



# TORO™ LH517i

## SAFER. STRONGER. SMARTER.



# LOW COST PER TONNE

## **MINIMIZED IMPACT DAMAGES**

This loader has been developed for demanding conditions to achieve the lowest cost of ownership while maintaining productivity and ease of maintenance.

The heavy duty rear frame and mask with integrated reaction bars minimizes damage from wall impacts. Welded steel box structures used in the frame and boom provide strong resistance to shock loads and are optimized to reduce stresses and extend frame lifetime while ensuring superior strength to weight ratio.

## **RETRIEVAL HOOK**

A fully hydraulic retrieval hook releases the brakes through hydraulic pressure allowing faster, easier and safer stope removal from under unsupported roof. Strong structures in the equipment withstand high pulling forces.

## **EXTENDED COMPONENT LIFETIMES**

Brake, hydraulic and transmission cooling capacity is increased for efficient operation at higher ambient temperatures. A more efficient cooling circuit leads to lower oil temperatures, reducing stress on the system, extending component lifetimes and minimizes oil leaks.

## **OPTIMIZED BRAKING**

The number of brake discs in the spring applied hydraulic release (SAHR) brakes has been optimized for smoother braking along with a simpler brake hydraulic circuit requiring less maintenance and adjustment. The optional Stage V engine comes with an engine brake, which provides better control of downhill speed, and minimizes brake and transmission overheating as well as brake wear. The standard engine Tier 2 / Stage II does not include an engine brake.

## **HEAVY DUTY AXLES**

Toro™ LH517i loader features heavy-duty axles to ensure long axle life in demanding conditions. Increased rear axle oscillation provides greater movement over rough terrain with a re-enforced steel structure to reduce stress.

## **RELIABLE ELECTRICAL HARDWARE**

All electrical hardware is specially designed for demanding conditions with corrosion, heat and water resistance. Increased wiring protection including new shrink mesh engine wiring harnesses improve reliability.

## **TRACTION CONTROL**

The optionally available traction control system reduces wheel spin and slipping when penetrating to the muck pile, extending tyre lifetime and reducing needs for tyre change.

## **DRIVELINE EFFICIENCY**

Automatically activated torque converter lock up increases driveline efficiency for faster ramp speed, reducing transmission heat and improving fuel economy. The electronically controlled powershift transmission allows the operator to choose between manual or automatic shifting. The transmission modulation valve provides smoother shifting and easy access test ports for trouble shooting.

## **LOWER BUCKET COSTS AND REDUCED DOWNTIME**

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. Available as either mechanical or weld on systems, Sandvik G.E.T. provides lower overall bucket maintenance costs and reduced downtime. A high productivity 9.1m<sup>3</sup> bucket is available as an option with a Sandvik G.E.T. Half Arrow weld-on lip system and optimized wear package for low specific gravity ore.







# INCREASED PRODUCTIVITY

## **FAST BUCKET FILLING**

Toro™ LH517i loader smart boom geometry is optimized to provide superior hydraulic power for fast bucket filling and handling of oversized rocks. The powerful boom and bucket hydraulics combined with smart geometry enables the use of both lift and tilt functions simultaneous when penetrating the muck pile. This makes one pass bucket filling easy by lifting the boom to increase front wheel traction ensuring fast bucket filling with high fill factors. Heavy duty rear frame with added weight in the rear balances the machine perfectly when lifting and pushing into the muck pile.

## **FUEL EFFICIENT AND LOW EMISSION ENGINES**

The standard engine configuration is a fuel efficient 310kW Tier 2 Volvo engine, delivering powerful thrust for bucket filling and high-speed tramming, all resulting in high productivity with low cost per loaded tonne.

When ultra-low Sulphur diesel fuel is available, Sandvik offers a Volvo Stage V low emission engine option. The Stage V engine meets the relevant European emission regulations and delivers significantly reduced MSHA and CANMET ventilation rates - still maintaining performance and fuel efficiency. The engine brake in the Stage V engine provides better control of vehicle speed downhill, minimizes brake and transmission overheating and brake wear. With the new Stage V engines, the engine oil change interval is extended from 250 to 500 hours, decreasing annual oil consumption, and improving productivity by means of increased availability.

## **REDUCED EMISSIONS WITH RENEWABLE DIESEL**

In addition to traditional diesel fuel, both available engines can use paraffinic diesel fuel meeting the requirements of EN 15940, which reduces emissions of CO, CO<sub>2</sub>, HC, NO<sub>x</sub> and diesel particulates.

## **EFFICIENT AND EASY TO USE**

Toro™ LH517i loader continues to use its predecessors proven load sense hydraulic system with variable displacement piston pumps that provide on demand pressure and flow for increased efficiency, reducing fuel consumption. The boom and bucket hydraulic circuit delivers fast movement through increased flow as well as a bucket shaking functionality for fast dumping times. Improved efficiency is achieved through lower flow resistance and heat generation. Steering control is optimized with a steering valve with integrated pilot pressure. Steering and boom soft stops reduce shock loads and vibration and extend cylinder lifetime.

## **PRODUCTION MONITORING**

Sandvik Integrated Weighing System (IWS) accurately measures payload when lifting the boom - as well as the number of buckets filled during a shift - and records the result to the My Sandvik Knowledge Box onboard.

The My Sandvik Knowledge Box can transfer this production monitoring data through Wi-Fi connection for access via the My Sandvik internet portal. Alternatively, data can be downloaded manually in the operator's compartment onto a USB stick. Monitoring the loader payload can assist in maximizing productivity, identifying needed operator training, and reducing overloading.



Toro™ LH517i



# SUPERIOR OPERATOR ENVIRONMENT

## **PREMIUM COMFORT**

The loader cabin offers premium ergonomics and comfort for long shifts. The cabin uses dust and noise resistant upholstery materials, and new softened paddings are fitted in the arm rests and cabin door. The arm rests and joysticks are adjustable and can be configured to suit the operator. Increased leg space and improved pedal positions improve ergonomics and help to reduce fatigue and get a convenient posture. As a new available option, Toro™ LH517i loader can now be equipped with the same ergonomic seat as the Toro™ LH515i loader; an adjustable low frequency suspension seat with two-point seat belt.

