

# Toro<sup>®</sup> LH518iB

Safer.  
Stronger.  
Smarter.



# Technical specification

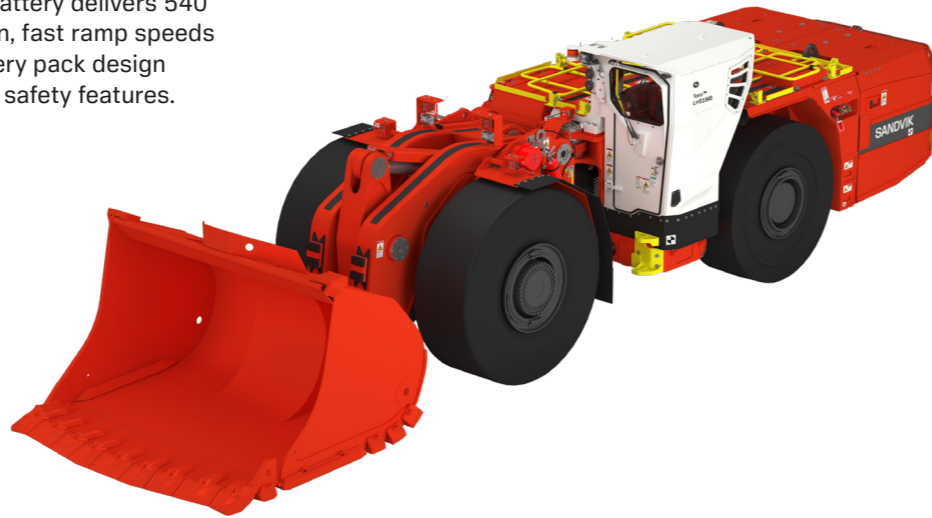
## Toro® LH518iB

Toro® LH518iB is an AutoMine® capable battery-electric loader. Along with zero underground diesel emissions and less heat, this innovative loader features a patented self-swapping battery system and easy access for field serviceability and maintenance. As with all Sandvik loaders and trucks, Toro® LH518iB loader features premium operator ergonomics to ensure comfort for long shifts underground.

The loader is designed around the Artisan® battery pack and electric driveline. The battery uses the stable lithium-iron phosphate (LFP) chemistry and has been through extensive testing in tough underground mining conditions. The battery delivers 540 kW of continuous power for high acceleration, fast ramp speeds and shorter cycle times. The protective battery pack design features a variety of built in fire suppression safety features.

Regenerative braking allows the battery to charge while braking and going downhill. For recharging a depleted battery, a mobile charging station, which connects to a mine's electrical grid, is all what is needed. All this means the mine will not require any large-scale additional infrastructure to accommodate Sandvik battery-electric loaders and trucks.

For added safety and productivity, Sandvik AutoMine® onboard kit is available for new equipment deliveries, or it can be retrofitted later in the field.



Capacities	
Maximum tramping capacity	18 000 kg
Break out force, lift	300 kN
Break out force, tilt	272 kN
Standard bucket	7.0 m <sup>3</sup>

Bucket motion times	
Raising time	8.0 sec
Lowering time	5.7 sec
Dumping time	3.5 sec

Approximate operating weights* (with 8.6 m <sup>3</sup> G.E.T. bucket)	
Total operating weight	54 800 kg
Front axle	21 200 kg
Rear axle	33 600 kg

\* Unit weight is dependent on the selected options

Approximate loaded weights* (with 8.6 m <sup>3</sup> G.E.T. bucket)	
Total loaded weight	71 000 kg
Front axle	47 700 kg
Rear axle	23 300 kg

Speeds forward and reverse	
Level, loaded	28.4 km/h
Level, unloaded	28.4 km/h
1:7 ramp uphill, loaded	13.3 km/h
1:7 ramp uphill, unloaded	16.4 km/h
1:7 ramp downhill, loaded	26.2 km/h
1:7 ramp downhill, unloaded	28.4 km/h

Recommended operating conditions	
Environmental temperature	From + 10 °C to + 45°C
Operating altitude	Below 3000 m

