



# TORO™ LH514iE ELECTRIC LOADER

## TECHNICAL SPECIFICATION

Toro™ LH514iE is an electrically-driven loader for underground hard rock loading and hauling applications, with a tramping capacity of 14 metric tons and a payload-to-own-weight ratio that's best in class.

Toro™ LH514iE is a game changer compared to traditional diesel-powered underground loaders. Toro™ LH514iE offers a possibility to select a loader equipped with an electric motor emitting zero diesel emissions, and significantly less noise, vibrations and heat than diesel equipment. The loader is a strong package of pure power, delivering high breakout forces, high tramping speeds, and increased acceleration. The high capacity, unique bucket filling design and rapid cycle times mean you can move more material faster – at a lower cost per tonne.

Operator efficiency and safety are always a priority in underground LHDs, and Toro™ LH514iE delivers there, too. Good ergonomics and responsive controls maximize efficiency.

### Advantages

- Zero diesel emissions from the electric motor improves working environment
- Small turning radius enables easy navigation and optimized envelope size
- High power-to-weight ratio ensures faster cycle times
- Sandvik Intelligent Control system offers a user-friendly interface with vehicle parameters for rapid fault-finding
- Quick and easy access for ground-level service and maintenance optimizes uptime

### CAPACITIES

Tramping capacity	14 000 kg
Break out force, lift	28 100 kg
Break out force, tilt	24 600 kg
Standard bucket	5.4 m <sup>3</sup>

### SPEEDS FORWARD & REVERSE (LEVEL/LOADED)

1st gear	4.0 km/h
2nd gear	7.1 km/h
3rd gear	12.1 km/h
4th gear	20.5 km/h

### BUCKET MOTION TIMES

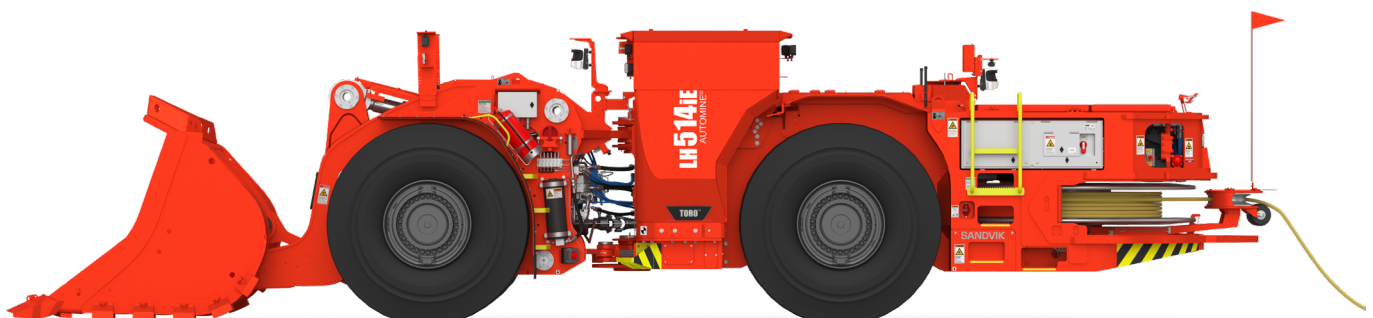
Raising time	8.4 sec
Lowering time	4.0 sec
Dumping time	1.8 sec

### OPERATING WEIGHTS

Total operating weight	38 500 kg
Front axle	16 200 kg
Rear axle	22 300 kg

### LOADED WEIGHTS

Total loaded weight	52 500 kg
Front axle	38 000 kg
Rear axle	14 500 kg



## OPERATIONAL CONDITIONS AND LIMITS

Environmental temperature	From -20 °C to +50 °C
Standard operating altitude	With standard unit from -1500 m to + 2000 m at 25 °C

## 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 FLOURINATED GREENHOUSE GASES (closed cabin option)
Refrigerant R134a under pressure max 38 bar/550 PSI:
Filled weight: 2,0 kg
CO <sub>2</sub> e: 2,860 tons
GWP: 1430
Information based on the F Gas Regulation (EU) No 517/2016

