Bobcat

DOOSAN Portable Power

DOOSAN

MONTABERT

Geith

Doosan worldwide factories

- Heavy Equipment Factory
- Compact Equipment Factory
- Attachment Factory

ILDESIGN_EN_201209

DOOSAN

Doosan Infracore Korea Office (HQ)
27/F, Doosan Tower 18-12, Euljiro-6Ga, Jung-Gu
Seoul 100-730 Korea
Tel : 82 2 3398 8114

www.doosaninfracore.com/ce/

DOOSAN

DL450 (Tier2 E/G)

Engine Power : SAE J1995, gross 224 kW(301 HP)@ 1,900 rpm
Operational Weight : 25,300 kg (55,776 lb) - STD.
Bucket capacity(SAE) : 4.5 ~ 4.8 m^3(5.9 ~ 6.3 cu.yd)

Wheel loader : DOOSAN DL450 (Tier2 E/G)

A Powerful Wheel loader with Novel Features

DL 450

The new DL450(Tier2 E/G) wheel loader has all the advantages of the previous loaders. This logical new step provides real added value to the owner and operator.

The new DL450(Tier2 E/G) was developed with the concept of “providing optimum value to the end user.” In concrete terms, this translates, into :

Increased production due to the powerful 11 liter engine and the excellent synchronization of the drive train with the hydraulics system.

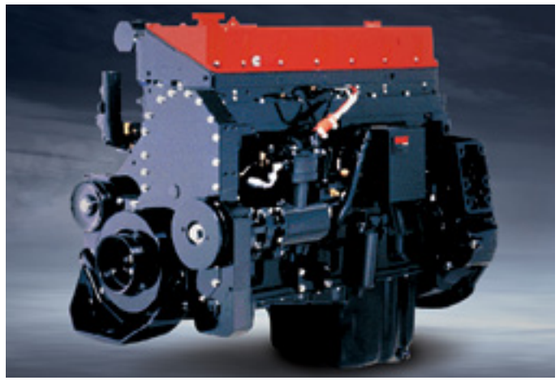
Improved ergonomics, increased comfort and excellent all round visibility ensuring safe and pleasant working conditions.

Improved reliability through the use of higher performance new materials, the development of new computer-assisted structural design techniques and by intensive and systematic test programs. All of these combine to increase the life of vital components and reduce operating costs.

Reduced maintenance increases the availability of the loader and reduces operating costs.

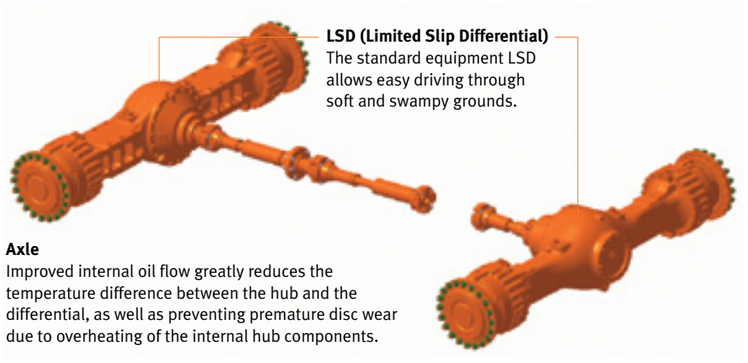
PERFORMANCE

DL450(Tier2 E/G) features an intelligent, load-sensing hydraulic system. Two variable piston pumps provide the exact flow and pressure required to deliver a powerful, highly effective force, offering superior penetration of even the hardest materials. The exceptional drawbar pull at the wheels, is reinforced further by providing limited-slip differentials as standard equipment. The engine offers high power and torque characteristics. As a result, the hydraulic system is able to multi-function with power and speed.



Cummins QSM11 Engine
The QSM11 low emission engine combines a patented high pressure unit injector system with full authority electronics for superior low-end performance with a strong torque rise.

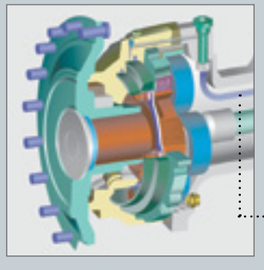
Full Auto Transmission
The electronic powershift transmission is particularly smooth with perfectly spaced gear ratios to give both operator comfort and at the same time deliver excellent traction in all working conditions. Built-in electronic controls enhance productivity and durability. The free wheel stator torque converter improves power train efficiency in load and carry operations which contributes to the improved fuel efficiency.



LSD (Limited Slip Differential)
The standard equipment LSD allows easy driving through soft and swampy grounds.