## **SAFETY ON BOARD**

The loader cabin is ROPS and FOPS certified to protect the operator in case of roll over or falling objects. It has 3-layer laminated safety glass windows, emergency escape windows, and illuminated cabin entrance with three-point contact handles and anti-slip steps. The door system features a magnetic interlock switch, which automatically applies brakes and inactivates boom, bucket, and steering when the cabin door is opened. A seat belt and door latch monitoring system is available as an option. During machine start-up, the horn emits a lower audible sound for reduced noise exposure and a different sound during reverse.

## **REDUCED OPERATOR FATIGUE**

A 7" color 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 environment to reduce eye fatigue, and red interior cabin lighting is also designed to not affect night vision during driving.

## **FOR IMPROVED VISIBILITY**

Outstanding all-around visibility is provided with an optional lift kit, additional cabin window, flat rear frame covers, optional right-hand side and rear facing monitoring cameras and adjustable high power LED lights. Illumination is increased by up to 20% over halogen lights, reducing eye fatigue and risk of collision, while longer LED lifetime offers lower cost of ownership.



## **RELIABLE AND EFFICIENT COOLING**

The efficient air conditioning system is directly driven off the engine for increased reliability, and it is independent of other hydraulics for easy troubleshooting. Air is filtered through a pre-filter and two-stage filtration while a centrifugal fan pressurizes the cabin to minimize the ingress of dust. To enable accurate temperature and humidity control for better air quality and operator comfort, the air conditioner is equipped with heating as standard.

Strengthened door hinges and improved door sealing extend the lifetime of the pressurized cabin system and decrease the need for maintenance.

## **SMOOTHER RIDE OVER ROUGH TERRAIN**

To reduce vibrations and balance movements that occur during loader operation, the equipment cabin is mounted with solid rubber mounts to the rear frame. New optimized weight distribution in the equipment further improves stability.

The optionally available ride control system helps to provide an even smoother ride for the operator over rough ground when carrying loads at high tramming speeds. The ride control system includes a boom suspension and floating valve, and the boom and bucket movement is dampened by a nitrogen filled accumulator in the hydraulic boom circuit.

## **OPERATOR SPEED ASSISTANT**

To support specifically in downhill driving and save equipment brakes, the operator speed assist system, available as an option with the Stage V engine, helps the operator to maintain effortlessly desired speed. The speed assist system has several different stages for speed control, including a maximum set speed limit.



# READY FOR DIGITALIZATION

Toro™ LH517i loader has been optimized for use with Sandvik AutoMine® for increased safety, productivity and lower costs.

## AutoMine®

AutoMine® is the industry leader in automation for underground loaders and trucks. This high-performing, comprehensive solution is working around the world, backed by Sandvik experts across the globe.

AutoMine® readiness is built into the loader for faster retrofitting later in the loader's lifetime. To maintain a fast retrofit time of 2 – 3 days, the AutoMine® Onboard Package now has one small enclosure and electrical quick connectors for fast installation, and no significant hydraulic changes are needed. All sensors have increased protection from rock fall.

With AutoMine®, a fleet of loaders is converted into a high performing autonomous production system, providing significant safety and productivity improvements for mine operations.

## OptiMine®

OptiMine® is the most comprehensive solution for optimizing underground hard rock mining production and processes. It integrates all assets and people - including Sandvik and non-Sandvik equipment - delivering descriptive and predictive insights to improve operations.

OptiMine® is interoperable and able to connect to any system and technology, including Newtrax IoT devices, providing a real-time view of mining operations. It is an open and scalable modular suite that gives you flexibility to expand and work with a full range of equipment, systems and networks.

## My Sandvik Digital Service Solutions 365

My Sandvik Digital Service Solutions are designed to help you maximize your productivity, operational efficiency and safety. The Knowledge Box™ onboard the equipment collects, processes and transfers monitoring data into My Sandvik Insight and My Sandvik Productivity dashboards which you can access 24/7 via My Sandvik customer portal for visualization of fleet health, productivity and utilization.

## Proximity Detection System Interface

A Proximity Detection System (PDS) interface option is also available on the loader for mines to interface with their site PDS system. The PDS interface offers easy installation and connection to the Sandvik Intelligent Control System with the capability to slow down and stop the loader on a signal from a PDS.

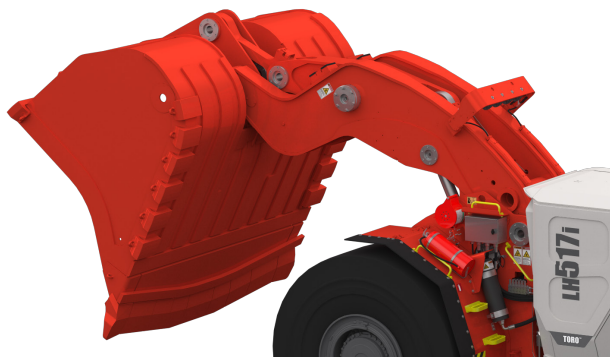








# MAINTENANCE FRIENDLY



Jacking points on the front and rear frame reduce risks during lifting, while built in tie down and lifting points in the frame and bucket enable safer transportation. Lighter drive shafts with a new sealing design offer longer bearing life and together with lighter construction driveline guards, easier removal and lifting.

The boom lock is integrated into the front frame and allows one handed operation to maintain 3 points of contact when accessing the lock. The boom uses robust solid floating pins with a M30 pull out thread for easier pin removal, along with new bush lip sealings to prevent the ingress of dirt. The loader is equipped with more greasing points in the boom geometry, well protected grease lines and automatic central lubrication system with increased capacity for longer time between refilling.

An electric filling pump for hydraulic oil quickly fills the hydraulic tank through a filter to ensure clean oil to protect hydraulic system components. Live oil sampling offers health monitoring of main components to increase availability. All hydraulic test points are at ground level via a light-weight removable door to the hydraulic tank that is easily accessible.

The maintenance access to the top of the machine includes 3-point high contrast handles and anti-slip steps on both front and rear frames. Safety rails are designed for reduced damage from wall collisions with an improved lock down mechanism. The left side is automatically opened by an actuator for safe rail assembly.



In addition to a swing out fan for engine cooler access, the side coolers for transmission, brakes and hydraulics, each have a swing out fan for easy cleaning. each have a swing out fan for easy cleaning.

The hot side of the loader includes heat shielding of all exhaust components backed up by an optional Eclipse™ Fire Suppression System from Sandvik for increased fire safety.