## POWER TRAIN

### ELECTRIC MOTOR

Three phase squirrel-cage drive motor	VEM
Drive motor output	132 kW
Drive motor voltage	1 000 V
Drive motor frequency	50 Hz
Drive motor speed	1 500 rpm
Drive motor insulation class	F
Drive motor degree of protection	IP 55
Three phase squirrel-cage pump motor	VEM
Pump motor output	45 kW
Pump motor voltage	900 V
Pump motor frequency	50 Hz
Pump motor speed	1500 rpm
Pump motor insulation class	F
Pump motor degree of protection	IP 55
Three phase squirrel-cage fan motor	VEM, 2 pcs
Fan motor output	1.5 kW
Fan motor voltage	400 V
Fan motor frequency	50 Hz
Fan motor speed	3 000 rpm
Fan motor insulation class	F
Total electric power	180 kW

### CONVERTER

Dana C8672-70
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## TRANSMISSION

Power shift transmission with modulation.	Dana 6422, electrical gear shift control, four gears forward and reverse.
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## AXLES

Front axle, spring applied hydraulic operated brakes. Fixed.	Kessler D106, limited slip differentials.
Rear axle, spring applied hydraulic operated brakes. Oscillating $\pm 8^\circ$ .	Kessler D106, limited slip differentials.

## TIRES

Tire size (Tires are application approved. Brand and type subject to availability.)	26,5x25 L5S 36 Ply
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## OPERATOR'S COMPARTMENT

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 mounts 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



## 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

## OPERATOR'S SEAT

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

## CONTROL SYSTEM, DASHBOARD AND DISPLAYS

Sandvik Intelligent Control system
Critical warnings and alarms displayed as text and with light
Instrument panel with 7" display, adjustable contrast and brightness. Illuminated switches,
My Sandvik Digital Services Knowledge Box™ on-board hardware
AutoMine® Loading readiness

## FRAME

### 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.
Central hinge with adjustable upper bearing
Rear tanks are bolted to frame, hydraulic tank and cabin base are both bolted and welded to frame
Automatic central lubrication

## HYDRAULICS

Electrical filling pump for hydraulic oil
Door interlock for brakes and boom, bucket, and steering hydraulics
Oil cooler for hydraulic and transmission oil with capability up to 52°C ambient temperature
ORFS fittings
MSHA approved hoses
Hydraulic oil tank capacity 320 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 center type, LS controlled
Steering hydraulic cylinders	100 mm, 2 pcs
Steering pump	Piston type
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 center 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 70 l

## ELECTRICAL EQUIPMENT

### MAIN COMPONENTS

Batteries	2 x 12 V, 56 Ah, Gelled-electrolyte type
Driving lights	LED lights: 4 pcs in front 4 pcs in rear 4 pcs in cabin
Working lights	LED light, 1 pc under boom
Parking and brake lights	LED lights: 2 pcs in front, LED lights 2 pcs in rear, LED lights
Control system	7" color display, 6 modules, inbuilt system diagnostics
Reverse alarm (CE)	
Flashing beacon	
Electronically controlled cable reeling	
Cable anchoring unit	
Cable shock absorber	

### INCLUDED SAFETY FEATURES

#### FIRE SAFETY

Portable fire extinguisher	12 kg (CE)
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#### ENERGY ISOLATION

Lockable main switch, 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

## DOCUMENTATION

### 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
ToolMan	2 x USB stick in pdf format, includes all the manuals
Decals	English, Swedish, Russian