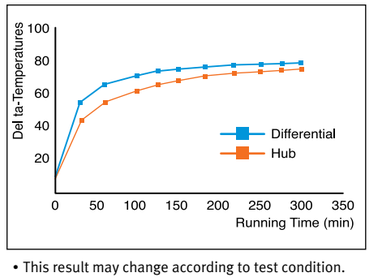
Axle
Improved internal oil flow greatly reduces the temperature difference between the hub and the differential, as well as preventing premature disc wear due to overheating of the internal hub components.

Axle Insert Housing optimized
- The stress of the axle insert housing is decreased by not changing the connection to the vehicle.
- Flange thickness increased, this leads to longer screw and therfore to an improvement of the screw connection.
- Optimized were the axle housing and axle insert housing by FEA



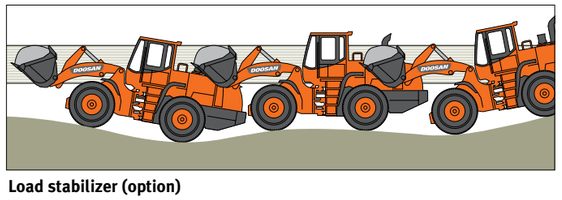
Increased Axle durability
The brake discs have been repositioned to the rear part of the reduction gear where the rotation speed is lower. As a result, the discs are exposed to lower rpm and heat generation is reduced and the life span of the discs is greatly extended. Automatic disc clearance adjustment has been intergrated into the design so that disc clearance is maintained at the optimum level at all times as the discs wear. This prevents any lag in brake response. Another convenient feature is that brake disc wear can easily be measured without disassembling the hub.

The brake piping has been redesigned into the axle housing and is protected from damage from external shock as the machine drives over rough terrain.



• This result may change according to test condition.

Z kinetics
The Z lifting geometry is very robust and designed for heavy loads. Few moving parts, reduced loads, simplicity,... everything contributes to good loader stability.
This geometry enables very rapid bucket movements and ensures correct angle positioning in all situations.
The rapid bucket dump capability makes it easier to unload sticky materials.



Load stabilizer (option)
This system is ideal for all loading and movement situations and increases driver productivity and comfort. It also minimizes the amount of material spilt during travelling.

Hydraulic Power Steering
The newly designed steering system ensures smooth steering even at low engine speeds.

COMFORT

From the beginning, Doosan has had great concern for machine operators. People need to work in a well-designed and comfortable environment. The work area is spacious, with several places for storage. The checking and monitoring devices are comprehensive. There is an open view of the work area. For night work, operators are provided with powerful front and rear lighting.

Noise Level
- LwA Surface Sound Power Level : 107dB(A) (ISO 6395)
- LpA Operator's Cabin Noise Level : 72dB(A) (ISO 6396)

The steering Column
The steering column features both tilting and telescopic adjustment functions.

Air Conditioning & Defroster System
Double filtered cab air and correctly located air ducts around the cabin, combined with proportional controls offer passenger car levels of comfort.

Heated exterior mirrors as standard
The heated exterior mirrors ensure good rear visibility even in cold and damp conditions.

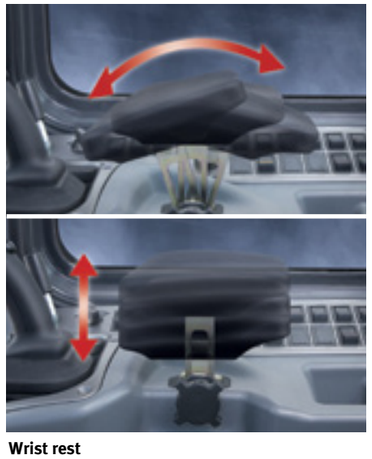
Switch
The ergonomically laid out switch panel in line with the natural movements of the body allows for convenient operation. The spare switch cut-outs allows easy installation of additional electrical accessories.

Multifunction Control Lever
The joystick installed allows combined operation of the loader arm and bucket as well as control of the transmission (Other lever options are available to suite operator preference).

Central Monitoring Panel
The compact central monitoring panel is ergonomically designed and allows the operator to monitor the status and warning lights at a single glance.

Sunvisor & Interior mirror(Std.)

Air-Suspension with 3" Seat Belt
Air-suspension seat provide more comfort and support for the operator.



Wrist rest
The tilting and telescopic wrist rest allows the operator to work more comfortably.