There are separate battery and starter isolation switches located at ground level for troubleshooting while the engine is locked out for service.



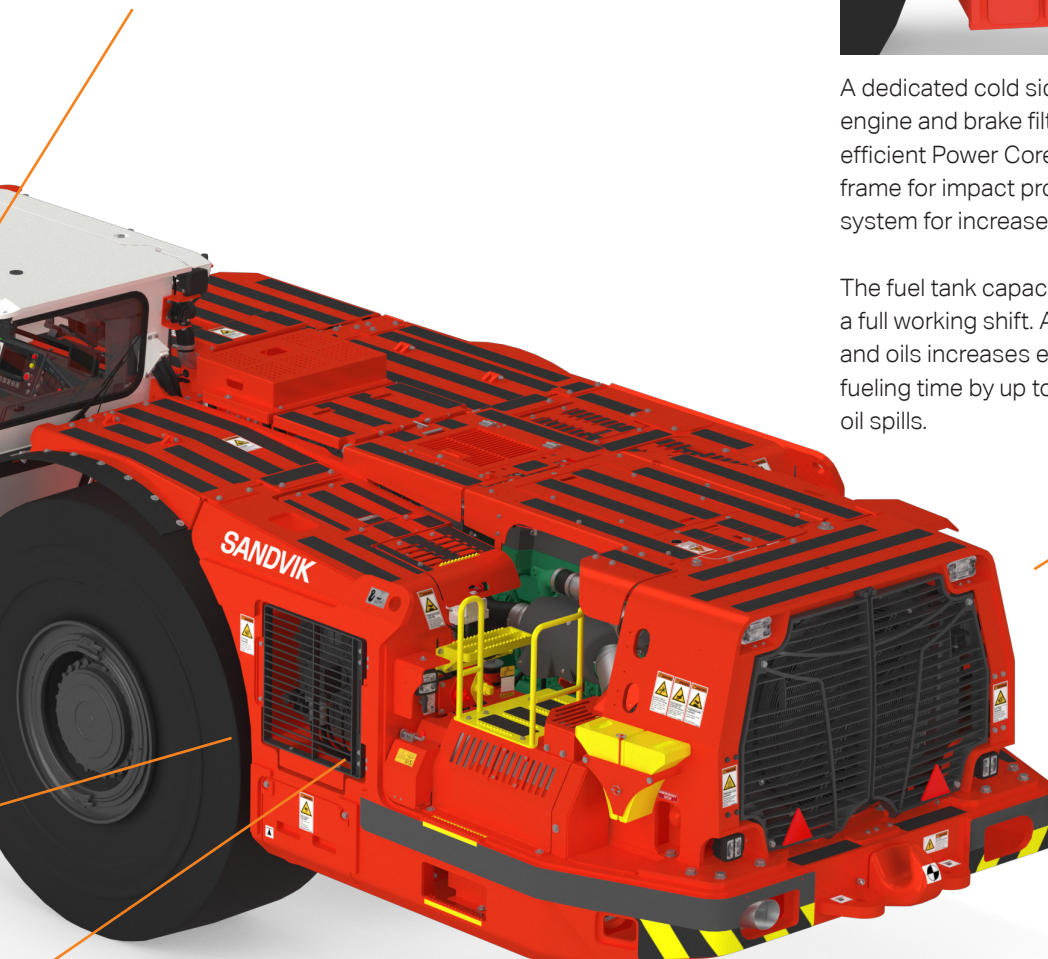


To minimize the need to move around the machine or use special tools, the 7" color display in the operator's compartment provides service information, easy system diagnostics and alarm log files.



A dedicated cold side includes a filter station for all engine and brake filters with easy ground level access. An efficient Power Core engine filter is housed well within the frame for impact protection and utilizes an ejector valve system for increased filter lifetime.

The fuel tank capacity enables continuous operation for a full working shift. An optional fast filling system for fuel and oils increases equipment availability by reducing fueling time by up to 80% as well as eliminating fuel and oil spills.



Tailor-made maintenance kits include all relevant parts and other materials for planned maintenance. Sandvik Performance Fluids preserve the machine's high performance. Smooth operation throughout its lifetime can be ensured with Sandvik Long-Life Engine, Transmission and Hydraulic Oils, which are available in different viscosity grades.



# SANDVIK 365 PARTS & SERVICES

## **LIFETIME SUPPORT**

Having great equipment is only part of the story. What makes working with Sandvik an unbeatable experience is the blend of lifetime support we can provide through our broad offering of genuine parts & components, services and digital innovations.

At the heart of this package lies a combination of skilled people, integrated processes & systems and a global footprint.

## **QUALITY SERVICE TAILORED TO YOUR NEEDS**

We offer different type of service agreements and advisory services that can be adapted to suit the support you require – helping you to maintain your fleet in the optimal way.

It's our job to keep your equipment in full health and to make sure that major components of your loader are being replaced or repaired at optimum intervals. With our solutions, you can expect superior reliability and longer life than with non-OEM alternatives.

## **DIGITAL SERVICES FROM THE EXPERTS**

As a long established and trusted OEM we understand the challenges our customers face in their mines with our equipment. In addition to that, we have the highest number of connected mining equipment.

Our learnings over this time have helped us to understand not only capturing the data but analyzing it to provide insights which deliver tangible value to our customers. Remote Monitoring Service is one example - the service leverages state of the art cloud technologies and AI to convert machine data into actionable information, hence enabling the prevention and prediction of breakdowns before they happen.





# TECHNICAL SPECIFICATION

## TORO™ LH517i

Toro™ LH517i is a high capacity loader for 5 x 5 meter mining tunnels. With superior hydraulic power for fast bucket filling and drivetrain power for high ramp speed, the loader is designed to quickly clear tunnel headings for rapid advance rates.

The loader is equipped with fuel efficient 310kW Tier 2 / Stage II engine as standard. 315kW Stage V and Tier 4f low emission engines are available with use of ultra low sulphur diesel fuel. These optional engines come with an engine break.

The intelligent loader features many improvements in operator and maintenance ergonomics. The already high level of safety has been further increased to make the operation and maintenance more fluent.

Higher productivity and profitability is achieved by better balanced machine and larger bucket size. Rebalancing makes the bucket filling easier and reduces tire wear. Combined with unique bucket filling, Toro™ LH517i loader can boost operations to the next level.