## OPTIONS

660VAC 250m trailing cable (250m 4x70) for China
1000VAC 280m trailing cable (280m 4x50) for China
Accordance with KA requirements for Chinese market
AutoMine® Loading Onboard Package
Boom suspension (ride control)
Cabin heater
Cabin lift kit (150 mm)
Cover grills for lamps
Disabled 4th gear
Electric motor 132 kW 660V/50Hz
Emergency steering (CE)
Fire suppression system ANSUL, 2 tanks, 8 nozzles (CE/UL), Checkfire, including auto shutdown
Fire suppression system ANSUL, 2 tanks, 8 nozzles (CE/UL), including auto shutdown (not for automation)
Integrated weighing system
Line of sight radio remote control (HBC, CAN)
Monitoring camera system
Reeling cable, 4x5 1000VAC, 330 m (KA certified)
Round cable, NEXANS RHEYCORD(RTS), 4x50 mm <sup>2</sup> , 330 m (1000V)
Round cable, NEXANS RHEYCORD(RTS), 4x70 mm <sup>2</sup> , 280 m (660V)
Safety cabin, 2-point seatbelt, corner light, ROPS/FOPS and air conditioning unit
Safety rails
Spare rim 22.00-25/3.0 (for tires 26.5-25)
Supply box (IT)
Supply box (TNS)
Towing kit (incl. emergency steering hydraulic pump)
Tyres 29.5x25 VSDT
VICTOR plugs for supply box
Wiggins quick filling set for oils

## GRADE PERFORMANCE

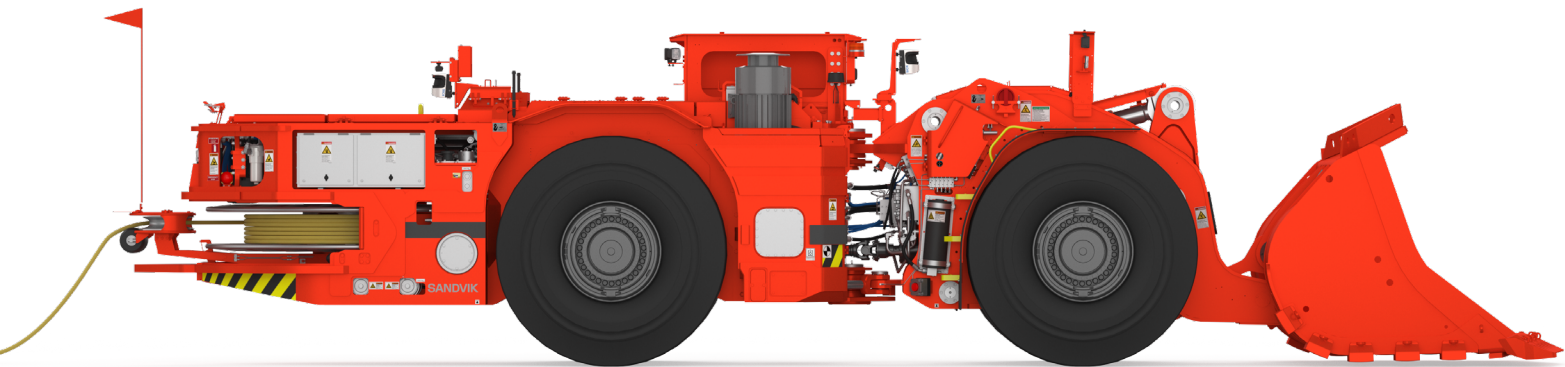
AC 132 kW

### Empty

Percent grade	0.0	2.0	4.0	6.0	8.0	10.0	12.5	14.3	17.0
Ratio					1:12	1:10	1:8	1:7	
1st gear (km/h)	4.1	4.0	3.9	3.8	3.8	3.7	3.6	3.6	3.5
2nd gear (km/h)	7.1	7.0	6.8	6.6	6.3	6.0	5.6	5.2	4.6
3rd gear (km/h)	12.3	11.7	11.0	9.9	8.6	7.3	5.8		
4th gear (km/h)	21.3	18.6	14.4	10.6					

