SANDVIK

Toro® LH517i

Safer.
Stronger.
Smarter.

Technical specification

Toro® LH517i

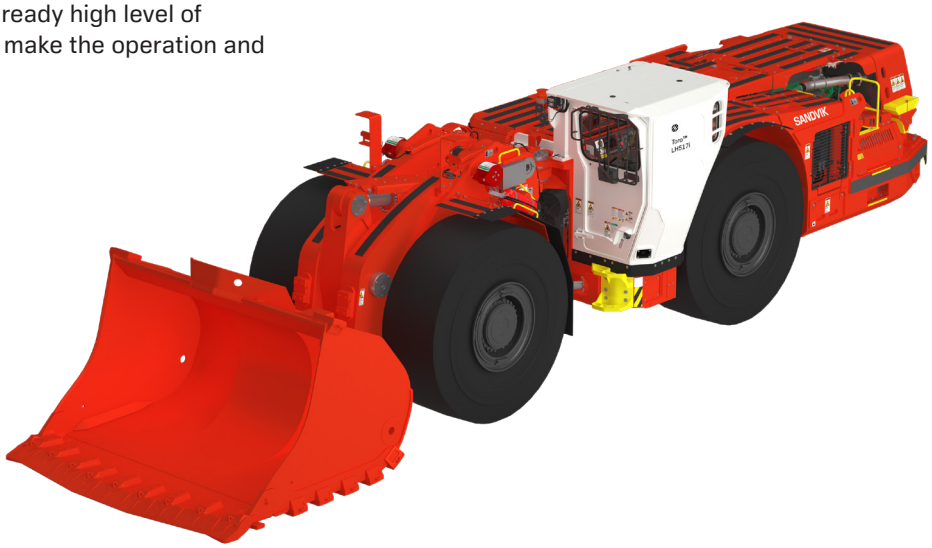
Toro® LH517i is a high capacity loader for 5 x 5 meter mining tunnels. With superior hydraulic power for fast bucket filling and drivetrain power for high ramp speed, the loader is designed to quickly clear tunnel headings for rapid advance rates.

The loader is equipped with fuel efficient 310kW Tier 2 engine as standard. 315kW Stage V low emission engine is available with use of ultra low sulphur diesel fuel. Both of these 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 m^3

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	Tier 2	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 from -1500 m to +3000 m at 25 °C without rated power derate

Requirements and compliance
Compliance with 2006/95/EC Low voltage directive
Compliance with 2004/108/EC Electromagnetic compatibility directive
Compliance with 2006/42/EC Machinery directive (Equipment for EU area, achieved with relevant options)
Design based on EN 1889-1. Machines for underground mines. Mobile machines working underground. Safety. Part 1: Rubber tyred vehicles.
Design based on MDG 15. Guideline for mobile and transportable equipment for use in mines. (Equipment for Australia, achieved with relevant options)
Electrical system based on IEC 60204-1. Safety of machinery – Electrical equipment of machines – Part 1: General requirements
CONTAINS FLUORINATED GREENHOUSE GASES 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

Engine	
Diesel engine	Volvo TAD1342VE
Output	310 kW @ 2 100 rpm
Torque	2 005 Nm @ 1 260 rpm
Engine brake	Yes
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 2
Ventilation rate (Ultra low sulphur diesel)	CANMET 12.74 m^3/s MSHA 18,500 CFM
Particulate index (Ultra low sulphur diesel)	MSHA 10,500 CFM
Exhaust system	Catalytic purifier and muffler, double wall exhaust pipe
Average estimated fuel consumption at 40% load	32 l/h
Fuel tank refill capacity	580 l
Compatible with paraffinic diesel fuel (EN 15940)	Yes

Converter
Dana SOH 9000 series with lock-up

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

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

Tires	
Tire size (Tires are application approved. Brand and type subject to availability.)	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 transmission oil	Capability up to 50°C ambient 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 articulation, power steering with two double acting cylinders. Steering lock.	Steering controlled by electric joystick
Steering main valve	Open circuit type
Steering hydraulic cylinders	125 mm, 2 pcs
Steering pump	Piston type, LS controlled
Steering and servo hydraulic pumps	Piston type

Bucket hydraulics	
The oil flow from steering hydraulic pump is directed to bucket hydraulics when steering is not used.	Joystick bucket and boom control (electric), equipped with piston pump that delivers oil to the bucket hydraulic main valve.
Boom system	Z-link
Lift cylinders	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
Neutral brake

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^2]	0,97
VDV_w over 15 min period [$m/s^{1.75}$]	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 L_{pA} [dB re 20 µPa]	73 dB
Sound power level L_{WA} [dB re 1 p W]	119 dB

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	
Alternator	28 V, 150 A
Batteries	2 x 12 V, 180 Ah
Starter	7 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 light
Parking, brake and indicator (blinkers) lights	LED lights: 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	

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	
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

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
Cover grills for windows
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
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

