



TORO™ LH515i UNDERGROUND LOADER



SAFER. STRONGER. SMARTER.

Increased payload capacity with one more tonne

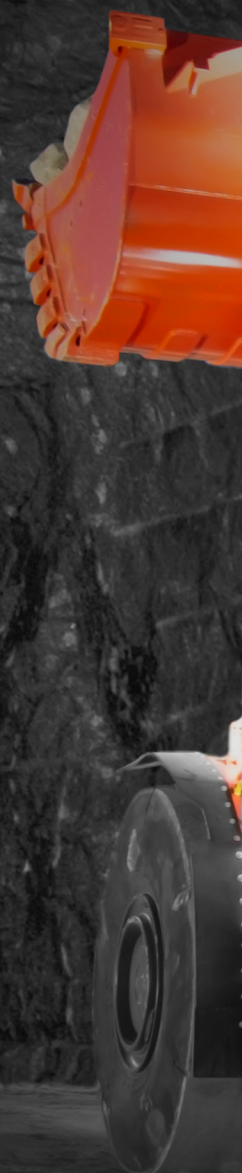
A new compact 15 tonne loader from Sandvik, Toro™ LH515i.

Toro™ LH515i from Sandvik is a capable and compact 15 tonne loader for underground mining. As the highest payload capacity loader in its size class, the new Toro™ LH515i outperforms in productivity and efficiency.

In addition to the compact size and high payload capacity, the new loader is an impressive combination of intelligence and simplicity. The loader features an exceptionally roomy layout, with all maintenance points and components efficiently organized for quick and easy service. It features an updated Sandvik Intelligent Control System, allowing for easy diagnostics and access to data. Toro™ LH515i is further optimized for use with AutoMine®, our robust mining automation system.

Toro™ LH515i has a totally new cabin with premium operator ergonomics. In the new loader, comfort has been further enhanced with a specifically designed footwell to allow more leg room for the operator. The long wheelbase, short rear frame, optimized bucket location and optionally available ride control provide comfort, balance and stability during tramming.

The loader Toro™ LH515i and the truck Toro™ TH545i from Sandvik's Toro™ family are designed to work together seamlessly as a matching pair for an optimized ore moving process. Be safer, be stronger and be smarter – together.





INCREASED PRODUCTIVITY

Toro™ LH515i from Sandvik is a capable and compact 15 tonne loader for underground mining. As the highest payload capacity loader in its size class, the new Toro™ LH515i is designed to outperform in productivity and efficiency. The loader is agile while being fitted with a standard 6,3 m³ G.E.T. bucket. The tunnel width required for turning is the same as in the 14 tonne size class. Further, Toro™ LH515i's new bucket range allows for high material densities.

Efficient bucket filling with new geometry

Its new light weight boom, new front frame geometry and new bucket shape with shorter lip and improved rounding are optimized to provide efficient bucket filling and reduce spillage during tramming. The bucket location close to the front axle decreases front axle load.

Traction control

The optionally available traction control reduces wheel slipping when penetrating to the muck pile and filling the bucket. Reduced slipping extends tyre lifetime and reduces the need for tyre change, reducing the overall cost of ownership. The traction control feature proves its worth when loading with the line-of-sight radio remote control system, also available as an option.



Production monitoring

Sandvik Integrated Weighing System (IWS) 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 Digital Services Knowledge Box™. The Knowledge Box™ can transfer this production monitoring data through Wi-Fi connection for access via My Sandvik internet portal.

De-Clutch and automatic bucket shaking

Toro™ LH515i electrohydraulic controls include an easy button operated de-clutch function for truck loading and automatic bucket shaking for shorter dumping times. Steering and boom soft stops reduce shock loads and vibration, and extend cylinder lifetime.

Improved ride and operator comfort

A new heavy duty rear frame with redistributed weight in the rear of the loader balances the machine perfectly when lifting and pushing into the muck pile. The balance and stability at high speeds are further improved by bucket location closer to the front axle, a longer wheelbase and shorter rear frame.

Flat rear frame for improved visibility

Toro™ LH515i has an incredibly flat rear frame, which provides excellent visibility from the cabin, supplemented with an extra window on the cabin left side. High power LED lights pierce the dark surroundings efficiently and reliably. Illumination is increased by up to 20% compared to halogen lights, reducing eye fatigue and risk of collision.

Efficient load sense hydraulics

The proven load sense hydraulic system with variable displacement piston pumps provides on demand pressure and flow for greater efficiency, enabling increased tractive effort during loading and reduced fuel consumption.

Engine configurations

Available engine configurations for Toro™ LH515i include a 256 kW Tier III engine and a 256 kW Stage V, both from Volvo Penta.

The state-of-the-art engine choice for the Toro™ LH515i loader is the Stage V. Equipped with reliable selective catalyst reduction (SCR) exhaust gas technology and a new diesel particulate filter (DPF), this engine configuration meets the requirements of the most stringent European emission regulations.

