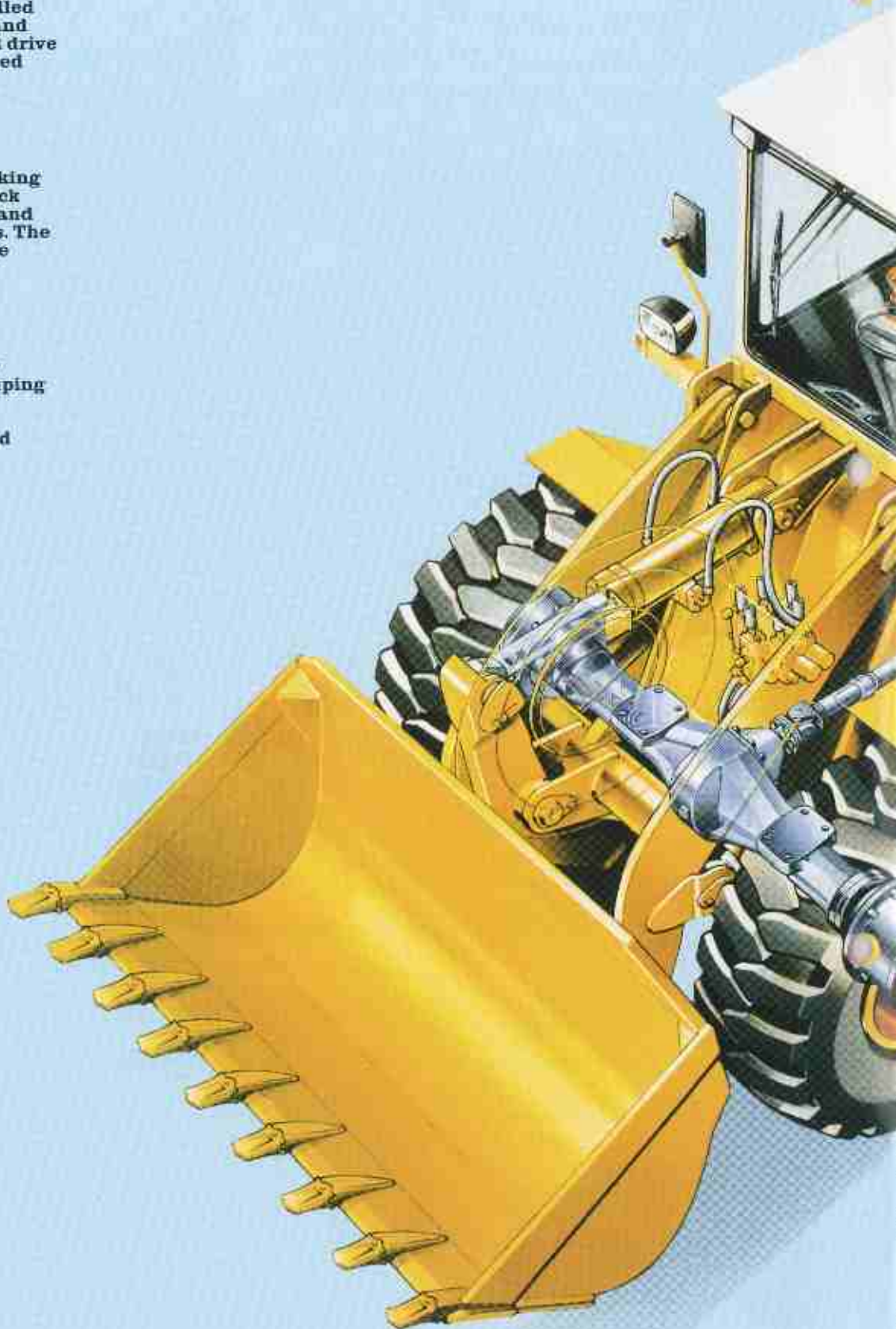
## Logical Operation

Control of travel drive and working hydraulics with only one joystick lever assures increased safety and fatigue free working conditions. The left hand always remains on the steering wheel.

## Z-bar Loader Linkage

Z-bar loader linkage for higher breakout forces and faster dumping speed.

High life expectancy and long service intervals through sealed attachment bearings.



# Technical Description



### **Liebherr Diesel Engine**

Long life expectancy and high reliability, even under extreme operating conditions are main features of the Liebherr Diesel engine. This engine was developed specially for earth moving equipment and has the following advantages:

- low fuel consumption and reduced emissions due to low engine RPMs
- powerful due to excellent torque characteristics
- robust with low maintenance requirements for hard work on construction sites.