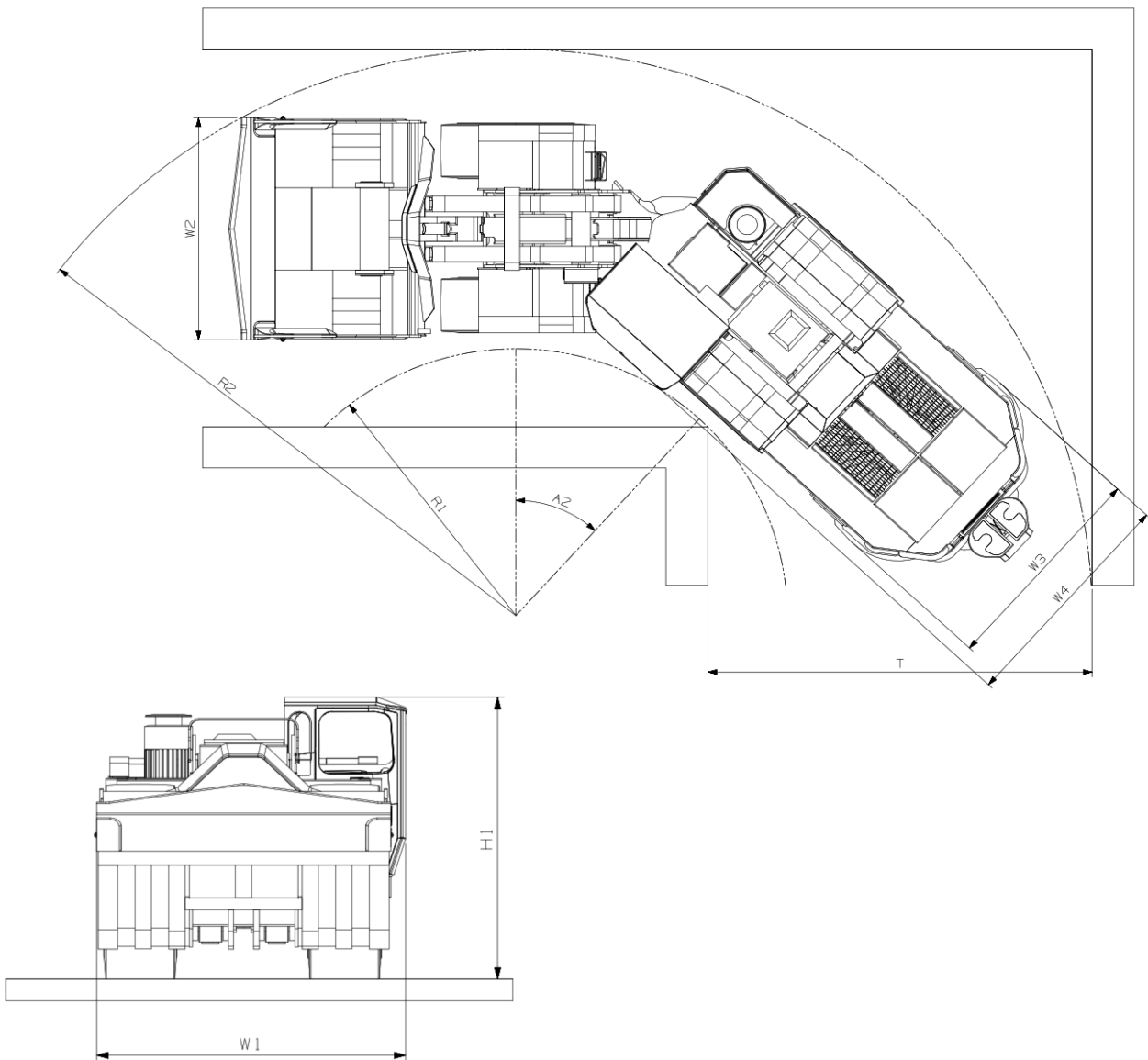