Requirements and compliance	
Compliance with 2006/95/EC Low voltage directive	
Compliance with 2004/108/EC Electromagnetic compatibility directive	
Compliance with 2006/42/EC Machinery directive (Equipment for EU area, achieved with relevant options)	
Design based on ISO 19296. Machines for underground mines. Mobile machines working underground. Safety. Part 1: Rubber tyred vehicles.	
Design based on MDG 15. Guideline for mobile and transportable equipment for use in mines. (Equipment for Australia, achieved with relevant options)	
Electrical system based on IEC 60204-1. Safety of machinery – Electrical equipment of machines – Part 1: General requirements	
Battery cell certifications: UL 1642, UN38.3, CE, IEC 6261, ROHS	

Electric/Traction motor x3	
Locations	2 for front axle, 1 for rear axle
Motor type	Permanent magnet, AC
Continuous power output	180 kW each
Regenerative braking	Equipped
Driveline cooling system volume	38 l
Power electric cooling system volume	40 l
Power (continuous)	540 kW
Traction control	Equipped

Auxiliary motor	
Application type/count	Hydraulic pump x 2
Rated power	80 kW per motor
Efficiency	>96%

Axles	
Front axle, spring applied hydraulic operated brakes. Fixed.	Kessler D111, limited slip differential
Rear axle, spring applied hydraulic operated brakes. Oscillating ± 8°	Kessler D106, limited slip differential

Tires	
Tire sizes	Front 29.5-R29 L-5S Rear 26.5-R25 L-5S

Tires are application approved. Brand and type subject to availability.

Main battery (contains 2 Artisan® battery packs and a frame)	
Cell chemistry	LiFePO4 (LFP)
Nominal energy	482 kWh
Nominal capacity	786 Ah
Continuous power	482 kW
Peak power	612 kW
Nominal voltage	614 V
Battery management system	Artisan BCS
Cooling method	(off-board) Liquid
Retrieval hook	Equipped
AutoConnect	Equipped
AutoSwap	Enables battery swap and allows the operator to stay in the cabin during the process
Charging current	300 A x 2
Optimal charging power	180 kW x 2
Charge time (0% to 100%)	~70 min at 0.9C ~120 min at C/2
Dimensions (LxWxH) (incl. battery frame)	2640 x 2790 x 1540 mm
Approx. weight (incl. battery frame)	11 550 kg

Artisan tramping battery	
Nominal energy	25 kWh
Nominal capacity	72 Ah
Dimensions (LxWxH)	270 x 640 x 1250 mm
Approx. weight	280 kg

Hydraulics	
The oil flow from steering hydraulic pump is directed to bucket hydraulics when steering is not used.	Two similar pump units that can deliver oil to steering/bucket. Depends on flow request and if one or two pumps are used.
Automatic brake activation	
Door interlock for brakes and boom, bucket, and steering hydraulics	
Electric filling pump for hydraulic oil	
Load sensing hydraulic system with piston pumps	
MSHA approved hoses	
ORFS fittings	

Steering hydraulics	
Full hydraulic, centre-point articulation, power steering with two double acting cylinders. Steering lock.	Steering controlled by electric joystick
Steering main valve	Open circuit type, LS controlled
Steering hydraulic cylinders	125 mm, 2 pcs

### Steering hydraulics

Steering hydraulic pumps	Piston type
Emergency steering	Equipped

### Bucket hydraulics

Boom system	Z-link
Lift cylinders	180 mm, 2 pcs
Dump cylinder	220 mm, 1 pc
Main valve	Open circuit type

### Brakes

Service brakes	SAHR with electric motor regen
Secondary (emergency) brake	SAHR
Park brake	SAHR
CAN/CSA-M424.3-90	Certified

### Cabin

12" color display with touch screen function
12 V output
Adjustable joysticks
Air conditioning unit located outside the cabin to reduce noise inside the cabin
AutoMine® Loading readiness in automation
Cabin heater DC 660V
Cabin mounted on rubber mounts to the frame to reduce vibrations
Emergency exit
Floor washable with water to reduce dust
Inclinometers to indicate operating angle
Laminated glass windows
No high pressure hoses in the operator's compartment
Powered pre-filter for A/C device
Remote circuit breaker switch
ROPS certification according to EN ISO 3471
FOPS certification according to EN ISO 3449
Sealed, air conditioned, over pressurized, noise suppressed closed cabin
Seat with low back rest and 2-point seat belt
Sound absorbent material to reduce noise
Three-point contact access system with replaceable and colour coded handles and steps

### Control system, dashboard and displays

A 12" color display with advanced touch screen functionality has all the needed information and alarms on one large display, allowing the operator more time to keep eyes on the road. Dark background graphics with clear symbols are designed for the underground mining environment to reduce eye fatigue, while red interior cabin lighting is also designed to not affect night vision during driving.