### **Hydrostatic Travel Drive**

The hydrostatic drive with 3-speed transmission is the optimum drive system for a wheel loader. Compared to conventional drive systems, it sets new economical standards regarding:

- full use of available engine horsepower and lower fuel consumption.
- virtually wear free brakes
- smooth and sensitive travel drive
- operator friendly operation.

### **Limited-Slip Differentials**

The automatic acting multi-disc limited-slip differentials in both axles are standard equipment and provide

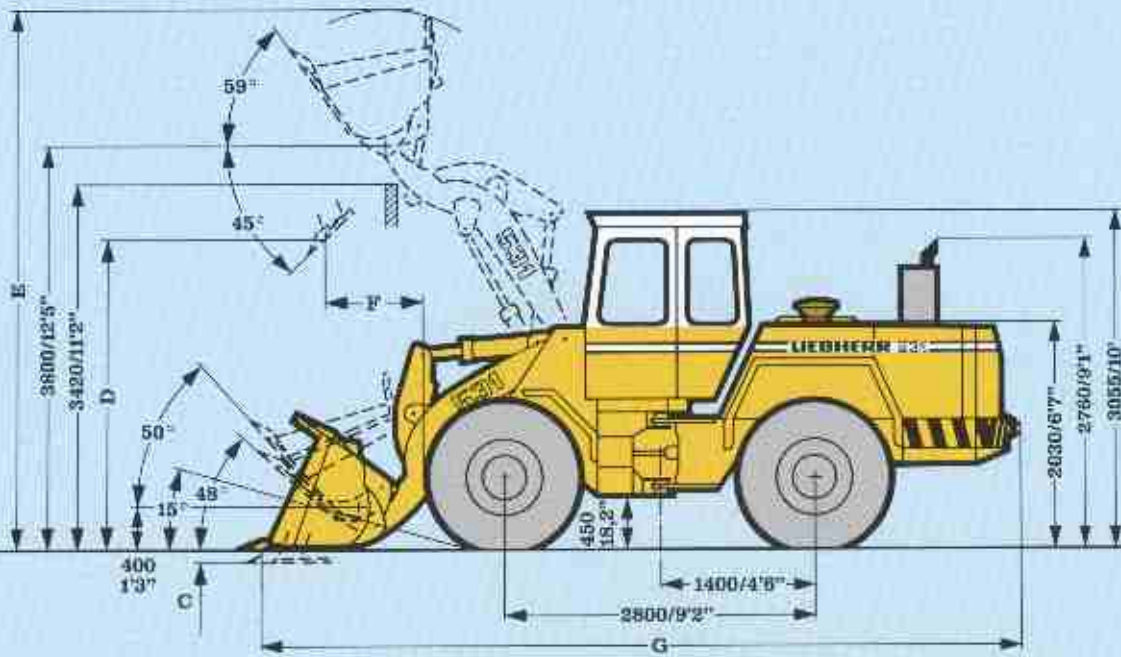
- improved draw bar pull in severe ground conditions
- reduced tire wear
- less fuel consumption.

### **Wet Disc Brakes**

The wet, oil cooled multi-disc brakes are integrated into the wheel hubs of the axles. These fully enclosed brakes, combined with the hydrostatic drive system, are

- virtually wear free and
- provide constant brake performance under all operating conditions.

Dimensions in mm with 20.5 R 25, L 2 tires



Tread 1900 mm/6'2" with all tires

Tire sizes	Width over tires mm/ft-in	Ground clearance mm/in	Change of vertical dimensions mm/in
20.5 R 25, L 3	2475/8'1"	450/18.2"	-
20.5 R 25, L 4	2480/8'1"	480/18.9"	30/1.2"
20-24, L 2	2495/8'2"	425/16.7	- 25/- 1"
20 R 24, L 2, L 3	2500/8'2"	405/15.9"	- 20/- 0.8"

Technical data and dimensions are in accordance with the ISO/SAE standards, where available.