The loader has integrated intelligence in the form of Sandvik Intelligent Control system, My Sandvik Digital Services Knowledge Box™ on-board hardware and automation readiness. Additional examples of available options are Integrated weighing system and AutoMine® Loading Onboard Package.

### CAPACITIES

|                           |           |
|---------------------------|-----------|
| Maximum tramming capacity | 17 200 kg |
| Break out force, lift     | 35 000 kg |
| Break out force, tilt     | 29 450 kg |
| Standard bucket           | 7.0 m³    |

### BUCKET MOTION TIMES

|               |         |
|---------------|---------|
| Raising time  | 8.3 sec |
| Lowering time | 4.3 sec |
| Dumping time  | 2.0 sec |

### OPERATING WEIGHTS \*

|                        |           |
|------------------------|-----------|
| Total operating weight | 48 400 kg |
| Front axle             | 19 400 kg |
| Rear axle              | 29 000 kg |

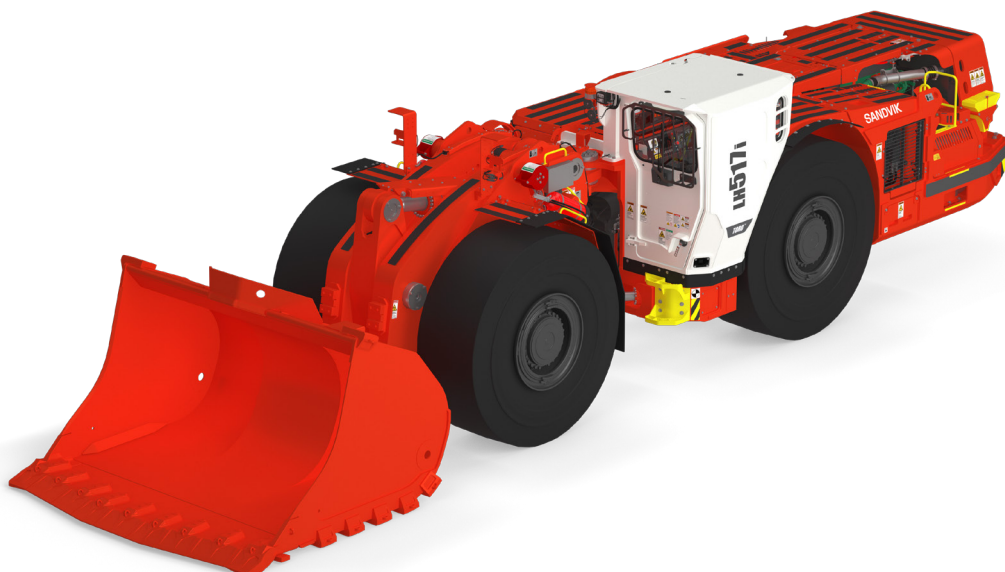
### LOADED WEIGHTS \*

|                     |           |
|---------------------|-----------|
| Total loaded weight | 65 600 kg |
| Front axle          | 46 100 kg |
| Rear axle           | 19 500 kg |

\* Unit weight is dependent on the selected options

### SPEEDS FORWARD & REVERSE (LEVEL/LOADED, WITH LOCK-UP)

| ENGINE   | STAGE II /<br>TIER 2 | TIER 4F AND<br>STAGE V |
|----------|----------------------|------------------------|
| 1st gear | 5.3 km/h             | 5.4 km/h               |
| 2nd gear | 9.5 km/h             | 9.6 km/h               |
| 3rd gear | 16.5 km/h            | 16.8 km/h              |
| 4th gear | 29.2 km/h            | 29.7 km/h              |





## OPERATIONAL CONDITIONS AND LIMITS

|                             |   |
|-----------------------------|---|
| Environmental temperature   | From -10°C to +50°C   |
| Standard operating altitude | With engine Volvo TAD1342VE<br>from -1500 m to +3000 m at<br>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  
Refrigerant R134a under pressure max 38 bar/550 PSI:  
Filled weight: 1.6 kg  
CO2e: 2.288 tons  
GWP: 1430  
Information based on the F Gas Regulation (EU) No 517/2016

## POWER TRAIN

### ENGINE

|  |   |
|--|---|
| Diesel engine  | Volvo TAD1342VE<br>Without engine brake                     |
| Output   | 310 kW @ 2 100 rpm  |
| Torque   | 2 005 Nm @ 1 260 rpm  |
| Number of cylinders                                  | In-line 6   |
| Displacement   | 12.78 l   |
| Cooling system                                       | Liquid cooled and piston pump<br>driven cooler fan          |
| Combustion principle                                 | 4-stroke, direct injection, turbo<br>with intercooler       |
| Air filtration                                       | Two stage filtration, dry type                              |
| Electric system                                      | 24 V  |
| Emissions  | Tier 2, Euro Stage II                                       |
| Ventilation rate<br>(Ultra low sulphur diesel)       | CANMET 12.74 m³/s<br>MSHA 18,500 CFM                        |
| Particulate index<br>(Ultra low sulphur diesel)      | MSHA 10,500 CFM   |
| Exhaust system                                       | Catalytic purifier and muffler,<br>double wall exhaust pipe |
| Average estimated fuel<br>consumption at 40% load    | 32 l/h  |
| Fuel tank refill capacity                            | 580 l   |
| Compatible with paraffinic<br>diesel fuel (EN 15940) | Yes   |

### CONVERTER

Dana SOH 9000 series with lock-up

### TRANSMISSION

|  |  |
|--|--|
| Power shift transmission with modulation | Dana SOH 6000 series,<br>automatic gear shift control,<br>four gears forward and reverse |
|--|--|

## AXLES

|   |  |
|---|--|
| Front axle, spring applied<br>hydraulic operated brakes.<br>Fixed           | Kessler D106, limited<br>slip differential |
| Rear axle, spring applied<br>hydraulic operated brakes.<br>Oscillating ± 8° | Kessler D106, limited<br>slip differential |

## TIRES

|   |                    |
|---|--------------------|
| Tire size (Tires are application<br>approved. Brand and type<br>subject to availability.) | 29.5x29 L5S 34 ply |
|---|--------------------|