The 256 kW Tier III engine is a proven choice for demanding conditions. This fuel efficient 13 litre engine is also calibrated for use in high altitude conditions to maintain performance and reliability.

To support the equipment high availability, the 550 litre fuel tank enables up to 12 hours of operation without the need to refuel.

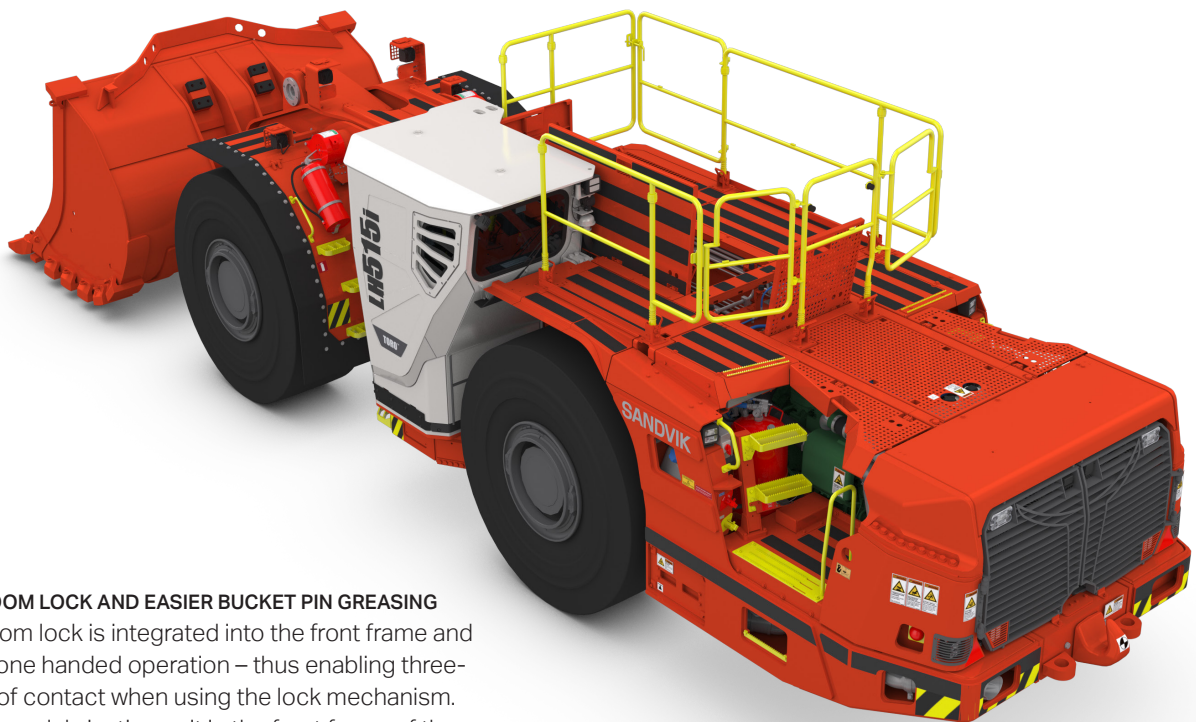


SMART AND SIMPLE MAINTENANCE

Following the guiding principles of simplicity and intelligence, Toro™ LH515i daily maintenance has been designed to be quick and easy. With LH515i, you can have the fastest pit-stop on the market.

The loader has centralized and easy service access as well as a roomy component layout. Everything you need to service on a regular basis is within reach, with all daily maintenance tasks done on the ground level.

The smart side of the equipment is the totally renewed Sandvik Intelligent Control System, making troubleshooting and diagnostics easy. The 12" display in the operator's compartment, equipped with a user friendly interface, provides all needed information at your fingertips.



NEW BOOM LOCK AND EASIER BUCKET PIN GREASING

The boom lock is integrated into the front frame and allows one handed operation – thus enabling three-points of contact when using the lock mechanism. There is no lubrication unit in the front frame of the loader, which makes it easier to access the boom lock. Further in its new location in the rear frame, the lubrication unit is better protected from impacts. When it comes to lubricating the bucket pins, their stationary end greasing points are easily accessible when the bucket is lowered to the ground. 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.

INTEGRATED FIRE SUPPRESSION SYSTEM

Eclipse™ fire suppression system from Sandvik is integrated inside the rear frame, with tanks less prone to hits and impacts, and out of the way of the access system. The fire suppression system hoses and nozzles are attached to the top cover, which significantly eases access to the service areas. For example, when servicing the engine, there is no need to detach the fire suppression system hoses.