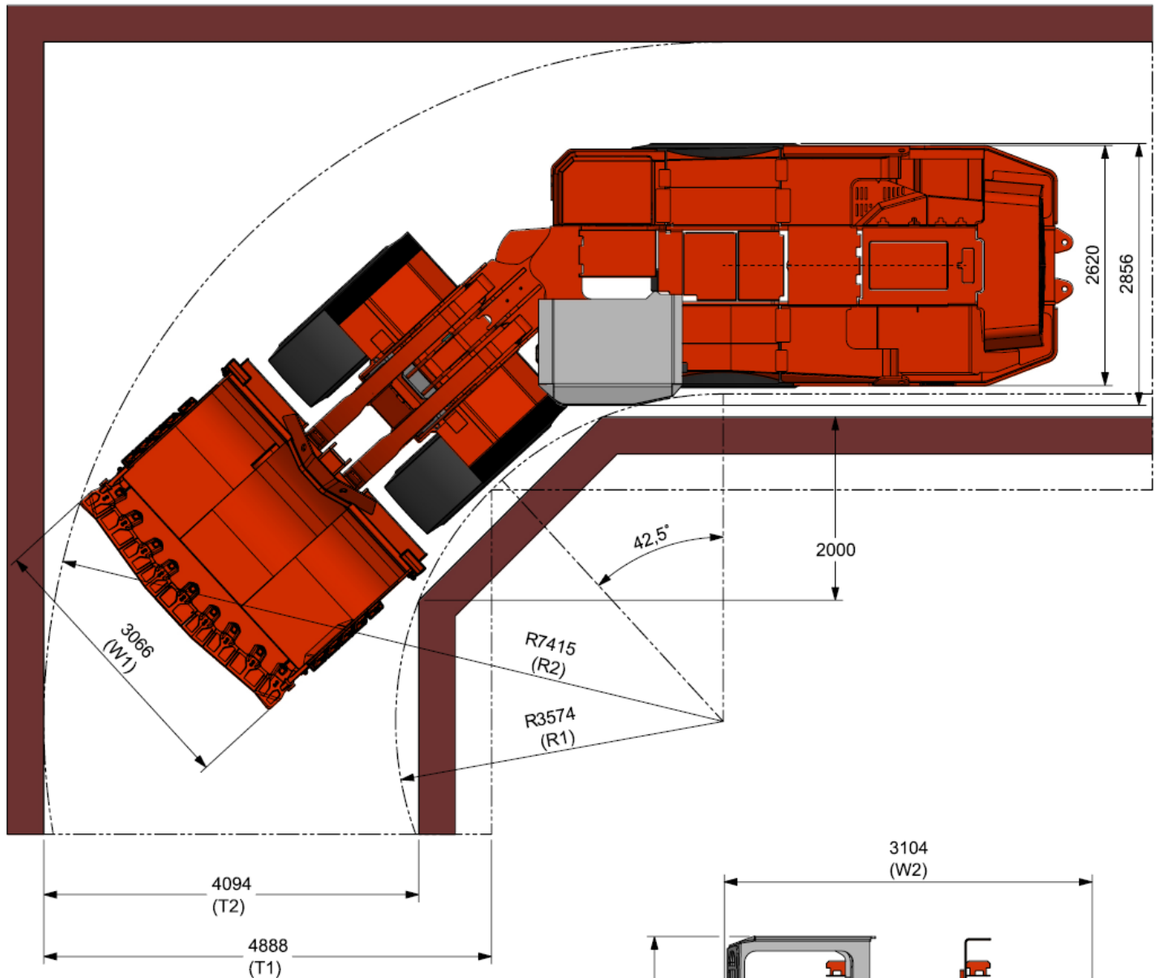
Type	Volume	Width	Max. material density
G.E.T. (standard)	7.0 m^3	3070 mm	2400 kg/m^3
G.E.T.	7.6 m^3	3070 mm	2100 kg/m^3
G.E.T.	8.6 m^3	3070 mm	1800 kg/m^3
G.E.T. Half Arrow	9.1 m^3	3436 mm	1700 kg/m^3
Bare Lip Ejector	7.0 m^3	2830 mm	2200 kg/m^3
Bare Lip	7.6 m^3	3000 mm	2200 kg/m^3
Bare Lip	8.4 m^3	3000 mm	2000 kg/m^3
MAKO	8.6 m^3	3110 mm	1800 kg/m^3