## HYDRAULICS

|  |  |
|--|--|
| Door interlock for brakes, boom, bucket, and steering hydraulics |  |
| Filling pump for hydraulic oil                                   | Electric                                     |
| Oil cooler for hydraulic and<br>transmission oil                 | Capability up to 50°C ambient<br>temperature |
| Fittings   | ORFS   |
| Hoses  | MSHA approved                                |
| Hydraulic oil tank capacity                                      | 333 l  |
| Sight glass for oil level  | 2 pcs  |

## STEERING HYDRAULICS

|   |   |
|---|---|
| Full hydraulic, centre-point<br>articulation, power steering with<br>two double acting cylinders.<br>Steering lock. | Steering controlled by electric<br>joystick |
| Steering main valve   | Open circuit type                           |
| Steering hydraulic cylinders  | 125 mm, 2 pcs                               |
| Steering pump   | Piston type, LS controlled                  |
| Steering and servo hydraulic<br>pumps   | Piston type                                 |

## BUCKET HYDRAULICS

|  |   |
|--|---|
| The oil flow from steering<br>hydraulic pump is directed to<br>bucket hydraulics when steering<br>is not used. | Joystick bucket and boom<br>control (electric), equipped with<br>piston pump that delivers oil to<br>the bucket hydraulic main valve. |
| Boom system  | Z-link  |
| Lift cylinders   | 180 mm, 2 pcs   |
| Dump cylinder  | 220 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.

Automatic brake activation system, ABA

Electrically driven emergency brake release pump

Brake oil tank capacity 77 l



## OPERATOR'S COMPARTMENT

The cabin offers superior operator ergonomics through well designed leg space and pedal position to reduce operator fatigue. With a slim line dash and greater headroom, the cabin is spacious for the operator's comfort, providing also additional storage for a water bottle and supplies needed for a full shift.

The cabin uses dust and noise resistant upholstery materials, is ROPS/FOPS certified to protect the operator in case of roll over or falling objects, has 3-layer laminated safety glass windows, emergency exits, illuminated cabin entrance with three-point contact handles and anti-slip steps. In addition, the cabin is mounted on oil dampened bushings to reduce whole body vibration.

### CABIN

|   |
|---|
| 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 inside the cabin  |
| Powered 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   |

### CONTROL SYSTEM, DASHBOARD AND DISPLAYS

|  |
|--|
| Sandvik Intelligent Control System   |
| Critical warnings and alarms displayed as text and with light  |
| Instrument panel with 7" color display, touch screen function, adjustable contrast and brightness and illuminated switches |
| My Sandvik Digital Services Knowledge Box™ on-board hardware   |
| AutoMine® Loading readiness  |
| Supports 3G, 4G, LTE and WLAN data transfer  |

### OPERATOR'S SEAT

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

## 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> ]              | 0,97 |
| VDV <sub>w</sub> over 15 min period [m/s <sup>1.75</sup> ] | 8,72 |

## 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, with engine Volvo TAD1342VE Tier 2.

|   |        |
|---|--------|
| Sound pressure level<br>$L_{pA}$ [dB re 20 µPa] | 73 dB  |
| Sound power level<br>$L_{WA}$ [dB re 1 p W]     | 119 dB |

## FRAME

### REAR AND FRONT FRAME

|   |
|---|
| Central hinge with adjustable upper bearing |
| Tanks welded to the frame                   |
| Automatic central lubrication               |

## ILLUMINATION

Illuminance  $E_{av}$  with 2 pieces of high and low beam lights and 1 piece of wide flood 50 W led lights at a distance of 20 m in front of the loader:

|                    |        |
|--------------------|--------|
| $E_{av}$ low beam  | 31 lx  |
| $E_{av}$ high beam | 158 lx |

Illuminance  $E_{av}$  with 2 pieces of high and low beam lights and 1 piece of wide flood 50 W led lights at a distance of 20 m behind the loader:

|                    |       |
|--------------------|-------|
| $E_{av}$ low beam  | 35 lx |
| $E_{av}$ high beam | 91 lx |

Toro™ LH517i 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

### MAIN COMPONENTS

|  |  |
|--|--|
| Alternator   | 28 V, 150 A  |
| Batteries  | 2 x 12 V, 180 Ah                                     |
| Starter  | 7 kW, 24 V   |
| Driving lights   | LED lights:<br>4 pcs in front, rear and cabin        |
| Working lights   | LED lights:<br>1 pc under boom<br>2 pcs corner light |
| Parking, brake and indicator (blinkers) lights                     | LED lights:<br>2 pcs in front and rear               |
| Control system   | 5 modules, inbuilt system diagnostics                |
| Dual horn configuration with separate alarms for start and reverse |  |
| Flashing beacon  |  |



## INCLUDED SAFETY FEATURES

### FIRE SAFETY

|   |
|---|
| Portable fire extinguisher, 12 kg (CE requirement)                    |
| 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 |
| 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   |

## 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 manuals   |
| Decals                    | English, Finnish, Swedish, Spanish, Russian, French, Polish, Portuguese, Turkish, German, Norwegian, Estonian, Chinese, Greek |

### OPTIONAL ENGINE

|  |                                   |
|--|-----------------------------------|
| Diesel engine                                      | Volvo TAD1372VE                   |
| Output   | 315 kW @ 1 900 rpm                |
| Engine brake                                       | Yes                               |
| Emissions  | Tier 4 Final                      |
| Ventilation rate (Ultra low sulphur fuel, AdBlue)  | CANMET 6.61 m³/s, MSHA 13,500 CFM |
| Particulate index (Ultra low sulphur fuel, AdBlue) | MSHA 2,000 CFM                    |
| Average estimated fuel consumption at 40% load     | 32 l/h                            |
| Compatible with paraffinic diesel fuel (EN 15940)  | Yes                               |