LESS HYDRAULIC HOSES, SHORTER LINES AND OPTIMIZED ROUTINGS

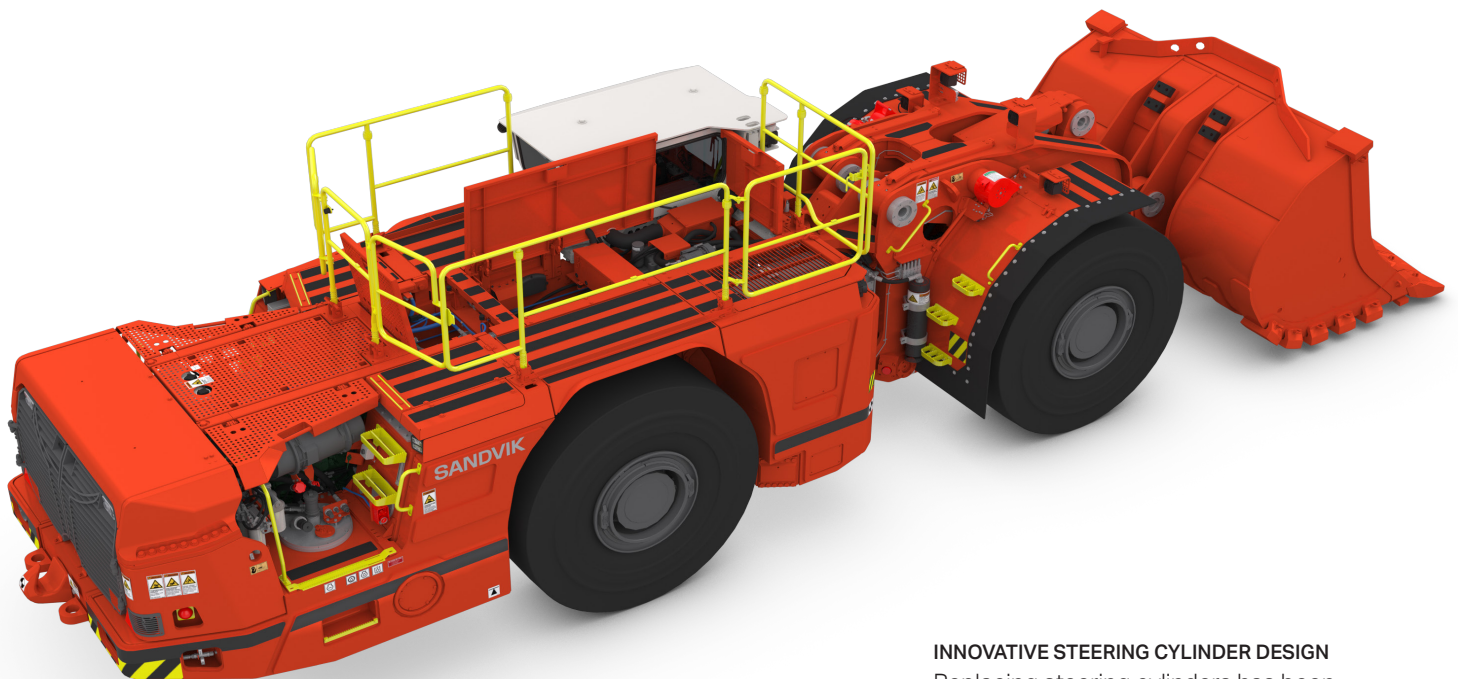
A well-planned layout and reduced amount of hoses results in more space for maintenance access and less potential leaking points – leading to improved reliability and uptime, lowering the costs of ownership. Reducing the amount of oil and tanks makes oil changes faster and reduces the amount of oil consumed on the site, having a smaller impact on site logistics and the environment. Moreover, by cutting down the amount of oils, the fire load of the equipment is reduced.

EASY DIAGNOSTICS AND REMOTE CONNECTION

The totally new Sandvik Intelligent Control System with its advanced diagnostics and improved sensors make troubleshooting easy. The 12" color touch screen display in the cabin provides service information, easy and increased system diagnostics as well as alarm log files. To minimize the need to move around on the machine or use special tools, the display in the cabin shows where the components requiring attention are located. For ease of maintenance work, when the control system modules need to be changed, they can simply be taken off and replaced with new modules, without the need for training or programming.

MAINTENANCE ACCESS TO THE TOP

When getting on top of the equipment is necessary, the very flat top of the Toro™ LH515i can be easily accessed both from the rear left and rear right, as both sides are equipped with steady access systems. The optionally available safety rails are designed for reduced damage from wall collisions and have an improved locking mechanism. The side rails are opened standing on the ground level by pushing an electrical actuator. On top of the equipment, perforated covers and anti-slip tapings reduce the risks of slipping, and the very flat top reduces the risks of tripping. The rear frame top cover opens as one, revealing the spacious component layout.



RETRIEVAL HOOK

The fully hydraulic retrieval hook releases the equipment brakes through hydraulic pressure, allowing faster and easier removal.