## Technical Data

Bucket types and cutting tools		Teeth <sup>1)</sup>	Bucket with			Rehandling bucket	
			Teeth	Bolt-on edges <sup>2)</sup>	Bolt-on edges	Teeth	Bolt-on edges
capacity (SAE) heaped 2:1 struck	m <sup>3</sup> /cuyd	2.0/2.5	2.0/2.5	2.3/3.0	2.3/3.0	3.0/3.9	3.0/3.9
	m <sup>3</sup> /cuyd	1.7/2.3	1.7/2.2	2.0/2.5	2.0/2.5	2.6/3.4	2.6/3.4
Specific material weight	t/m <sup>3</sup>	1.8	1.8	1.6	1.6	1.2	1.2
Bucket width	mm/ft-in	2490/8'2"	2490/8'2"	2490/8'2"	2490/8'2"	2700/8'10"	2700/8'10"
D Dump height at max. lift height and 45° discharge	mm/ft-in	2920/9'7"	2920/9'7"	2850/9'4"	2850/9'4"	2735/8'11"	2735/8'11"
F Reach at max. lift height and 45° discharge	mm/ft-in	820/2'8"	820/2'8"	885/2'11"	885/2'11"	1000/3'3"	1000/3'3"
Reach at 2130 mm/7" clearance and 45° discharge	mm/ft-in	1435/4'8"	1435/4'8"	1470/4'9"	1470/4'9"	1520/4'11"	1520/4'11"
E Max. operating height	mm/ft-in	5065/16'7"	5065/16'7"	5165/16'11"	5165/16'16"	5205/17'	5205/17'
G Overall length	mm/ft-in	6740/22'1"	6740/22'1"	6840/22'5"	6840/22'5"	7000/22'11"	7000/22'11"
Turning radius, bucket in transport position	mm/ft-in	5640/18'5"	5640/18'5"	5665/18'6"	5665/18'6"	5805/19'	5805/19'
C Digging depth	mm/in	65/2.6"	65/2.6"	65/2.6"	65/2.6"	65/2.6"	65/2.6"
Lifting force (SAE)	kN	135	135	135	135	135	135
Breakout force (SAE)	kN	118	118	106	106	91	91
* Tipping load straight (SAE) articulated 35° full turn 40°	kg/lb	8650/19070	8630/19030	8630/19030	8580/18920	8520/18790	8420/18570
	kg/lb	7870/17350	7850/17300	7800/17200	7750/17090	7750/17090	7660/16890
	kg/lb	7650/16870	7620/16800	7570/16690	7525/16590	7525/16590	7440/16400
* Operating weight	kg	11380/25090	11390/25115	11445/25240	11500/25360	11500/25360	11600/25580

\* Shown numbers include all lubricants, full fuel tank, tire sizes 20.5 R 25, L 2, ROPS/FOPS cab and driver.

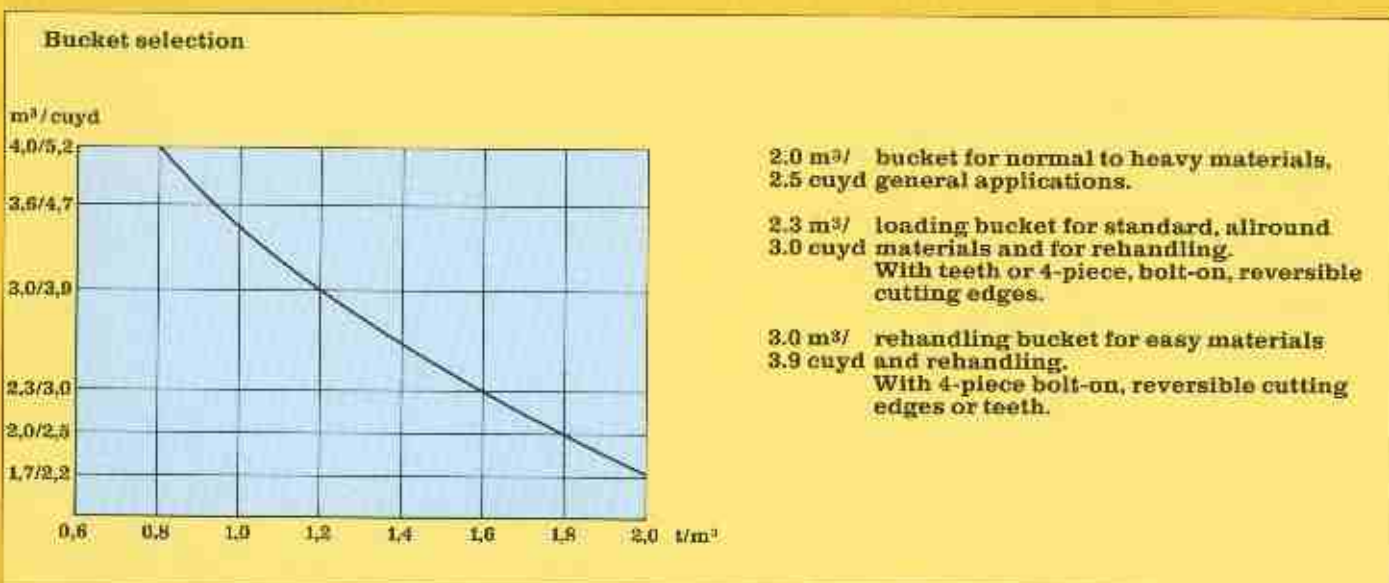
\* Different tires and optional equipment will change the operating weight and tipping load.

