SANDVIK

Toro® TH551i | Gen2

Safer.
Stronger.
Smarter.



Technical specification

Toro® TH551i

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 (level/loaded)	
1st gear	6,3 km/h
2nd gear	8,2 km/h
3rd gear	10,6 km/h
4th gear	13,6 km/h
5th gear	16,6 km/h
6th gear	21,4 km/h
7th gear	27,7 km/h
8th gear	35,1 km/h

Dump box motion times & movements	
Discharging time	14 sec
Dumping angle	62°

Operating weights*	
Total operating weight	46 870 kg
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

Operational conditions and limits	
Environmental temperature	From -20°C to +50°C
Standard operating altitude	With engine Volvo TAD1642VE-B from -1500 m to +1000 m at 25 °C without rated power derate

Requirements and compliance
Compliance with 2004/108/EC Electromagnetic compatibility directive
Compliance with 2006/42/EC Machinery directive (Equipment for EU area, achieved with relevant options)
Compliance with 2006/95/EC Low voltage directive
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: 1,5 kg CO_2e: 2,145 tons GWP: 1430 Information based on the F Gas Regulation (EU) No 517/2016

Engine	
Diesel engine	Volvo TAD1643VE-B (Tier 2)
Engine brake	Yes
Output	565 kW (768 hp) @ 1900 rpm
Torque	3221 Nm @ 1300 rpm
Number of cylinders	In-line 6
Displacement	16.1 l
Cooling system	Liquid cooled
Combustion principle	4-stroke, direct injection, turbo, after cooler
Air filtration	Dry type
Electric system	24 V
Emissions	Tier 2, Euro Stage II
Ventilation rate (Ultra low sulphur diesel)	CANMET 48,100 CFM m3/s, MSHA 45000 Ventilation Rate
Particulate index (Ultra low sulphur diesel)	MSHA Particulate Ventilation Index 5,000 CFM
Exhaust system	Catalytic converter with muffler
Average fuel consumption at 50% load	46 l/h
Fuel tank capacity	840 l
Compatible with paraffinic diesel fuel (EN 15940)	Yes

Transmission
Fully automatic Dana transmission with electric shifting system and retarder. Includes converter with lock-up and drop box. Standard Operator Speed Assist helps operators maintain speed control when traveling downhill. Eight gears forward and two reverse. Dana self-diagnostics fully integrated into Sandvik Intelligent Control System.

Up box	
Katsa	Ratio 1:1

Axles	
Front axle	Kessler D106 series, spring applied hydraulic operated brakes, hydraulic suspension
Rear axle	Kessler D106 series, spring applied hydraulic operated brakes, fixed

Tires	
Tire size (Application approved. Brand and type subject to availability.)	35/65 R33 -E4

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 and heating unit as a standard
Cyclone pre-filter for A/C device
Adjustable steering wheel
No high pressure hoses in the cabin
Inclinometers to indicate operating angle
Emergency exit
Illuminated steps to the cabin
Three-point contact access system with replaceable and colour coded handles and steps
12 V output
Remote circuit breaker switch
Mirrors defrost
Trainer's seat (behind operator)

Control system, dashboard and displays
Sandvik Intelligent Control System
Critical warnings and alarms displayed as text and with light, warnings and alarms recorded to the control system log
5.7” display with adjustable contrast and brightness
Instrument panel with illuminated switches
My Sandvik Digital Services Knowledge Box™ on-board hardware
AutoMine® Trucking 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 isolator to minimise vibrations in driving direction
Padded and adjustable arm rests
Adjustable lumbar support
Selectable damping
Seatbelt monitoring system
Four-point seat belt on operator’s seat
Three-point seat belt on trainer’s seat

Measured vibration level

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

Maximum r.m.s. value a_w [m/s^2]	0,69 (driving with load)
VDV_w over 15 min period [$m/s^{1.75}$]	8,37 (driving with load)

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 TAD1642VE:

Sound pressure level L_{pA} [dB re 20 µPa]	75 dB
Sound power level L_{WA} [dB ew 1 p W]	121 dB

Rear and front frame
High strength structure with optimized material thicknesses. Reduced own weight for higher overall hauling capacity and long structural lifetime. Welded steel construction.
Automatic central lubrication
Central hinge with adjustable lower bearing
Tanks are stand alone structures and bolted onto main frame
Removable belly guards

Hydraulics
Filling pump for hydraulic oil
Filtration
Door interlock for brake hydraulics and steering
Oil cooler for hydraulic and transmission oil, capability up to 55°C ambient temperature
ORFS fittings
Hydraulic oil tank capacity 280 l
Sight glass for oil level, 2 pcs

Steering hydraulics

Fully hydraulic, center articulad, power steering with two double acting cylinders. Closed-center system with a load sensing piston type pump and pilot operated orbital wheel steering.