CENTRALIZED FILTER ACCESS

The dedicated cold side of the loader includes ground level access to the engine oil filters, fuel filters and the engine air intake filter. A separate collector tray is placed under the filters to collect potential oil spills. Wiggins quick filling point for fuel and oils is available as an option. Wiggins increases equipment availability by reducing fueling time by up to 80% as well as eliminating fuel and oil spills. The fuel filling point is well protected inside the frame, but still easily accessible. Located in the rear frame, on the right front corner, are the transmission oil filters, the pilot line filter and brake pressure oil filter. A collector tray will collect potential oil spills.

INNOVATIVE STEERING CYLINDER DESIGN

Replacing steering cylinders has been made easy as both cylinders can be changed at the same time without the need to move the equipment. The center articulation area is equipped with access hatches for hose connections and removal.

SUPERIOR OPERATOR COMFORT

FOR THE OPERATOR SAFETY

The robust ROPS and FOPS certified, sealed and pressurized cabin of the new loader is air-conditioned and uses dust and noise resistant upholstery materials, has three-layer laminated safety glass windows, emergency exits and an illuminated cabin entrance with three-point contact handles and anti-slip steps. The cabin door includes a magnetic interlock switch which automatically applies brakes and deactivates the boom, bucket and steering when the door is opened.

PREMIUM ERGONOMICS

As with all Sandvik i-series equipment, Toro™ LH515i loader's new cabin offers premium ergonomics and comfort. The cabin sits deep in the rear frame, reducing hits and shock loads to the cabin and allowing the equipment to be compact in width. To further reduce vibrations and noise, the cabin and the transmission are both mounted on rubber pads, and the engine cooler is located in the very rear of the equipment.

INCREASED LEG SPACE

In the new Toro™ LH515i, comfort has been further enhanced with a specifically designed footwell to allow more room for the operator's legs to improve ergonomics during the long shifts.

ADJUSTABLE ARMREST, LOW FREQUENCY SUSPENSION SEAT

This loader is fitted with a totally new adjustable low frequency suspension seat with two-point seat belt. Padded arm rests and adjustable joysticks can be configured to suit the operator. The electro-hydraulic joystick controls for steering and boom movements, allow for the removal of hydraulic hoses inside the cabin and reduce potential hydraulic hazards. The optional ride control system dampens the boom and bucket movements by a nitrogen filled accumulator in the hydraulic boom circuit, providing an even smoother ride over rough ground and less spillage when carrying loads at high speeds.

REDUCED FATIGUE

A new large 12" touch screen color display has all the needed information and alarms on one color display giving the operator more time to keep eyes on the road. Adjustable contrast and brightness together with dark background graphics and clear symbols have been designed to reduce eye fatigue in the underground environment. Red interior lighting is specifically tailored into the cabin design not to affect the night vision.



LOW COST OF OWNERSHIP



HEAVY DUTY REAR FRAME

The very robust rear frame of the Toro™ LH515i loader minimizes impact damage and takes unavoidable hits without bending. 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. Casted corners with less distortion are easy to remove.

STATE-OF-THE-ART ENGINE TECHNOLOGY WITH PASSIVE DPF REGENERATION

The optional Stage V engine is equipped with reliable Selective Catalyst Reduction (SCR) exhaust gas technology to reduce nitrogen oxides and a Diesel Particulate Filter (DPF). The DPF passive regeneration takes place during equipment operation, i.e. in normal conditions, so there is no need to stop or manually start the regeneration.

Our Stage V loaders are capable of operating with up to 3% reduced fuel consumption compared to the lower Stages, reducing the total cost of ownership.

MODULATING ENGINE BRAKE

The Stage V engine also features a modulating engine brake, enabling the operator to adjust the engine braking power, providing better control of downhill speed, minimizing brake and transmission overheating and brake wear.

TRACTION CONTROL FOR EXTENDED TYRE LIFETIME

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

NEW TRANSMISSION

The advanced powertrain technology includes a totally new electronically controlled power shift transmission allowing the operator to choose between manual or automatic gear shifting. The robust transmission design is made for off-road application, extending transmission lifetime. The new transmission includes improved self-diagnostics, and it is integrated fully in the control system.

The automatically activated torque converter lock up increases driveline efficiency for faster ramp speeds, reduces transmission heat and improves fuel economy.

ELECTRICS FOR THE UNDERGROUND

Reliable electrics lower operating costs. Therefore, all electrical hardware is specifically designed for harsh underground conditions. To increase reliability, the amount of connections, boxes and relays is reduced to a minimum. Wiring protection has been improved with new shrink mesh engine wiring harnesses. All circuit breakers are centralized to one location. The new control system modules are placed on the equipment frame in the vicinity of the relevant components to reduce wiring and ensure quick access.

LOWER BUCKET MAINTENANCE COSTS AND REDUCED DOWN TIME

Due to changes in Toro™ LH515i boom geometry, the calculated load on the boom bushes and pins is reduced, increasing strength. 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, G.E.T. solutions provide lower overall bucket maintenance costs and reduced downtime.