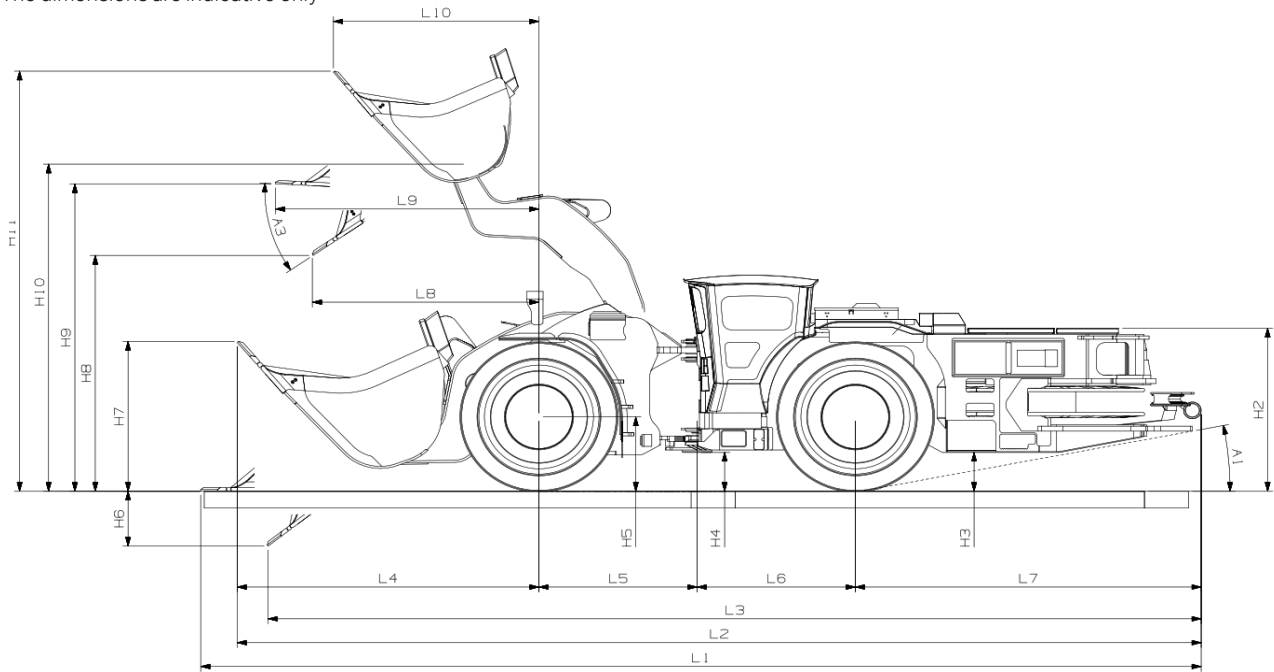
### Loaded