## OPTIONS

|  |
|--|
| Additional cabin heater element for air conditioning   |
| ANSUL Twin fire suppression system (CE requirement)  |
| Arctic package (120V or 230V) Includes cabin heater for new AC unit, hydraulic oil heater, transmission heater, engine heaters and arctic oils |
| AutoMine® Loading: Onboard Package   |
| Boom suspension (ride control)   |
| Cabin lift kit (150 mm)  |
| CE Declaration of conformity   |
| Cover grills for lamps   |
| Disabled 4th gear  |
| Door latch and seatbelt monitoring system  |
| Driving direction lights (red / green)   |
| Eclipse™ Fire suppression system with auto shutdown, Sustain or Extreme agent delivered separately (CE requirement)                            |
| Emergency steering (CE requirement)  |
| Harsh conditions package   |
| High backrest seat with four-point seat belt   |
| Integrated weighing system (IWS)   |
| Jump start interface   |
| Line of Sight Radio remote control HBC CANBUS controlled   |
| Line of Sight Radio remote control HBC CANBUS controlled with Video camera system  |
| Monitoring camera system   |
| Neutral brake  |
| Operator Speed Assist  |
| Proximity detection system (PDS) interface   |
| Retrieval hook (hydraulic brake release by pulling the hook)   |
| Safety rails   |
| Seat: comfort, mid backrest with two-point seat belt   |
| Seat mounted armrests  |
| Spare rim 25.00-29/3.5 (for tyres 29.5R29)   |
| Traction control   |
| Tyre pressure monitoring system  |
| Wiggins quick filling set for fuel, coolant and oils (hydraulic, engine and transmission)  |

### OPTIONAL ENGINE

|   |                              |
|---|------------------------------|
| Diesel engine                                     | Volvo TAD1382VE              |
| Output  | 315 kW @ 1 900 rpm           |
| Engine brake                                      | Yes, modulating engine brake |
| Emissions   | Stage V                      |
| Average estimated fuel consumption at 40% load    | 32 l/h                       |
| Compatible with paraffinic diesel fuel (EN 15940) | Yes                          |

**AVAILABLE BUCKETS**

| TYPE              | VOLUME             | WIDTH   | MAX. MATERIAL DENSITY  |
|-------------------|--------------------|---------|------------------------|
| G.E.T. (standard) | 7.0 m <sup>3</sup> | 3070 mm | 2400 kg/m <sup>3</sup> |
| G.E.T.            | 7.6 m <sup>3</sup> | 3070 mm | 2100 kg/m <sup>3</sup> |
| G.E.T.            | 8.6 m <sup>3</sup> | 3070 mm | 1800 kg/m <sup>3</sup> |
| G.E.T. Half Arrow | 9.1 m <sup>3</sup> | 3436 mm | 1700 kg/m <sup>3</sup> |
| Bare Lip Ejector  | 7.0 m <sup>3</sup> | 2830 mm | 2200 kg/m <sup>3</sup> |
| Bare Lip          | 7.6 m <sup>3</sup> | 3000 mm | 2200 kg/m <sup>3</sup> |
| Bare Lip          | 8.4 m <sup>3</sup> | 3000 mm | 2000 kg/m <sup>3</sup> |
| MAKO              | 8.6 m <sup>3</sup> | 3110 mm | 1800 kg/m <sup>3</sup> |

**GRADE PERFORMANCE**

Volvo TAD1342VE, EU Stage II, Tier 2 (3 % rolling resistance, with lock-up)

**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) | 5,3  | 5,3  | 5,3  | 5,3  | 5,2  | 5,2  | 5,2  | 5,2  | 5,2  | 5,1  |
| 2nd gear (km/h) | 9,5  | 9,4  | 9,4  | 9,3  | 9,2  | 9,2  | 9,1  | 8,7  | 7,8  | 7,1  |
| 3rd gear (km/h) | 16,6 | 16,4 | 16,2 | 16,0 | 14,0 | 12,4 |      |      |      |      |
| 4th gear (km/h) | 29,6 | 28,9 | 22,8 |      |      |      |      |      |      |      |

**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) | 5,3  | 5,3  | 5,3  | 5,2  | 5,2  | 5,2  | 5,1  | 5,1  | 5,1  | 4,8  |
| 2nd gear (km/h) | 9,5  | 9,4  | 9,3  | 9,2  | 9,1  | 8,5  | 7,5  | 6,9  |      |      |
| 3rd gear (km/h) | 16,5 | 16,2 | 15,5 | 13,0 |      |      |      |      |      |      |
| 4th gear (km/h) | 29,2 | 23,4 |      |      |      |      |      |      |      |      |

**GRADE PERFORMANCE**

Volvo TAD1382VE, Stage V and Volvo TAD1372VE, Tier 4f (3 % rolling resistance, with lock-up)

**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) | 5,4  | 5,4  | 5,4  | 5,4  | 5,3  | 5,3  | 5,3  | 5,3  | 5,2  | 5,2  |
| 2nd gear (km/h) | 9,7  | 9,6  | 9,5  | 9,5  | 9,4  | 9,3  | 9,2  | 9,1  | 8,2  | 7,3  |
| 3rd gear (km/h) | 16,9 | 16,7 | 16,5 | 16,3 | 14,6 | 12,8 |      |      |      |      |
| 4th gear (km/h) | 30,1 | 29,4 | 23,6 |      |      |      |      |      |      |      |