READY FOR DIGITALIZATION

Toro™ LH515i has been designed for use with AutoMine®, Sandvik's robust mining automation system for increased safety, productivity and lower costs.

AutoMine®

Sandvik AutoMine® is the industry leader in automation for underground loaders and trucks. This high-performing, comprehensive solution is widely used, backed by Sandvik experts across the globe. The Optional Sandvik AutoMine® readiness allows retrofitting of the AutoMine® Onboard Package for autonomous use later during the Toro™ LH515i lifetime.

OptiMine®

Take optimization further with OptiMine®, the powerful suite of digital tools for real time visualization, analysis, and optimization of mining production and processes. OptiMine® integrates all relevant data into one source, delivering both real-time and predictive insights to improve operations.

Knowledge Box™

The Knowledge Box™ onboard Toro™ LH515i transfers monitoring data through a Wi-Fi connection to the My Sandvik internet portal for visualization of fleet health, productivity and utilization. Transferred data can also be used by OptiMine®, an analytics and process optimization suite to improve mining processes efficiency.

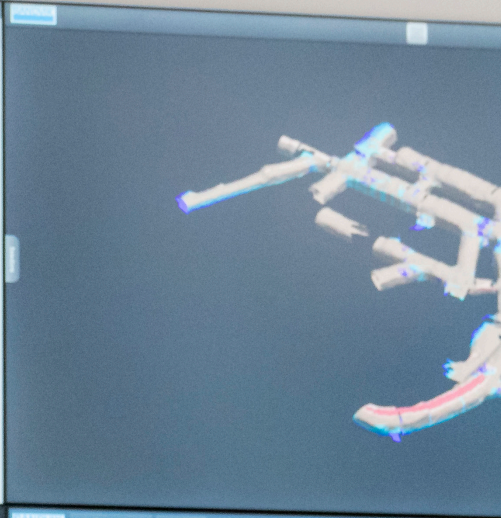
Line of sight radio remote control

Toro™ LH515i can be equipped with a line of sight radio remote control, available with a direct can-bus connection to the Sandvik Intelligent Control System. An additional video camera system is available for improved visibility when loading by radio remote control. A recovery kit option releases equipment brakes by pulling a hook at the rear of the loader to retrieve the equipment from under unsupported roof, in case it is required.

Proximity Detection System Interface

A Proximity Detection System (PDS) interface option is also available on Toro™ LH515i 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 the signal from the PDS system.





SANDVIK 365 PARTS & SERVICES

MAKING A DIFFERENCE THROUGH SERVICE AND DIGITAL EXPERTISE

You may wonder what you get when choosing Sandvik Parts & Service solutions?

PERSONALIZED, PROACTIVE SERVICE AND HIGH QUALITY

We strive to serving our customers in a personalized manner and we give high emphasis to quality, which is not only about using genuine parts & components, you can also expect consistent service quality from us.

The backbone of our service is a unique mix of skilled people, our system, tools & global infrastructure, our long experience from the field and the great collaboration with our customers.

Instead of just waiting for issues to pop up and reacting only after they have happened, we are able to offer solutions that take the whole lifecycle of the machine into account, which allows us to be supportive in a proactive way.

SCALABLE OFFERINGS

It starts with the basic support at site including operator training, parts availability and of course technical and advisory support to ensure a trouble-free and economical operation.

All major components of your loader can be replaced or repaired. With our solutions, you can expect superior reliability and longer life than with non-OEM alternatives.

We offer different type of service agreements and advisory services which can be adapted to the specific level of support you require – helping you to proactively manage your fleet and to find the optimal maintenance strategy.

A UNIQUE COMBINATION: SANDVIK DIGITAL SERVICES + APPLIED OEM KNOWLEDGE

As an in-house digital services developer, we know the machines and their features through and through. This means that we can tailor our services to offer exactly the information and features the machines, their owners and their operators need. Besides our standard telemetry reporting we also offer assisted & advanced digitalization-based services.

Through analyzing the data and referencing it against our big pool of data, then, combined with our product expertise, we can offer insights into how to get the most out of your equipment. From a sustainability point of view, digital services provide clear insights into fuel consumption and excessive idle time, which can drastically reduce emissions underground. Equipment alerts on speeding, brake violations and freewheeling in neutral are just some examples which improve safety for operators and other staff in the mine.



TECHNICAL SPECIFICATION

TORO™ LH515i

Toro™ LH515i is a high capacity underground loader for hard rock applications.

Toro™ LH515i 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™ LH515i 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 AutoMine® loading readiness for fully automated use.

