SANDVIK

Toro® LH514

Safer.
Stronger.
Smarter.



Technical specification

Toro® LH514

Toro® LH514 is a high capacity underground loader for hard rock applications.

Toro® LH514 combines smart geometry with powerful thrust, high breakout forces, responsive controls and high tramming speeds. The advanced but still robust loader provides fast bucket filling, high fill factors, fast cycle times and proven reliability for underground mining use.

Toro® LH514 is equipped with Sandvik Intelligent Control System, the backbone of the loader. The control system monitors the equipment productivity and health, and enables multiple smart solutions, such as the optionally available Integrated Weighing System and full AutoMine® loading capability.

SHARK™ Ground Engaging Tools (G.E.T.) are available on a wide range of bucket sizes, optimized for loader productivity and extended bucket service life.



Capacities	
Maximum tramming capacity	14 000 kg
Break out force, lift	28 042 kg
Break out force, tilt	23 453 kg
Standard bucket	5.4 m^3

Speeds forward & reverse (Level/loaded) With Volvo TAD1340VE engine	
1st gear	5.9 km/h
2nd gear	10.5 km/h
3rd gear	18.3 km/h
4th gear	32.7 km/h

Bucket motion times	
Raising time	7.0 sec
Lowering time	4.0 sec
Dumping time	2.3 sec

Operating weights	
Total operating weight	38 100 kg
Front axle	16 700 kg
Rear axle	21 400 kg

Loaded weights	
Total loaded weight	52 100 kg
Front axle	38 625 kg
Rear axle	13 475 kg

Operational conditions and limits	
Environmental temperature	From -20°C to +50°C
Standard operating altitude	With engine Volvo TAD1340VE from -1500 m to +3000 m at 25 °C without rated power derate

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 EN 1889-1. 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
CONTAINS FLUORINATED GREENHOUSE GASES (closed cabin option) Refrigerant R134a under pressure max 38 bar/550 PSI: Filled weight: 2,000 kg CO_2e: 2,860 tons GWP: 1430 Information based on the F Gas Regulation (EU) No 517/2016

Engine	
Diesel engine	Volvo TAD1340VE
Output	256 kW @ 2100 rpm
Torque	1 770 Nm @ 1260 rpm
Engine brake	No
Number of cylinders	In-line 6
Displacement	12.78 l
Cooling system	Liquid cooled and piston pump driven cooler fan
Combustion principle	4-stroke, direct injection, turbo with intercooler
Air filtration	Two stage filtrarion, dry type
Electric system	24 V
Emissions	Tier 2, Euro Stage II
Ventilation rate	CANMET 9.96 m^3/s, MSHA 15500 CFM
Particulate index	MSHA 10500 CFM
Exhaust system	Catalytic purifier and muffler, double wall exhaust pipe
Average fuel consumption at 40% load	33.0 l/h
Fuel tank refill capacity	540 l
Compatible with paraffinic diesel fuel (EN 15940)	Yes

Converter	
Dana C9602	No lock-up

Transmission	
Power shift transmission with modulation	Dana SOH 6000 series, automatic gear shift control, four gears forward and reverse

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

Tires	
Tire size (Tires are application approved. Brand and type subject to availability.)	26.5x25 L5S 36 ply

Hydraulics
Electric filling pump for hydraulic oil
Door interlock for brakes and boom, bucket, and steering hydraulics
Oil cooler for hydraulic and transmission oil capability up to 50°C ambient temperature
ORFS fittings
MSHA approved hoses
Hydraulic oil tank capacity 240 l
Sight glass for oil level, 2 pcs

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
Steering hydraulic cylinders	125 mm, 2 pcs
Steering pump	Piston type, LS controlled
Steering and servo hydraulic pumps	Piston type

Bucket hydraulics	
The oil flow from steering hydraulic pump is directed to bucket hydraulics when steering is not used.	Joystick bucket and boom control (electric), equipped with piston pump that delivers oil to the bucket hydraulic main valve.
Boom system	Z-link
Lift cylinders	160 mm, 2 pcs
Dump cylinder	200 mm, 1 pc
Main valve	Open circuit type
Pump for bucket hydraulics	Piston type, LS controlled

Brakes
Service brakes are spring applied; hydraulically operated multidisc wet brakes on all wheels. Two independent circuits: one for the front and one for the rear axle. Service brakes also function as an emergency and parking brake. Brake system performance complies with requirements of EN ISO 3450, AS2958.1 and SABS 1589.
Neutral brake
Automatic brake activation system, ABA
Electrically driven emergency brake release pump
Brake oil tank capacity 75 l

Operator's compartment
Toro® LH514 is available with a robust ROPS and FOPS certified cabin or canopy, both protectecting the operator in case of roll over or falling objects. The optional sealed and pressured cabin is air-conditioned and uses dust and noise resistant upholstery materials, has 3-layer laminated safety glass windows, emergency exits, illuminated cabin entrance with three-point contact handles and anti-slip steps.