Sandvik Intelligent Control System

Critical warnings and alarms displayed as text and with symbols

12" color display with touch screen function and adjustable contrast and brightness, illuminated switches

My Sandvik Digital Services Knowledge Box™ on-board hardware

### Operator's seat

Toro® LH518iB loader cabin is fitted with an adjustable low frequency suspension seat with two-point seat belt or optional high back seat with four-point seat belt. New softer padded arm rests and adjustable joysticks can be configured either on the cabin wall or fixed to the seat.

Low frequency suspension

Height adjustment

Adjustment according to the operator's weight

Padded and adjustable arm rests

Two-point seat belt

Seatbelt monitoring system

Fore-aft isolation

Adjustable lumbar support

Selectable damping

### Measured vibration level

Whole body vibration was determined while operating the loader in a simulated working cycle consisting of loading, unloading and driving with and without load. The value is determined applying standards EN 1032 and ISO 2631-1.

Maximum r.m.s. value $a_w$ [m/s <sup>2</sup> ], driving with load	0.86
VDV <sub>w</sub> over 15 min period [m/s <sup>1.75</sup> ], driving with load	8.61

### Measured sound level

The sound pressure level and sound power level at the operator's compartment have been determined in stationary conditions on high idle and at full load.

Sound pressure level $L_{pA}$ [dB re 20 µPa]	72 dB
Sound power level $L_{WA}$ [dB ew 1 p W]	99 dB

### Frame

Automatic central lubrication

Battery frames x 2 (excluding battery packs)

Central hinge with adjustable upper bearing

High strength structure with optimized material thickness

### Illumination

Illuminance E<sub>av</sub> in front of the loader with 3 pieces of 50 W LED lights and 2 pieces 28 W lights at a distance of 20 m in front of the loader:

E <sub>av</sub> low beam	45 lx
E <sub>av</sub> high beam	90 lx

Illuminance E<sub>av</sub> behind the loader with 3 pieces of 50 W LED lights, 2 pieces of 28 W LED lights and 2 pieces of 13 W LED lights at a distance of 20 m in front of the the loader:

E <sub>av</sub>	329 lx
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Toro® LH518iB is compliant with South African Mine health and safety act 29 of 1996, because average light intensity in the direction of travel is more than 10 lux at a distance of 20 m.

### Electrical equipment

Connection for external 24V power supply

Flashing beacon

LED brake and parking lights

LED driving and working lights

Dual horn configuration with separate alarms for start and reverse

Camera for battery swapping

Reverse camera

### Electronic manuals

High-voltage battery service manual	English and other EU languages
Operator's manual	English and other EU languages
Maintenance manual	English and other EU languages
Parts manual	English
Service and repair manual	English
ToolMan	2 x USB stick in PDF format, includes all manuals

Note: Paper copies and other languages available upon request

### Fire safety features

Underground suitable LFP chemistry

Fire suppression cartridges inside battery packs

Temperature monitoring of battery cells

Isolation of combustibles and ignition sources

Portable fire extinguisher, 12 kg

### Energy isolation features

Lockable main switch, ground level access

Lock-outs for battery packs, ground level access

Emergency stop push buttons according to EN ISO 13850: 1 pc in cabin, 2 pcs in rear

Automatic discharge for pressure accumulators (brake system and pilot circuit)

Frame articulation locking device

Mechanical boom locking device

Wheel chocks and brackets

### Options

Ansul 210 fire suppression system with CHECKFIRE

AutoMine® Loading Onboard Package ACS 2.0 DIO. Electrically compatible with system ACS 3.0

Boom suspension (ride control)

Cover grills for lamps

CE Declaration of conformity

Driving direction lights (red / green)