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	15 000 kg
Break out force, lift	28 100 kg
Break out force, tilt	24 500 kg
Standard bucket	6.3 m³

SPEEDS FORWARD & REVERSE (LEVEL/LOADED) WITH VOLVO TAD1350VE ENGINE

1st gear	5.2 km/h
2nd gear	9.4 km/h
3rd gear	15.7 km/h
4th gear	28.2 km/h

BUCKET MOTION TIMES

Raising time	6.9 sec
Lowering time	4.3 sec
Dumping time	3.0 sec

OPERATING WEIGHTS *

Total operating weight	39 600 kg
Front axle	16 900 kg
Rear axle	22 700 kg

LOADED WEIGHTS *

Total loaded weight	54 600 kg
Front axle	40 000 kg
Rear axle	14 600 kg

* Unit weight depends on selected options



OPERATIONAL CONDITIONS AND LIMITS

Environmental temperature	From -20°C to +55°C
Standard operating altitude (at sea level)	± 1700m (variable of 5%)

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 391 PSI Filled weight: 1.5 kg CO2e: 2145 kg GWP: 1430 Information based on the F Gas Regulation (EU) No 517/2016

POWER TRAIN

ENGINE

Diesel engine	Volvo TAD1350VE
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 filtration, dry type
Electric system	24 V
Emissions	Tier 3, Euro Stage III
Ventilation rate	UNECE R96
Particulate index	China III
Exhaust system	Catalytic purifier and muffler, double wall exhaust pipe
Average fuel consumption at 40% load	TAD1350VE - 29 L/h TAD1181VE - 28 L/h
Fuel tank refill capacity	550 l
Compatible with paraffinic diesel fuel (EN 15940)	Yes

TRANSMISSION

Fully automatic Dana transmission with electric shifting system. Includes converter with lock-up. Four gears forward and reverse with de-clutch function. Dana self-diagnostics fully integrated into Sandvik Intelligent Control System. Upbox: Kessler, ration 1:1

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.)	26.5-R25
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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 249 l
Sight glass for oil level, 1 pc

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	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	220 mm, 1 pc
Main valve	Open circuit type
Pump for bucket hydraulics	Piston type

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
One tank system
Brake-by-wire

OPERATOR'S COMPARTMENT

Toro™ LH515i comes with a robust ROPS and FOPS certified cabin protecting the operator in case of roll over or falling objects.

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 mounts to the frame to reduce vibrations

Air conditioning unit located outside the cabin to reduce noise 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

A 12" 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. New 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 light

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™ LH515i 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

Fore & aft isolator to minimise vibrations in driving direction

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/s²] 0,84

VDV_w over 15 min period [m/s^{1.75}] 7,49

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 TAD1181VE Stage V.

Sound pressure level
 L_{pA} [dB re 20 μ Pa] 75 dB

Sound power level
 L_{WA} [dB re 1 p W] 117 dB

FRAME

REAR AND FRONT FRAME

A heavy duty rear frame with added weight in the rear of the loader balances the machine perfectly when lifting and pushing into the muck pile. Heavy duty rear frame and mask with integrated reaction bars minimize damages from wall impacts. High strength structure with optimized material thicknesses and reduced own weight contribute to higher overall hauling capacity and long structural lifetime. 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.

Adjustable upper bearing in central hinge

Tanks welded to the frame

Automatic central lubrication

ELECTRICAL EQUIPMENT

MAIN COMPONENTS

Alternator 24 V, 150 A

Batteries 2 x 12 V, 180 Ah

Starter 9 kW, 24 V

Driving lights LED lights:
4 pcs in front, rear and cabin

Working lights LED lights:
1 pc under boom
2 pcs corner lights

Parking, brake and indicator (blinkers) lights LED lights:
2 pcs in front
2 pcs in rear

Control system with 12" Color display
1 CPU module, 8 modules, 2 pcs safety modules
inbuilt system diagnostics

Dual horn configuration with separate alarms for start and reverse

Flashing beacon

ILLUMINATION

Illuminance E_{av} in front of the loader with 3 pieces of 50 W led lights and 2 pieces of 28W led lights at a distance of 20 m in front of the loader

E_{av} low beam	125 lx
E_{av} high beam	133 lx

Illuminance E_{av} behind the loader with 4 pieces of 28 W led lights and 1 piece of 50 W led lights and at a distance of 20 m behind the loader::

E_{av} low beam	20 lx
E_{av} high beam	52 lx

Toro™ LH515i 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.

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
ToolMan	2 x USB stick in pdf format, includes all manuals
Decals	English, Finnish, German and other languages as needed.

AVAILABLE BUCKETS***

Type	Volume SAE heaped (2:1) *	Width	Material broken density with fill factor 100%
G.E.T. (standard)	6.3 m ³	2740 mm	2400 kg/m ³
Bare Lip	6.8 m ³	2740 mm	2200 kg/m ³
G.E.T.	7.5 m ³	3066 mm	2000 kg/m ³

Note: Depending on the bucket size and type, the actual payload may deviate from the nominal payload.