<sup>1)</sup> weld on tooth adaptors with exchangeable teeth

<sup>2)</sup> 4-piece, bolt-on, reversible cutting edges

Additional specifications	Change of operating weight kg/lb	Change of static tipping load full turn (40°) kg/lb
20.5 R 25, L 3	88/194	56/123
20.5 R 25, L 4	408/900	262/578
20-24, L 2	-252/- 556	- 162/- 357
20 R 24, L 2	- 88/- 194	- 56/- 123
20 R 24, L 3	-	-
Additional counterweight	420/926	850/1874
Tire ballast 20-24	760/1676	960/2117

The use of additional counterweight or tire ballast is only recommended to improve stability on firm, level surfaces.  
The use of both at the same time is not recommended and should be avoided.



### Material densities-loose t/m³

Gravel, moist _____ 1.9	Clay and gravel, dry _____ 1.4	Sandstone _____ 1.6
dry _____ 1.6	wet _____ 1.6	Slate _____ 1.75
wet, 6-50 mm _____ 2.0	Earth, dry _____ 1.3	Bauxite _____ 1.4
dry, 6-50 mm _____ 1.7	wet excavated _____ 1.6	Gypsum, broken _____ 1.8
crushed stone _____ 1.5	Topsoil _____ 1.1	Coke _____ 0.5
Sand, dry _____ 1.5	Decomposed rock 50 % rock, 50 % earth _____ 1.7	Slag, broken _____ 1.8
moist _____ 1.8	Basalt _____ 1.95	Coal _____ 1.1
wet _____ 1.9	Granite _____ 1.8	
Gravel and sand, dry _____ 1.7	Limestone, hard _____ 1.65	
wet _____ 2.0	soft _____ 1.55	
Sand and clay _____ 1.6		
Clay, natural _____ 1.6		
dry _____ 1.4		
wet _____ 1.65		



## Standard Equipment

- Sound insulated ROPS/FOPS cab
- Cab heating system with defroster and pressurisation
- Wash/wipe system front and rear
- Suspended 6-way adjustable seat with seat belt
- Working lights front and rear
- Doors, battery box and toolbox lockable
- Emergency steering system
- Limited slip differentials
- Mudguards
- Air cleaner system with automatic dust ejector
- Automatic bucket positioner
- Automatic lift kick out
- Floating position
- Toolbox with toolkit
- Instrument panel with indicators for:
  - engine oil pressure, fuel content, coolant temperature and service hour meter
- Warning lights for:
  - engine oil pressure
  - transmission oil pressure
  - brake system, accumulator pressure
  - parking brake
  - transmission oil temperature
  - coolant level
  - air cleaner service indicator
  - battery charger
- Audible warnings for:
  - engine oil pressure
  - brake system accumulator pressure
  - transmission oil pressure

Standard and optional equipment may vary.

## Optional Equipment

- Buckets with and without teeth or with reversible cutting edge
- Hi-dump buckets
- Protective equipment for saw mill applications
- Hydraulic quick-coupler
- Pallet fork
- 3rd hydraulic circuit for hydraulically operated attachments
- LFD-Liebherr travel pitch damper
- Cold climate kit
- Mudguards with rubber edge
- Rubber stops for frame articulation
- Adjustable steering column
- Tinted glass
- Air conditioning
- Radio
- Air suspension seat
- Beacon
- Rotating
- Back up alarm
- 20 km/h speed limiter

Additional equipment on request.

LIEBHERR-EXPORT AG, P.O. Box 54, CH-5415 Nussbaumen/AG, ☎ (056) 801111, Fax (056) 801299, Tx 825 010

LIEBHERR-EXPORT AG, P.O. Box 54, CH-5415 Nussbaumen/AG, ☎ (056) 801111, Fax (056) 801299, Tx 825 010