High backrest seat with four point seat belt

Integrated weighing system for loaders

Line of sight radio remote control HBC, CAN

Monitoring camera system (including 2 additional cameras)

Proximity detection system interface (not operational in automation mode)

Safety rails

Spare rim 22.00-25/3.0 (for tires 26.5R25)

Spare rim 25.00-29/3.5 (for tires 29.5R29)

Tire pressure monitoring system

Wiggins quick filling set for oils

**Available buckets**

Type	Volume	Width	Max material density
G.E.T. (standard)	7.0 m <sup>3</sup>	3070 mm	2500 kg/m <sup>3</sup>
G.E.T.	7.6 m <sup>3</sup>	3070 mm	2200 kg/m <sup>3</sup>
G.E.T.	8.6 m <sup>3</sup>	3070 mm	1900 kg/m <sup>3</sup>
G.E.T. Half Arrow	9.1 m <sup>3</sup>	3440 mm	1700 kg/m <sup>3</sup>
Bare Lip	7.0 m <sup>3</sup>	3000 mm	2600 kg/m <sup>3</sup>
Bare Lip	7.6 m <sup>3</sup>	3000 mm	2300 kg/m <sup>3</sup>
Bare Lip	8.4 m <sup>3</sup>	3000 mm	2000 kg/m <sup>3</sup>

Note that more buckets may be available, please contact your local Sandvik representative for more information.

**Grade performance**

Uphill, 3 % rolling resistance

Empty										
Percent grade	0.0	2.0	4.0	6.0	8.0	10.0	12.5	14.3	17.0	20.0
Ratio					1:12	1:10	1:8	1:7	1:6	1:5
Forward	28,4	26,3	24,4	22,5	20,8	19,2	17,5	16,4	14,9	13,6
Reverse	28,4	26,3	24,4	22,5	20,8	19,2	17,5	16,4	14,9	13,6

Loaded										
Percent grade	0.0	2.0	4.0	6.0	8.0	10.0	12.5	14.3	17.0	20.0
Ratio					1:12	1:10	1:8	1:7	1:6	1:5
Forward	28,4	24,6	22,2	19,8	17,8	16,2	14,3	13,3	12,0	10,8
Reverse	28,4	24,6	22,2	19,8	17,8	16,2	14,3	13,3	12,0	10,8