***Other bucket sizes will become available later

OPTIONS

ANSUL Twin fire suppression system (CE requirement)
Arctic packages
AutoMine® Loading: Onboard Package
Boom suspension (ride control)
CE Declaration of conformity (CE requirement)
Cover grills for lamps
Disabled 4th gear
Driving direction lights (red / green)
Eclipse™ Fire suppression system with auto shutdown, Sustain or Extreme agent delivered separately (CE requirement)
Emergency steering (CE requirement)
High back rest seat with four point seatbelt
Integrated weighing system (IWS)
Jump start interface
Line of sight radio remote control system
Monitoring camera system
Neutral brake
Proximity detection system (PDS) interface
Retrieval hook (hydraulic brake release by pulling the hook)
Safety rails
Spare rim 22.00-25/3.0 (for tyres 26.5R25)
Traction control
Tyre pressure monitoring system
Wiggins quick filling set for fuel, coolant and oils (hydraulic, engine and transmission)

OPTIONAL ENGINE

Diesel engine	Volvo TAD1181VE
Output	265 kW @ 2 100 rpm
Engine brake	Yes
Emissions	Stage V
Ventilation rate (Ultra low sulphur fuel, AdBlue)	12 000
Particulate index (Ultra low sulphur fuel, AdBlue)	500
Average estimated fuel consumption at 40% load	27 l/h

GRADE PERFORMANCE (STANDARD ENGINE)

Volvo TAD1350 265 kW/1900 rpm (standard engine). With 3% rolling resistance and 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)	5.2	5.1	5.1	5.1	5.1	5.1	5.0	5.0	5.0	5.0
2nd gear (km/h)	9.4	9.4	9.3	9.2	9.2	9.1	9.0	8.9	8.0	7.3
3rd gear (km/h)	15.8	15.6	15.4	15.2	14.2	12.6	8.9			
4th gear (km/h)	28.5	27.9	23.2							

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)	5.2	5.1	5.1	5.1	5.0	5.0	5.0	5.0	4.9	4.9
2nd gear (km/h)	9.4	9.3	9.2	9.1	9.0	8.6	7.6	7.0		
3rd gear (km/h)	15.7	15.4	15.1	13.0	11.2					
4th gear (km/h)	28.2	23.5								

GRADE PERFORMANCE (OPTIONAL ENGINE)

Volvo TAD1181VE 265 kW/2000 rpm (optional engine). With 3% rolling resistance and 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)	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9
2nd gear (km/h)	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.1	8.3	7.5
3rd gear (km/h)	15.9	15.9	15.9	15.9	14.6	13.0	9.1			
4th gear (km/h)	29.2	29.2	24.0							