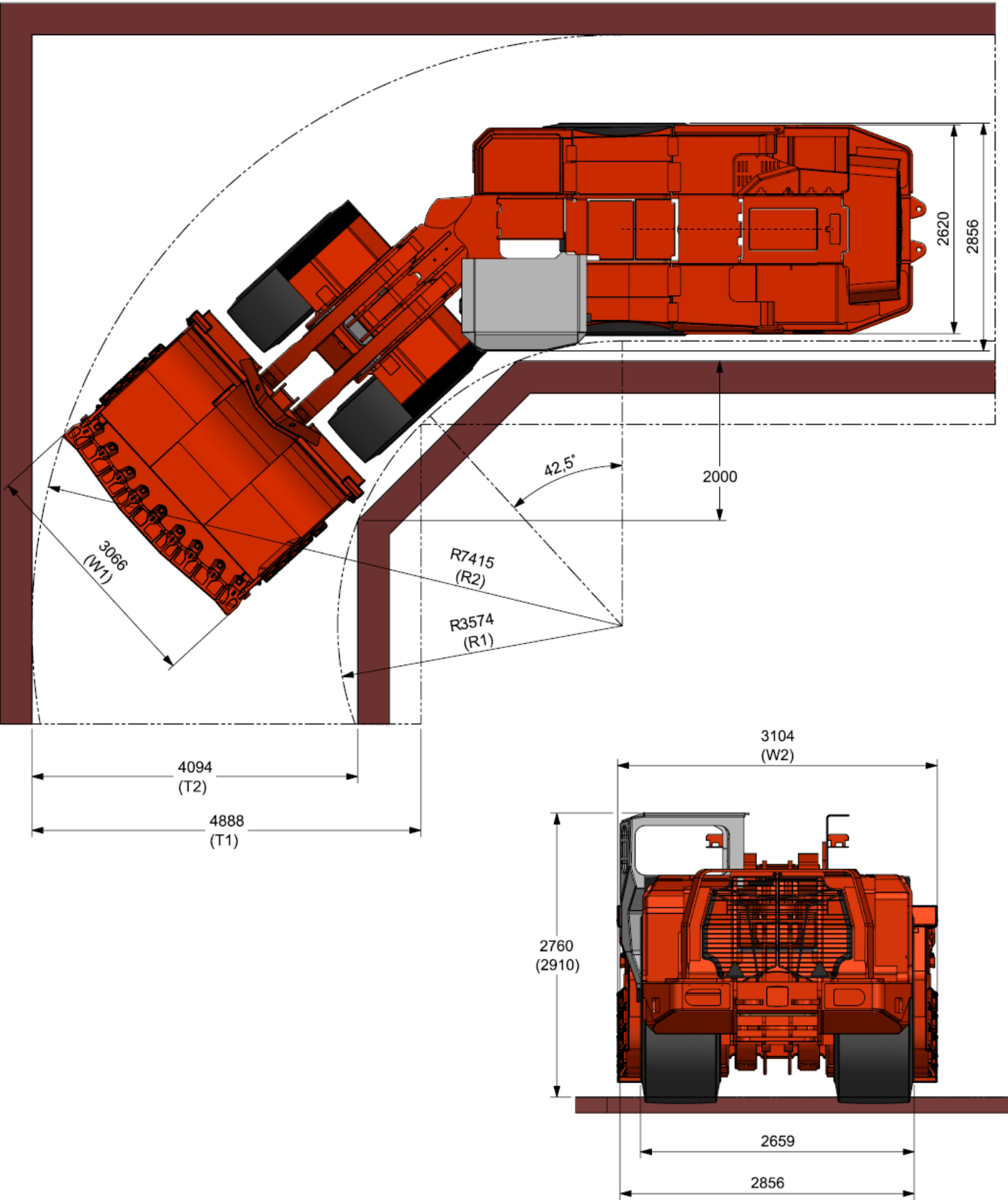
**Loaded**

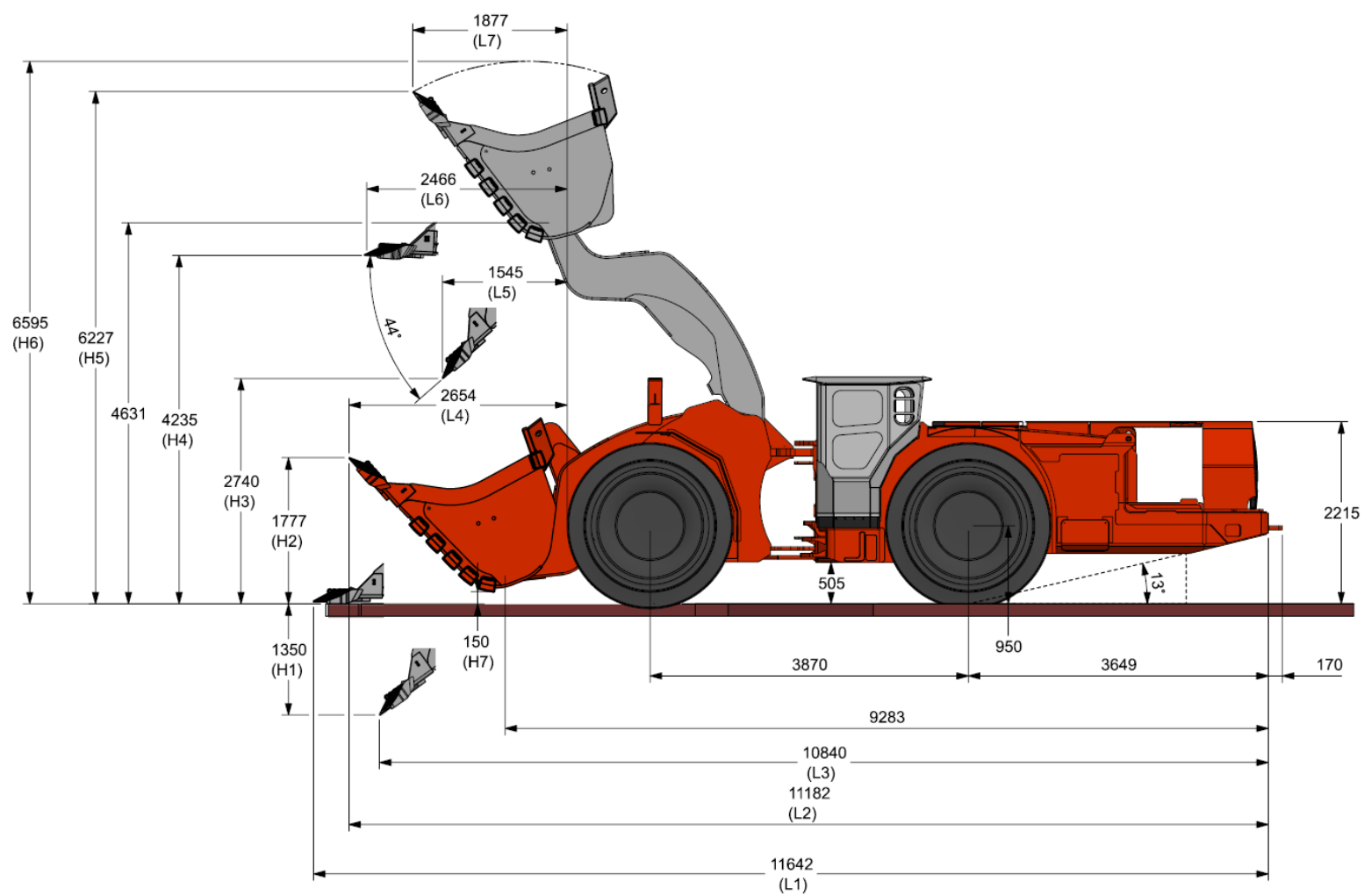
|                 |      |      |      |      |      |      |      |      |      |      |
|-----------------|------|------|------|------|------|------|------|------|------|------|
| Percent grade   | 0.0  | 2.0  | 4.0  | 6.0  | 8.0  | 10.0 | 12.5 | 14.3 | 17.0 | 20.0 |
| Ratio           |      |      |      |      | 1:12 | 1:10 | 1:8  | 1:7  | 1:6  | 1:5  |
| 1st gear (km/h) | 5,4  | 5,4  | 5,4  | 5,3  | 5,3  | 5,3  | 5,2  | 5,2  | 5,2  | 5,1  |
| 2nd gear (km/h) | 9,6  | 9,5  | 9,5  | 9,4  | 9,3  | 8,9  | 7,8  | 7,2  |      |      |
| 3rd gear (km/h) | 16,8 | 16,5 | 16,2 | 13,5 |      |      |      |      |      |      |
| 4th gear (km/h) | 29,7 | 24,3 |      |      |      |      |      |      |      |      |