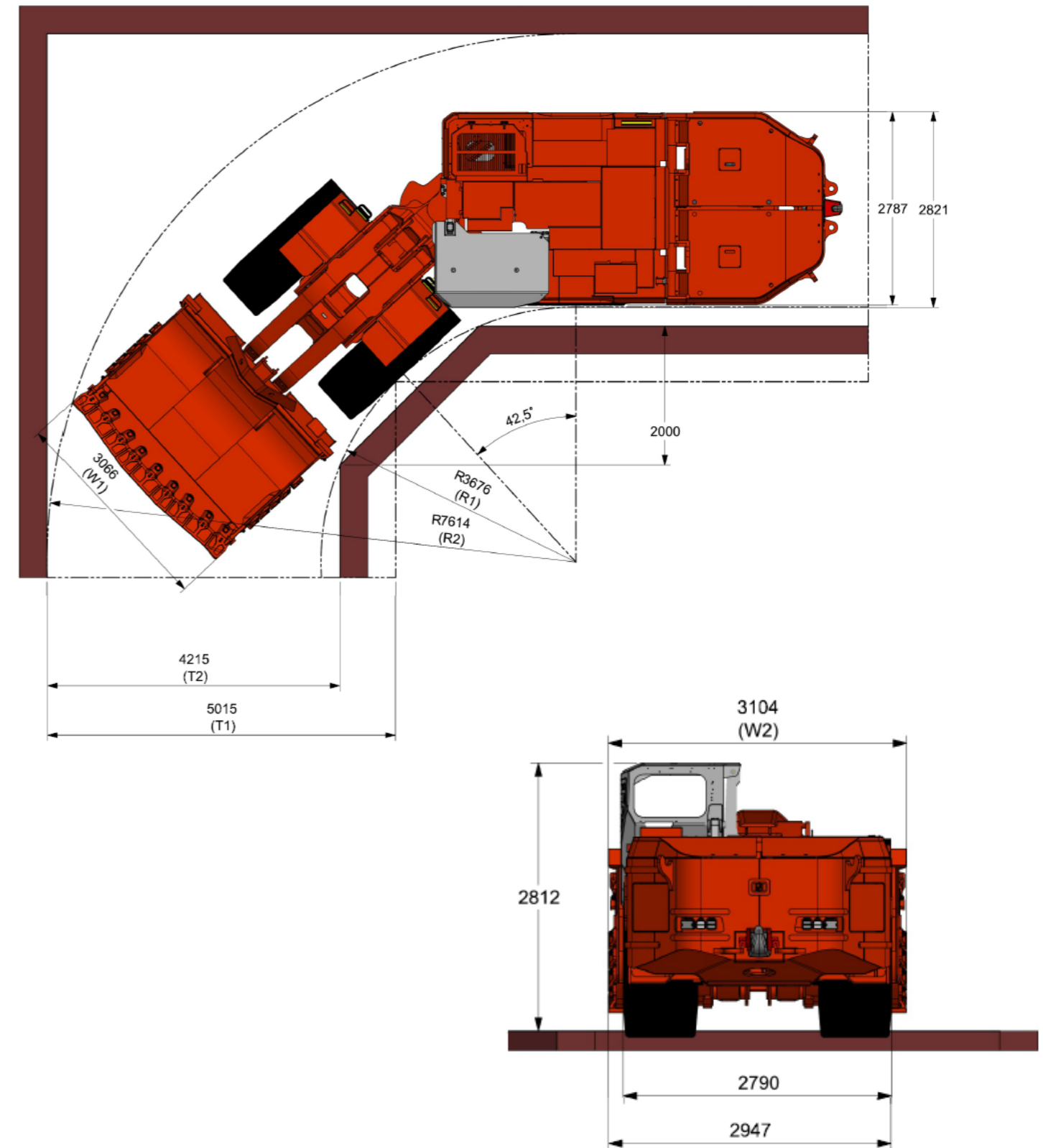
Downhill, 3 % rolling resistance

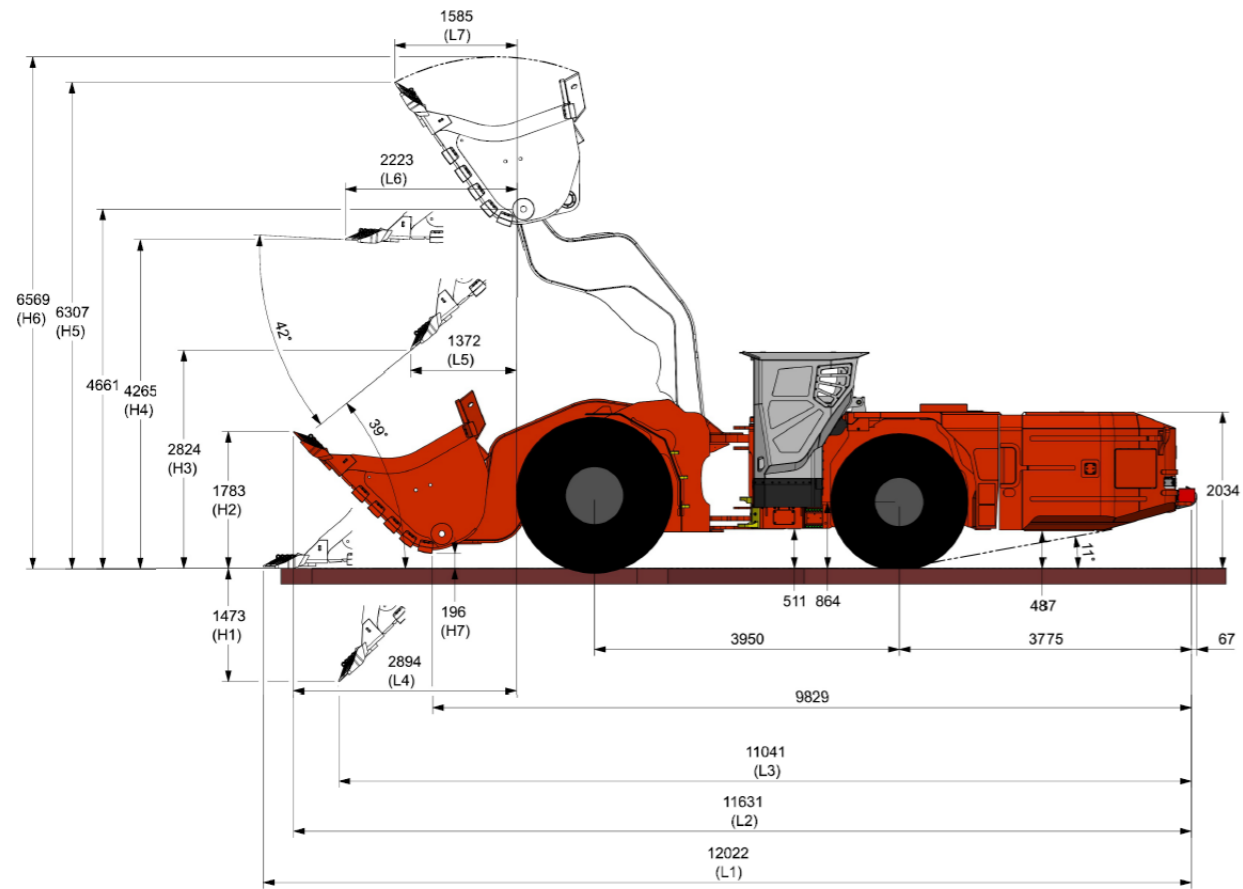
Empty										
Percent grade	0.0	2.0	4.0	6.0	8.0	10.0	12.5	14.3	17.0	20.0
Ratio					1:12	1:10	1:8	1:7	1:6	1:5
Forward	28,4	28,4	28,4	28,4	28,4	28,4	28,4	28,4	28,4	25,3
Reverse	28,4	28,4	28,4	28,4	28,4	28,4	28,4	28,4	28,4	26,3