Steering main valve	Pilot operated
Steering hydraulic cylinders	140 mm, 2 pcs
Steering pump	Variable displacement piston pump

Dump box hydraulics

Fully hydraulic system, equipped with variable displacement piston pump. Oil flows to box hydraulic system from the steering hydraulics. Oil flow from the brake circuit pump is divided to the brake system and oil cooler motor.

Hydraulic pump	Variable displacement piston pump
Control valve	Solenoid operated
Main valve	Solenoid operated
Cylinders	180 mm, 2 pcs

Brakes

Service brakes are spring applied; hydraulically operated multi disc 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, brake activates after 3sec in neutral gear
Automatic brake activation system, ABA
Electrically driven emergency brake release pump
Foot operated brake pedal valve, fully modulated
Brake oil tank capacity, 100 l

Electrical equipment

Alternator	28 V, 150 A
Batteries	2 × 12V 180 Ah
Starter	24 V, 7 kW
Driving lights	LED lights 4 pcs in front 4 pcs in rear
Working lights	LED lights: 4 pcs in front 4 pcs in rear

Electrical equipment	
Parking, brake and indicator (blinkers) lights	LED lights: 2 pcs in front 2 pcs in rear
Control system	5,7” Color display, 5 modules, inbuilt system diagnostics
Reverse Camera	
Reverse alarm (CE)	
Flashing beacon	

Illumination	
Illuminance E_{av} with 2 pieces of 50 W led lights at a distance of 20 m in front of the truck:	
Head lights, low beam E_{av}	12 lx
Illuminance E_{av} with 2 pieces of 50 W led lights at a distance of 20 m behind the truck:	
Reversing lights, low beam E_{av}	13 lx
Toro® TH551i is compliant with the South African Mine health and safety act 29 of 1996, as the average light intensity in the direction of travel is more than 10 lux at a distance of 20 m.	

Fire safety
Portable fire extinguisher, 12 kg
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, 1 pc in front frame. 2 pcs in rear frame
Pressure release in the radiator cap
Automatic discharge for pressure accumulators (brake system and pilot circuit)
Frame articulation locking device
Mechanical dump box locking device
Wheel chocks and brackets

Documentation	
Operator’s Manual	English and other EU languages
Maintenance Manual	English and other EU languages
Parts Manual	English
Service and Repair Manual	English
E-manuals	2 × USB stick in pdf format, includes all the manuals
Decals	English and other EU languages

Optional engine	
Diesel engine	Volvo TWD1683VE
Engine brake	305 kW @ 1900 rpm
Requirements	Ultra low sulphur fuel and AdBlue
Output	585 kw (784 hp) @ 1900 rpm
Torque	3650 Nm @ 1200 rpm
Emissions	Euro Stage V (CE)
Ventilation rate (Ultra low sulphur diesel)	CANMET 27 000 CFM MSHA 25 000 CFM
Particulate index (Ultra low sulphur diesel)	MSHA Particulate Ventilation Index CFM 3000
Compatible with paraffinic diesel fuel (EN 15940)	Yes

Options
ANSUL Twin fire suppression system (CE)
Arctic package 120V or 230V (preheater for hydr. oil, brake oil transmission, up-box, drop box and engine)
AutoMine® Trucking: Onboard Package
Box-up support device (N/A with Ejector box)
Carryback reduction system
CE Declaration of conformity
Collision Prevention System interface
Cover grills for lamps
Diesel particulate filter (for Tier 2, Euro Stage II engine)
Direct feed for beacon
Duck tail
Dump box 28.0 m^3 (SAE heap. 2:1) made with SSAB Zero™ steel
Emergency steering
Fire suppression system Sandvik Eclipse with auto shutdown
Harsh conditions package
Integrated jacking system
Integrated weighing system (IWS)
Integrated weighing system (IWS) with external screens
Jump start interface
Live oil sampling kit
Pre- and post-lubrication for turbo
Safety rails
Seat, Actimo XXL with high backrest+headrest, adjustable armrests with four-point seatbelt
Service stand
Spare rim 33-28.00/3.5 (for tyres 35/65R33)
Spill guard
Tyre Pressure Monitoring System
Water cooled alternator
Wiggins fuel fill system
Wiggins quick filling set for fuel and oils (hydraulic, engine and transmission)

Available boxes						
			Standard		Ejector	Ejector
Box capacity SAE heaped 2:1 (m^3)	24	26	28	30	25	28
Material broken density with 90% fill factor (t/m^3)	2.3	2.1	2.0	1.8	1.8	1.6
Total height (mm)	2936	3048	3157	3304	3167	3402
* According to SAE 1363/ISO 6483						