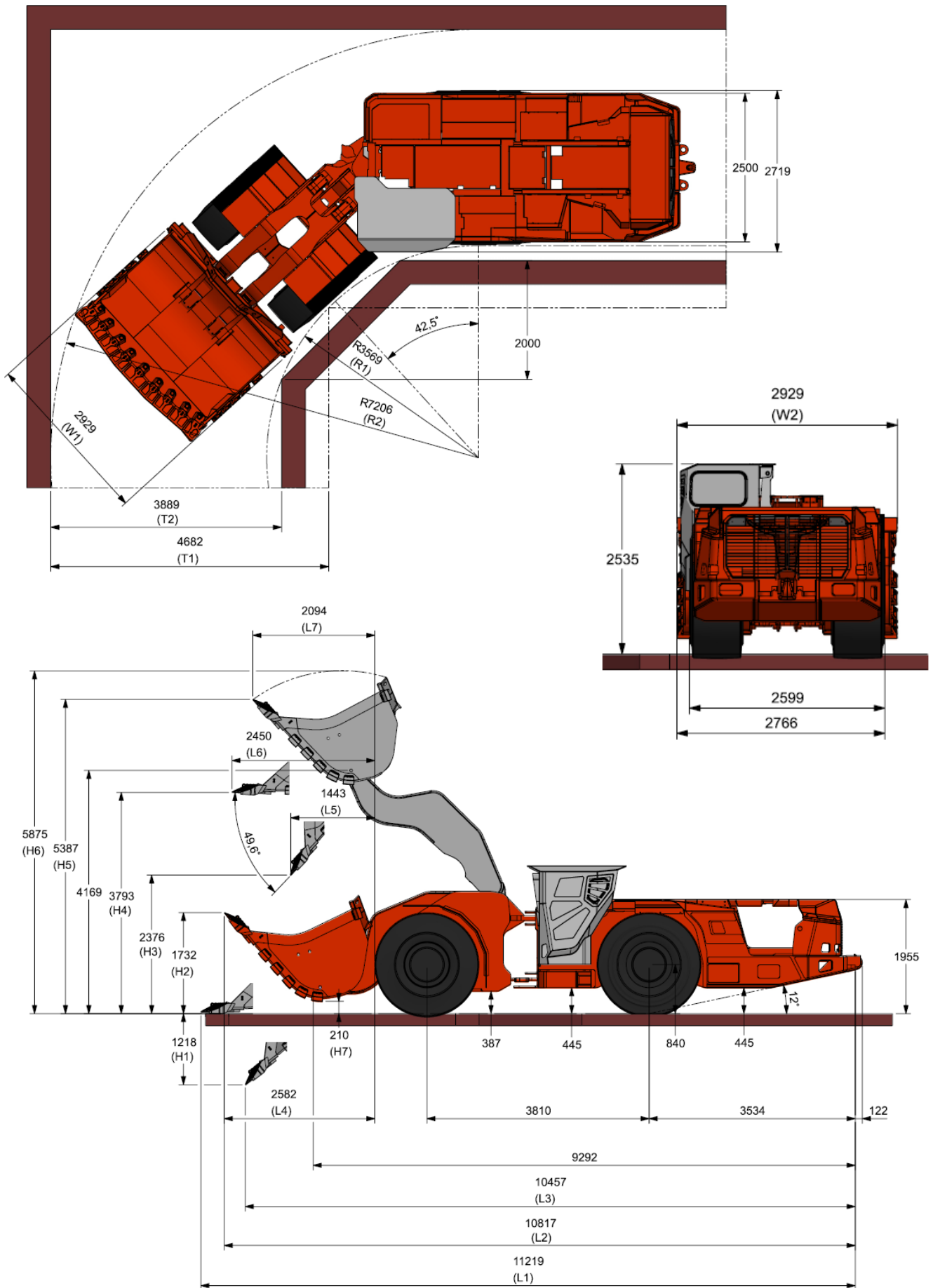
Loaded

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)	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9
2nd gear (km/h)	9.4	9.4	9.4	9.4	9.4	8.9	7.9	7.3		
3rd gear (km/h)	15.9	15.9	15.9	13.4	11.5					
4th gear (km/h)	29.2	24.3								

DIMENSIONS (dimensions drawing on next page)

Volume SAE heaped 2:1 (m ³)	6.3 (standard)	6.8	7.5
Maximum material broken density with fill factor 100% (kg/m ³)	2400	2200	2000
Lip plate type	G.E.T.	Bare Lip	G.E.T.
L1(mm)	11219	11412	11418
L2(mm)	10817	10926	10946
L3(mm)	10457	10658	10605
L4(mm)	2582	2961	2711
L5(mm)	1443	1632	1577
L6(mm)	2450	2671	2645
L7(mm)	2094	2110	2228
H1(mm)	1218	1324	1345
H2(mm)	1732	1931	1878
H3(mm)	2376	2240	2228
H4(mm)	3793	3843	3793
H5(mm)	5387	5582	5528
H6(mm)	5875	5878	5879
H7(mm)	210	260	208
W1(mm)	2929	2830	3098
W2(mm)	2929	2835	3098
R1(mm)	3569	3569	3569
R2(mm)	7206	7203	7337
T1(mm)	4682	4682	4813
T2(mm)	3889	3886	4020

STANDARD DIMENSIONS (with standard bucket) in the drawing, necessary changing dimensions in a table.



MATCHING PAIR

TORO™ LH515i AND TH545i

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

The loader Toro™ LH515i is a matching pair for three-pass loading with dump truck TH545i considering the designed payload capacities.

TH545i is a high performance 45 tonne articulated underground dump truck for use in 4.5 x 4.5 meter haulage ways. The truck's performance is based on proven design, high engine power and high payload related to own weight.

This robust and intelligent truck delivers benefits in safety, productivity and profitability. Safety, health and comfort are enhanced with enclosed and vibration isolated cabin. Optional EU Stage IV / Tier 4f low emission engine will further help reducing the fuel consumption and emissions without sacrificing the high productivity.

The TH545i truck features a wide range of intelligence integrated technology, such as Sandvik Intelligent Control system, My Sandvik Digital Services and Automation compatibility as standard, supplemented with Onboard Weighing System option for tracking the payload. With the latest addition of the AutoMine® Trucking Onboard option, TH545i enables autonomous haulage for both transfer level and decline ramp application.

CAPACITIES

Maximum payload capacity (SAE heaped 2:1)	45 000 kg
Standard dump box	22.0 m³
Dump box range	18 - 26 m³

SPEEDS (LEVEL/LOADED) WITH ENGINE VOLVO TAD1641VE-B

1st gear	5.4 km/h
2nd gear	7.2 km/h
3rd gear	9.7 km/h
4th gear	12.8 km/h
5th gear	16.9 km/h
6th gear	22.3 km/h
7th gear	30.1 km/h

DUMP BOX MOTION TIMES & MOVEMENTS

Discharging time	14 sec
Dumping angle	62°

OPERATING WEIGHTS *

Total operating weight	36 000 kg
Front axle	26 500 kg
Rear axle	9 500 kg

LOADED WEIGHTS *

Total loaded weight	81 000 kg
Front axle	37 900 kg
Rear axle	43 100 kg

* Unit weight is dependent on the selected options