DIMENSIONS WITH 7m³ GET BUCKET (STANDARD)

The dimensions are indicative only







**DIMENSIONS**

|   |              |        |        |
|---|--------------|--------|--------|
| Volume SAE heaped 2:1 (m³) *                              | 7.0          | 7.6    | 8.6    |
| Max material broken density with fill factor 100% (kg/m³) | 2400         | 2100   | 1800   |
| Lip plate type  | G.E.T. (STD) | G.E.T. | G.E.T. |
| L1 (mm)   | 11642        | 11803  | 11950  |
| L2 (mm)   | 11182        | 11292  | 11392  |
| L3 (mm)   | 10840        | 10963  | 11074  |
| L4 (mm)   | 2654         | 2764   | 2864   |
| L5 (mm)   | 1545         | 1658   | 1761   |
| L6 (mm)   | 2466         | 2623   | 2766   |
| L7 (mm)   | 1877         | 1972   | 2059   |
| H1 (mm)   | 1350         | 1448   | 1530   |
| H2 (mm)   | 1777         | 1889   | 1991   |
| H3 (mm)   | 2740         | 2631   | 2531   |
| H4 (mm)   | 4235         | 4236   | 4236   |
| H5 (mm)   | 6227         | 6351   | 6465   |
| H6 (mm)   | 6595         | 6625   | 6659   |
| H7 (mm)   | 150          | 145    | 147    |
| W1 (mm)   | 3066         | 3066   | 3066   |
| W2 (mm)   | 3104         | 3148   | 3105   |
| R1 (mm)   | 3574         | 3574   | 3574   |
| R2 (mm)   | 7415         | 7469   | 7518   |
| T1 (mm)   | 4888         | 4941   | 4991   |
| T2 (mm)   | 4094         | 4148   | 4197   |

**DIMENSIONS**

|   |          |          |
|---|----------|----------|
| Volume SAE heaped 2:1 (m³) *                              | 7.6      | 8.4      |
| Max material broken density with fill factor 100% (kg/m³) | 2200     | 1900     |
| Lip plate type  | Bare Lip | Bare Lip |
| L1 (mm)   | 11802    | 11949    |
| L2 (mm)   | 11282    | 11383    |
| L3 (mm)   | 11018    | 11131    |
| L4 (mm)   | 2754     | 2855     |
| L5 (mm)   | 1715     | 1818     |
| L6 (mm)   | 2657     | 2800     |
| L7 (mm)   | 1955     | 2042     |
| H1 (mm)   | 1433     | 1523     |
| H2 (mm)   | 1946     | 2048     |
| H3 (mm)   | 2641     | 2541     |
| H4 (mm)   | 4282     | 4282     |
| H5 (mm)   | 6406     | 6521     |
| H6 (mm)   | 6636     | 6674     |
| H7 (mm)   | 196      | 196      |
| W1 (mm)   | 3000     | 3000     |
| W2 (mm)   | 3027     | 3027     |
| R1 (mm)   | 3574     | 3574     |
| R2 (mm)   | 7408     | 7458     |
| T1 (mm)   | 4881     | 4930     |
| T2 (mm)   | 4087     | 4137     |

# MATCHING PAIR

## TORO™ TH551i

Be safer, be stronger, and be smarter – together.

The loader Toro™ LH517i is a matching pair for three-pass loading with dump truck Toro™ TH551i considering the designed payload capacities.

Toro™ TH551i is a high productivity 51 tonne articulated underground dump truck for use in 5 x 5 meter haulage ways.

This intelligent truck is a safer, efficient, high capacity and easy to maintain underground truck for optimized fleet management.

Toro™ TH551i truck features a wide range of intelligence integrated technology, such as Sandvik Intelligent Control system, My Sandvik Digital Services and Automation Readiness as standard, supplemented with Onboard Weighing System option for tracking the payload. With the latest addition of the AutoMine® Trucking Onboard option, the truck enables autonomous haulage for both transfer level and decline ramp application.

Toro™ TH551i offers a reliable and safer solution that can significantly increase the efficiency and productivity of operations while decreasing the cost per tonne, providing smart productivity.

Operator safety, health and comfort are enhanced by the mining focused, sound suppressed, ROPS and FOPS certified cabin.

### CAPACITIES

|   |            |
|---|------------|
| Maximum payload capacity (SAE heaped 2:1) | 51 000 kg  |
| Standard dump box                         | 28.0 m³    |
| Dump box range                            | 24 - 30 m³ |

### SPEEDS

|          |           |
|----------|-----------|
| 1st gear | 5.8 km/h  |
| 2nd gear | 7.7 km/h  |
| 3rd gear | 10.0 km/h |
| 4th gear | 12.7 km/h |
| 5th gear | 15.6 km/h |
| 6th gear | 20.5 km/h |
| 7th gear | 26.3 km/h |
| 8th gear | 33.4 km/h |

### DUMP BOX MOTION TIMES & MOVEMENTS

|                  |        |
|------------------|--------|
| Discharging time | 14 sec |
| Dumping angle    | 62°    |

### OPERATING WEIGHTS \*

|                        |           |
|------------------------|-----------|
| Total operating weight | 46 870kg  |
| Front axle             | 32 860 kg |
| Rear axle              | 14 010 kg |

### LOADED WEIGHTS \*

|                     |           |
|---------------------|-----------|
| Total loaded weight | 97 870 kg |
| Front axle          | 44 470 kg |
| Rear axle           | 53 400 kg |

\* Unit weight is dependent on the selected options



TS3-LH517i-B-03/ENG/METRIC