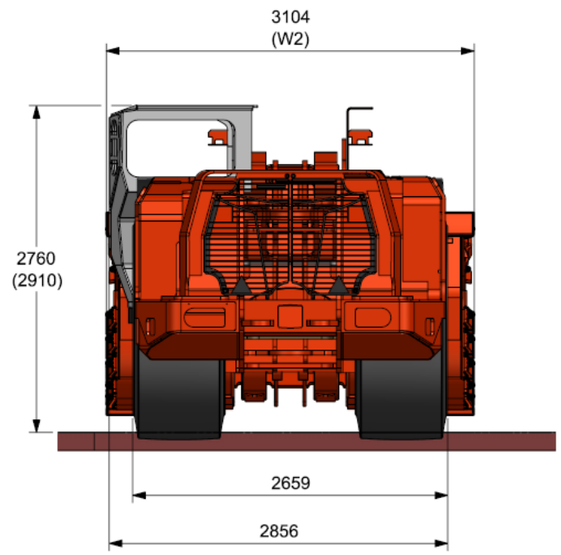
Grade performance										
Volvo TAD1342VE, Tier 2 (3 % rolling resistance, with lock-up)										
Empty										
Percent grade	0.0	2.0	4.0	6.0	8.0	10.0	12.5	14.3	17.0	20.0
Ratio					1:12	1:10	1:8	1:7	1:6	1:5
1st gear (km/h)	5,3	5,3	5,3	5,3	5,2	5,2	5,2	5,2	5,2	5,1
2nd gear (km/h)	9,5	9,4	9,4	9,3	9,2	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								

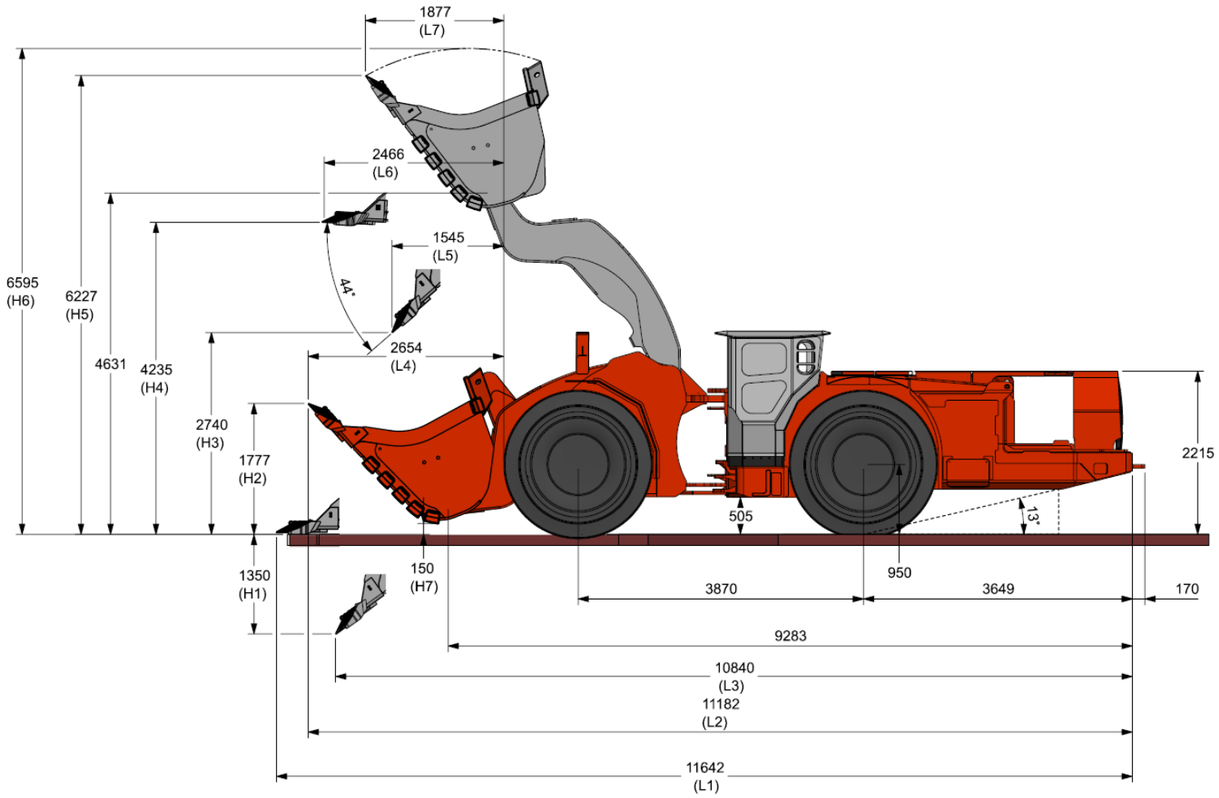
Grade performance										
Volvo TAD1382VE, Stage V (3 % rolling resistance, with lock-up)										
Empty										
Percent grade	0.0	2.0	4.0	6.0	8.0	10.0	12.5	14.3	17.0	20.0
Ratio					1:12	1:10	1:8	1:7	1:6	1:5
1st gear (km/h)	5,4	5,4	5,4	5,4	5,3	5,3	5,3	5,3	5,2	5,2
2nd gear (km(h)	9,7	9,6	9,5	9,5	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 G.E.T. bucket (standard)

The dimensions are indicative only







Dimensions			
Volume SAE heaped 2:1 (m^3) *	7.0	7.6	8.6
Max material broken density with fill factor 100% (kg/m^3)	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 (m^3) *	7.6	8.4
Max material broken density with fill factor 100% (kg/m^3)	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