CABIN (Cabin option replaces the standard canopy)
ROPS certification according to EN ISO 3471
FOPS certification according to EN ISO 3449
Sealed, air conditioned, over pressurized, noise suppressed closed cabin
Sound absorbent material to reduce noise
Laminated glass windows
Cabin mounted on rubber dampers to the frame to reduce vibrations
Air conditioning unit located outside the cabin to reduce noise inside the cabin
Cyclone pre-filter for A/C device
Adjustable joysticks
No high pressure hoses in the operator's compartment
Inclinometers to indicate operating angle
Emergency exit
Floor washable with water to reduce dust
Three-point contact access system with replaceable and colour coded handles and steps
12 V output
Remote circuit breaker switch

Operator's seat	
Low frequency suspension	
Height adjustment	
Adjustment according to the operator's weight	
Padded and adjustable arm rests	
Two-point seat belt	
Fore-aft isolation	With cabin option only
Adjustable lumbar support	With cabin option only
Selectable damping	With cabin option only

Canopy (Standard)
ROPS certification according to EN ISO 3471
FOPS certification according to EN ISO 3449
Adjustable joysticks
No high pressure hoses in the operator's compartment
Inclinometers to indicate operating angle
Emergency exit
Floor washable with water to reduce dust
Three-point contact access system with replaceable and colour coded handles and steps
12 V output
Remote circuit breaker switch

Control system, dashboard and displays
A 7" colour display with advanced touch screen functionality has all the needed information and alarms on one large display giving 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. The Sandvik Intelligent Control system monitors and warns the operator before failures occur, preventing severe damage and potential loss of production.
Sandvik Intelligent Control System
Critical warnings and alarms displayed as text and with light
7" color display with touch screen function and adjustable contrast and brightness, illuminated switches
My Sandvik Digital Services Knowledge Box™ on-board hardware
Supports 3G, 4G, LTE and WLAN data transfer

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^2]	0,95
VDV_w over 15 min period [$m/s^{1.75}$]	8,26

Measured sound level	
The sound pressure level and sound power level at the operator's compartment, in a closed cabin, have been determined in stationary conditions on high idle and at full load, with engine Volvo TAD1340VE Tier 2.	
Sound pressure level L_{pA} [dB re 20 µPa]	74 dB
Sound power level L_{WA} [dB re 1 p W]	122 dB

Rear and front frame
High strength structure with optimized material thicknesses. Reduced own weight for higher overall hauling capacity and long structural lifetime. Welded steel construction.
Adjustable upper bearing in central hinge
Rear tanks bolted to frame, hydraulic tank and cabin base both bolted and welded to frame
Automatic central lubrication

Main components	
Alternator	24 V, 150 A
Batteries	2 x 12 V, 180 Ah
Starter	9 kW, 24 V
Driving lights	LED lights: 2 pcs in front 4 pcs in rear 4 pcs in cabin
Working lights	LED lights, 1 pc under boom
Parking, brake and indicator (blinkers) lights	LED lights: 2 pcs in front 2 pcs in rear
Control system with 7” Color display, 5 modules, inbuilt system diagnostics	
Reverse alarm (CE)	
Flashing beacon	

Fire safety
Portable fire extinguisher, 12 kg (CE)
Hot side - cold side design
Isolation of combustibles and ignition sources
Heat insulation on exhaust manifold, turbo, and isolated exhaust pipe

Energy isolation
Lockable main switch, ground level access
Starter isolator
Emergency stop push buttons according to EN ISO 13850: 1 pc in cabin, 2 pcs in rear of the loader
Pressure release in the expansion tank cap
Automatic discharge for pressure accumulators (brake system and pilot circuit)
Frame articulation locking device
Mechanical boom locking device
Wheel chocks and brackets

Standard manuals	
Operator’s Manual	English and other EU languages
Maintenance Manual	English and other EU languages
Parts Manual	English
Service and Repair Manual	English, Russian, French
E-manuals	2 x USB stick in pdf format, includes all the manuals
Decals	English, Finnish, Swedish, Spanish, Russian, French, Polish, Portuguese, Turkish, German, Norwegian, Estonian, Chinese, Greek