Grade performance										
Volvo TAD1643VE-B (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)	6,3	6,3	6,3	6,3	6,3	6,2	6,2	6,2	6,2	6,1
2nd gear (km(h)	8,2	8,2	8,1	8,1	8,1	8,1	8,0	8,0	7,9	7,9
3rd gear (km/h)	10,7	10,7	10,6	10,5	10,5	10,4	10,4	10,3	10,3	10,2
4th gear (km/h)	13,7	13,6	13,6	13,5	13,4	13,3	13,2	13,1	13,0	12,8
5th gear (km/h)	16,8	16,7	16,5	16,4	16,3	16,1	16,0	15,8	15,5	15,0
6th gear (km/h)	21,8	21,5	21,3	21,1	20,9	20,6	20,1	19,6	17,9	
7th gear (km/h)	28,3	27,9	27,5	27,1	26,6	25,7	23,1			
8th gear (km/h)	36,1	35,5	34,9	34,0	31,9					

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)	6,3	6,3	6,2	6,2	6,1	6,1	6,1	6,0	6,0	5,9
2nd gear (km(h)	8,2	8,1	8,0	8,0	7,9	7,8	7,7	7,7	7,5	7,3
3rd gear (km/h)	10,6	10,5	10,4	10,3	10,2	10,0	9,8	9,5	8,6	
4th gear (km/h)	13,6	13,4	13,2	13,0	12,8	12,3	11,1			
5th gear (km/h)	16,6	16,3	16,0	15,7	15,0	13,2				
6th gear (km/h)	21,4	20,9	20,3	18,7						
7th gear (km/h)	27,7	26,8	24,1							
8th gear (km/h)	35,1	32,7								

Note: Machine's speed can be limited through the control system without limiting the gears. The speed limit can be adjusted in 1 km/h increments.

Grade performance										
Volvo TWD1683VE (Stage V), 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)	6,2	6,2	6,1	6,1	6,1	6,1	6,1	6,1	6,0	6,0
2nd gear (km(h)	8,2	8,1	8,1	8,1	8,1	8,0	8,0	8,0	7,9	7,9
3rd gear (km/h)	10,6	10,5	10,5	10,4	10,4	10,3	10,3	10,2	10,2	10,1
4th gear (km/h)	13,5	13,5	13,4	13,3	13,2	13,2	13,1	13,0	12,9	12,8
5th gear (km/h)	16,6	16,5	16,3	16,2	16,1	16,0	15,9	15,8	15,6	15,2
6th gear (km/h)	21,9	21,7	21,5	21,3	21,1	20,9	20,5	20,1	18,5	16,5
7th gear (km/h)	28,2	27,9	27,6	27,2	26,9	26,1	23,8	21,7		
8th gear (km/h)	36,1	35,5	35,0	34,3	32,8	28,6				