Percent grade	0.0	2.0	4.0	6.0	8.0	10.0	12.5	14.3	17.0
Ratio					1:12	1:10	1:8	1:7	
1st gear (km/h)	4.0	3.9	3.8	3.8	3.7	3.6	3.4	3.3	3.1
2nd gear (km/h)	7.1	6.8	6.6	6.2	5.7	5.2	4.4	3.9	3.3
3rd gear (km/h)	12.1	11.2	9.8	8.0	6.3				
4th gear (km/h)	20.5	15.6	10.2						



**DIMENSIONS WITH 5.4m³ GET BUCKET (STANDARD)**

The dimensions are indicative only



## DIMENSIONS

	Standard				
Bucket alternatives (m³)	4.6 m³	5.0 m³	5.4 m³	6.2 m³	7.0 m³
Material broken density (kg/m³)	max. 3200 kg/m³	max. 2900 kg/m³	max. 2600 kg/m³	max. 2200 kg/m³	max. 1900 kg/m³
Lip plate type	GET	GET	GET	GET	GET
L1 (mm)	11075	11193	11309	11479	11494
L2 (mm)	10800	10881	10960	11077	11087
L3 (mm)	10402	10578	10578	10706	10719
L4 (mm)	3267	3348	3427	3544	2708
L5 (mm)	1800	1800	1800	1800	1800
L6 (mm)	1850	1850	1850	1850	1850
L7 (mm)	3883	3883	3883	3883	3883
L8 (mm)	2408	2502	2595	2730	2742
L9 (mm)	3010	3128	3243	3413	3429
L10 (mm)	2690	2770	2848	2962	2971
H1, CC517 (mm)	2545	2545	2545	2545	2545
H1, OC410 (mm)	2559	2559	2559	2559	2559
H2 (mm)	1913	1913	1913	1913	1913
H3 (mm)	425	425	425	425	425
H4 (mm)	425	425	425	425	425
H5 (mm)	850	850	850	850	850
H6 (mm)	1070	1148	1148	1335	1344
H7 (mm)	1502	1588	1673	1790	1808
H8 (mm)	2664	2596	2523	2420	2411
H9 (mm)	3699	3699	3699	3699	3700
H10 (mm)	4080	4080	4080	4080	4080
H11 (mm)	5189	5277	5363	5489	5494
W1 (mm)	2897	2897	2897	2897	3098
W2 (mm)	2766	2766	2766	2766	3066
W3 (mm)	2581	2581	2581	2581	2581
W4 (mm)	2819	2819	2819	2819	2819
A1	10°	10°	10°	10°	10°
A2	42.5°	42.5°	42.5°	42.5°	42.5°
R1, left turn (mm)	3155	3155	3155	3155	3155
R2, left turn (mm)	6860	6898	6935	6992	7123
T, left turn (mm)	4629	4667	4704	4732	4892
R1, right turn (mm)	3362	3362	3362	3362	3362
R2, right turn (mm)	6860	6898	6935	6992	7123
T, right turn (mm)	4482	4520	4558	4614	4745

## DIMENSIONS

Bucket alternatives (m³)	4.6 m³	5.0 m³	5.4 m³	6.2 m³	7.0 m³
Material broken density (kg/m³)	max. 3400 kg/m³	max. 3100 kg/m³	max. 2800 kg/m³	max. 2400 kg/m³	max. 2000 kg/m³
Lip plate type	Bare Lip	Bare Lip	Bare Lip	Bare Lip	Bare Lip
L1 (mm)	11138	11253	11369	11539	11564
L2 (mm)	10806	10885	10965	11082	11098
L3 (mm)	10485	10572	10660	10788	10808
L4 (mm)	3273	3353	3432	3549	3565
L5 (mm)	1800	1800	1800	1800	1800
L6 (mm)	1850	1850	1850	1850	1850
L7 (mm)	3883	3883	3883	3883	3883
L8 (mm)	2491	2583	2676	2811	2831
L9 (mm)	3069	3185	3301	3471	3496
L10 (mm)	2695	2773	2851	2965	2981
H1, CC517 (mm)	2545	2545	2545	2545	2545
H1, OC410 (mm)	2559	2559	2559	2559	2559
H2 (mm)	1913	1913	1913	1913	1913
H3 (mm)	425	425	425	425	425
H4 (mm)	425	425	425	425	425
H5 (mm)	850	850	850	850	850
H6 (mm)	1073	1149	1225	1337	1352
H7 (mm)	1586	1670	1754	1878	1897
H8 (mm)	2666	2596	2526	2423	2409
H9 (mm)	3747	3747	3747	3747	3749
H10 (mm)	4080	4080	4080	4080	4080
H11 (mm)	5273	5359	5444	5570	5590
W1 (mm)	2848	2848	2848	2848	3000
W2 (mm)	2700	2700	2700	2700	3000
W3 (mm)	2581	2581	2581	2581	2581
W4 (mm)	2819	2819	2819	2819	2819
A1	10°	10°	10°	10°	10°
A2	42,5°	42,5°	42,5°	42,5°	42,5°
R1, left turn (mm)	3155	3155	3229	3155	3155
R2, left turn (mm)	6813	6850	6865	6944	7075
T, left turn (mm)	4582	4619	4582	4713	4844
R1, right turn (mm)	3362	3362	3362	3362	3380
R2, right turn (mm)	6813	6850	6887	6944	7010
T, right turn (mm)	4435	4472	4510	4566	4620