Loaded										
Percent grade	0.0	2.0	4.0	6.0	8.0	10.0	12.5	14.3	17.0	20.0
Ratio					1:12	1:10	1:8	1:7	1:6	1:5
Forward	28,4	28,4	28,4	28,4	28,4	28,4	28,4	26,2	21,4	17,8
Reverse	28,4	28,4	28,4	28,4	28,4	28,4	28,4	26,2	21,4	17,8

**Dimensions with 7 m<sup>3</sup> G.E.T. bucket (standard)**

The dimensions are indicative only





**Dimensions**

Lip plate type	G.E.T (standard)	G.E.T	G.E.T.	Bare Lip	Bare Lip	Half Arrow
Volume SAE heaped (m³)	7.0	7.6	8.6	7.6	8.4	9.1
Max. material density (t/m³)	2.4	2.1	1.8	2.2	2.0	1.7
L1(mm)	12022	12182	12328	12189	12336	12279
L2(mm)	11631	11743	11846	11734	11838	11815
L3(mm)	11041	11151	11252	11208	11309	11210
L4(mm)	2894	3006	3109	2998	3101	3078
L5(mm)	1372	1489	1595	1545	1652	1552
L6(mm)	2223	2380	2523	2413	2557	2473
L7(mm)	1585	1677	1760	1658	1742	1736
H1(mm)	1473	1362	1687	1576	1679	1655
H2(mm)	1783	1892	1992	1949	2050	1948
H3(mm)	2824	2719	2623	2731	2635	2652
H4(mm)	4265	4266	4266	4313	4313	4260
H5(mm)	6307	6434	6551	6489	6606	6504
H6(mm)	6569	6569	6569	6569	6569	6552
H7(mm)	196	191	194	240	243	227
W1(mm)	3066	3066	3066	3000	3000	3436
W2(mm)	3104	3146	3105	3000	3000	3436
R1(mm)	3676	3676	3676	3676	3676	3673
R2(mm)	7614	7670	7723	7609	7662	7833
T1(mm)	5015	5071	5124	5010	5063	5236
T2(mm)	4215	4271	4324	4210	4263	4436

\* According to SAE 1363/ISO 6483