Options
Additional cabin heater element for air conditioning
ANSUL Twin fire suppression system, without CHECKFIRE
ANSUL Twin fire suppression system, with CHECKFIRE
Arctic package 120 V / 230 V
AutoMine© Loading readiness
AutoMine Loading Onboard Package ACS 2.0 DIO. Electrically compatible with system ACS 3.0.
Cabin lift kit (150 mm)
Closed cabin
Collision Prevention System interface
Converter with lock-up, Dana SOH
Cover grills for lamps
Disabled 4th gear
Driving direction lights (red / green)
Eclipse™ fire suppression system with auto shut down, Sustain or Extreme agent delivered separately
Electric loader towing kit
Emergency steering (CE)
Extra fire extinguisher 12kg
Integrated weighing system (IWS)
Jump start interface
Line of sight radio remote control (HBC CAN)
Line of sight radio remote control (HBC CAN) with video camera system
Monitoring camera system
Parking beacon
Radio remote control interface HBC (analoque, not with automation)
Recovery kit (brake release by pulling the hook)
Ride control
Safety rails
Seat belt monitoring system
Spare rim 22.00-25/3.0 (for tires 26.5-25)
Wiggins quick filling set for fuel and oils (hydraulic, engine and transmission)

Available buckets			
Type	**Volume**	**Width**	**Max. material density**
BareLip	6.2 m³	2700 mm	2400 kg/m³
BareLip	7.0 m³	3000 mm	2000 kg/m³
G.E.T. (standard)	5.4 m³	2770 mm	2600 kg/m³
G.E.T.	6.2 m³	2770 mm	2200 kg/m³
G.E.T.	7.0 m³	3070 mm	1900 kg/m³
G.E.T. Half Arrow	7.0 m³	3060 mm	1900 kg/m³

Grade performance										
Volvo TAD1340VE (Tier 2, Euro Stage II)										
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
1st gear (km/h)	5.9	5.8	5.8	5.8	5.8	5.8	5.7	5.7	5.7	5.7
2nd gear (km(h)	10.5	10.4	10.3	10.3	10.2	10.1	9.9	9.1	8.2	7.4
3rd gear (km/h)	18.3	18.1	17.9	17.0	14.7	12.9				
4th gear (km/h)	32.6	30.7	23.7							
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
1st gear (km/h)	5.9	5.8	5.8	5.8	5.7	5.7	5.7	5.6	5.6	5.1
2nd gear (km(h)	10.4	10.3	10.2	10.1	10.0	8.9	7.8	7.1		
3rd gear (km/h)	18.2	17.9	16.3	13.4						
4th gear (km/h)	32.2	24.1								

Dimensions				
Volume SAE heaped 2:1 (m^3) *	5.4	6.2	7.0	7.0
Max material broken density with fill factor 100% (kg/m^3)	2600	2200	1900	1900
Lip plate type	G.E.T. (standard)	G.E.T.	G.E.T.	G.E.T. Half Arrow
L1 (mm)	10925	11100	11115	11188
L2 (mm)	10534	10652	10662	10716
L3 (mm)	10135	10263	10275	10323
L4 (mm)	2535	2653	2663	2717
L5 (mm)	1479	1599	1611	1655
L6 (mm)	2345	2515	2530	2602
L7 (mm)	1952	2067	2077	2128
H1 (mm)	1231	1343	1360	1406
H2 (mm)	1644	1766	1777	1821
H3 (mm)	2349	2229	2219	2166
H4 (mm)	3699	3699	3700	3696
H5 (mm)	5358	5483	5495	5542
H6 (mm)	5869	5869	5869	5869
H7 (mm)	173	173	177	171
W1 (mm)	2799	2799	3099	3158
W2 (mm)	2842	2842	3099	3158
R1 (mm)	3224	3224	3224	3224
R2 (mm)	6873	6932	6873	7122
T1 (mm)	4593	4652	4783	4842
T2 (mm)	3824	3883	4014	4073

* According to ISO 7546

Dimensions			
Volume SAE heaped 2:1 (m^3) *	6.2	7.0	5.4
Max material broken density with fill factor 100% (kg/m^3)	2400	2000	2000
Lip plate type	Bare Lip	Bare Lip	Ejector
L1 (mm)	11121	11146	11054
L2 (mm)	10657	10674	10547
L3 (mm)	10344	10364	10346
L4 (mm)	2658	2675	2548
L5 (mm)	1681	1700	1687
L6 (mm)	2573	2598	2534
L7 (mm)	2071	2087	1990
H1 (mm)	1337	1353	1272
H2 (mm)	1848	1866	1889
H3 (mm)	2223	2206	2302
H4 (mm)	3747	3749	3889
H5 (mm)	5565	5584	5568
H6 (mm)	5869	5869	5882
H7 (mm)	221	221	256
W1 (mm)	2700	3000	3000
W2 (mm)	2793	3000	3000
R1 (mm)	3224	3224	3224
R2 (mm)	6882	7013	7032
T1 (mm)	4602	4733	4752
T2 (mm)	3833	3964	3983

* According to ISO 7546

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Please contact a Sandvik representative for clarification on specifications and options.

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Dimensions with 5.4 m³ G.E.t. bucket (standard)

The dimensions are indicative only.