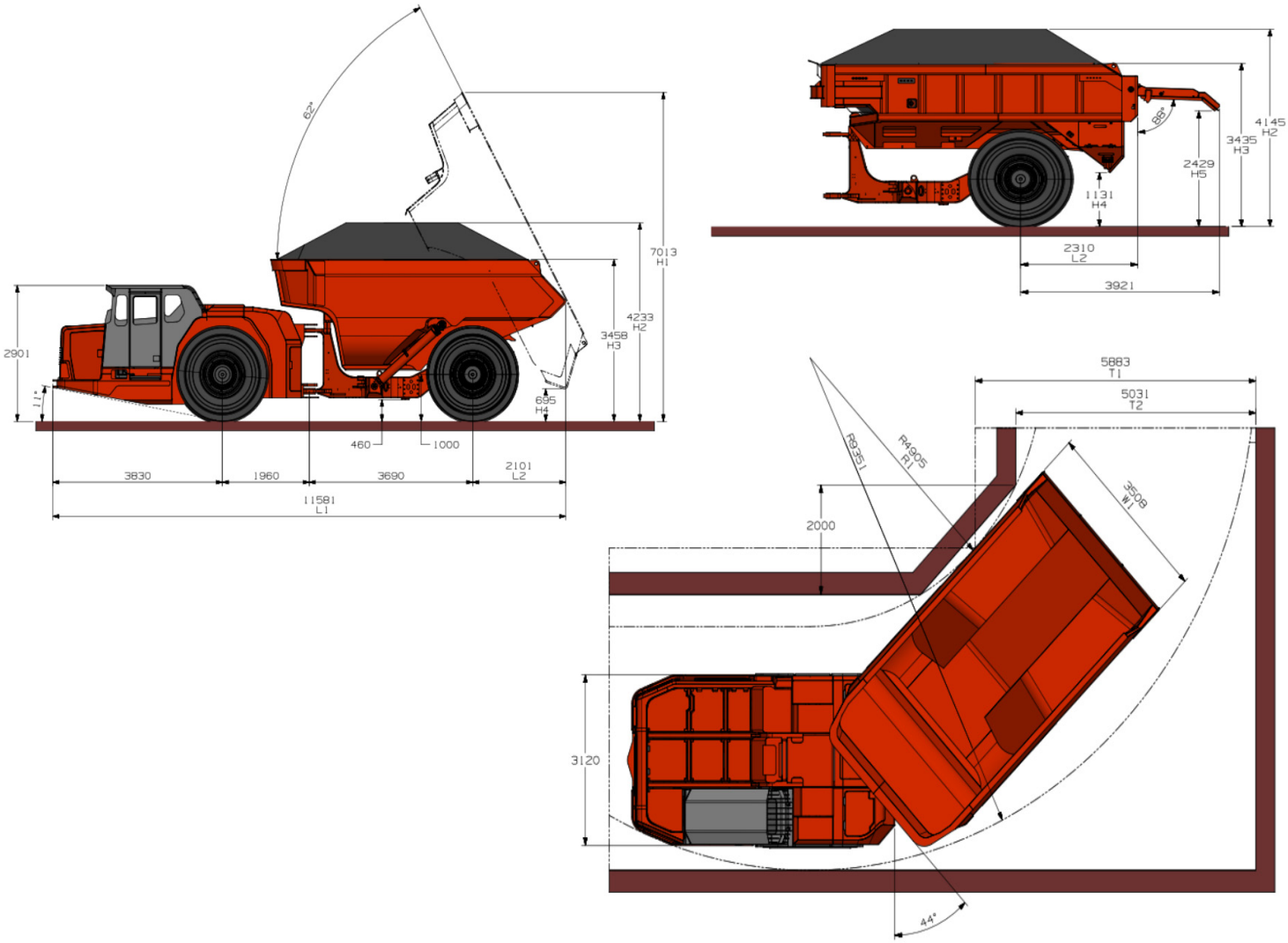
Loaded										
Percent grade	0.0	2.0	4.0	6.0	8.0	10. 0	12.5	14.3	17.0	20.0
Ratio					1:12	1:10	1:8	1:7	1:6	1:5
1st gear (km/h)	6,1	6,1	6,1	6,0	6,0	6,0	5,9	5,9	5,9	5,9
2nd gear (km(h)	8,1	8,1	8,0	7,9	7,9	7,8	7,8	7,7	7,6	7,4
3rd gear (km/h)	10,5	10,4	10,3	10,2	10,1	10,0	9,8	9,6	8,9	7,9
4th gear (km/h)	13,4	13,3	13,1	12,9	12,8	12,4	11,4	10,4		
5th gear (km/h)	16,4	16,1	15,9	15,7	15,1	13,6				
6th gear (km/h)	21,5	21,1	20,7	19,3	15,2					
7th gear (km/h)	27,7	27,0	24,8							
8th gear (km/h)	35,2	33,3								

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

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Dimensions

The dimensions shown in the pictures are from Toro® TH663i truck. Refer to the table below for accurate measurements of Toro® TH551i.



Dimensions							
Dump boxes				Standard		Ejector	Ejector
Volume SAE heaped 2:1*	(M^3)	24	26	28	30	25	28
Maximum material density with fill factor of 90%	(T/m^3)	2.3	2.1	2.0	1.8	1.8	1.6
Overall machine length	L1 (mm)	11581	11581	11581	11581	11790	11790
Rear axle to rear of machine	L2 (mm)	2101	2101	2101	2101	2310	2310
Dump position height max	H1 (mm)	6759	6829	6875	6965		
Sae heap height	H2 (mm)	3655	3765	3863	4010	3945	4145
Dumpbox spillguard	H3 (mm)	2961	3071	3173	3316	3200	3435
Discharge height	H4 (mm)	690	690	690	690	1131	1131
Ejector bucket tailgate height	H5 (mm)					2429	2429
Dumpbox width	W1 (mm)	3228	3228	3228	3228	3200	3200
Dumpbox inner turn radius	R1 (mm)	5038	5038	5038	5038	5038	5038
Minimum tunnel width	T1 (mm)	5789	5789	5789	5789	5789	5789
Tunnel width	T2 (mm)	4932	4932	4932	4932	4932	4932

* According to SAE 1363/ISO 6483