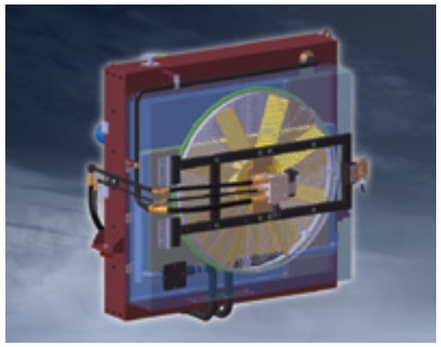
MAINTENANCE

A liquid crystal display conveys information to the operator relative to the ZF transmission. At the same time, it reports the nature of any problem (if one exists). When servicing the loader, specialised apparatus can be used to adjust the clutch disks to compensate for their wear. Additionally, by connecting a lap top computer, a complete transmission diagnostic can be performed.

Good accessibility at the articulation joint is essential for an easy maintenance.

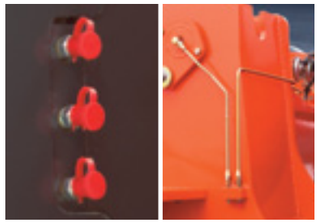
Transmission & Engine Diagonosis
The transmission and engine can be diagnosed using a laptop computer to interface with the diagnostic system.

Hydraulically operated reversible fan & Cooling fan swing out
With electronic control of the variable speed on-demand fan, temperature levels of the engine coolant, transmission oil are constantly monitored. Controlled fan speed improves fuel efficiency,lowers noise levels and reduces radiator plugging. The hydraulic fan can be switched to reverse operation from the cabin for quick clean out of the cooling system.
In addition, fan can be opened for easy-cleaning.



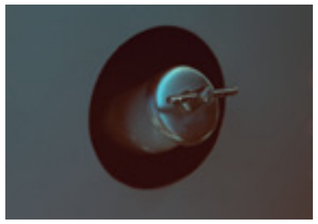
Large Capacity Transmission Oil Cooler
The large capacity transmission oil cooler ensures durable and stable operation of transmission.

Remote Engine oil & Coolant Drain
Remote drain valves have been installed in easily accessible location for convenient draining of fluids. (Coolant - Right, Engine oil - Left)



Remote Greasing Lubrication Ports
The front pins can be lubricated from without crawling under the machine or reaching in to awkward positions through conveniently located lubrication ports.

Central Remote Hydraulic Pressure Check Ports
The centralized remote hydraulic check ports allow main, steering, brake charge, pilot, load-sensing signal and transmission clutch pressures to be checked at a convenient central location.



Convenient Transmission Oil Filling
The oil filler pipe is located near the articulation joint for easy access.

Propeller Shaft
A protective cover has been installed to protect the seals from dust, foreign objects and hence premature wear.

Transmission Filters
The transmission filters are within easy reach and like the rest of the machine's service components, can be checked from ground level.

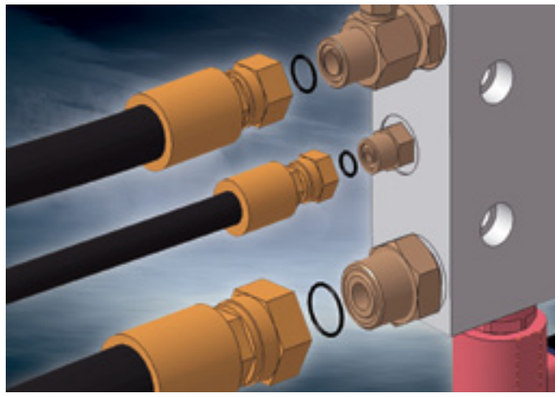
Air-Cleaner Filter
The high capacity air cleaner eliminates harmful particles from the air and extends the life of the engine and replacement intervals.

Brake & Pilot Filter
The brake & pilot filter is easy to replace and a clogged filter warning system has been added for extra protection.

Sight Gauges
Well-located, yet easily visible sight gauges for the hydraulic oil and radiator coolant allow easy daily checks while reducing the risk of contaminants entering the systems.

RELIABILITY

Every morning, when the operators commence work, they know that things will go smoothly- because Doosan has taken care of it. The product is soild. Operators know that they have significant reserves at hand and that they won't have to push the machine to its limit. The Doosan DL450(Tier2 E/G) wheel loader is designed and built to last. For Doosan, 'reliable' means availability, accessibility and simplicity.



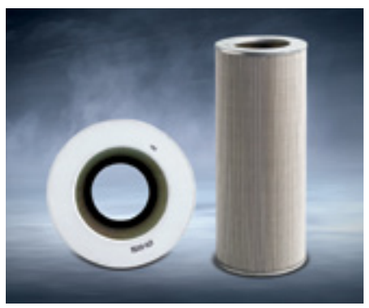
ORFS(O-Ring faced Seal)-All Ports(Even in Pilot line and Low pressure line)

2-piece type tooth(Pin-on+Bolt-on adapter)

Radiator Grill (Steel structure)

Rubber-mounting (for Radiator: Lateral 2EA / Vertical 2EA)

Fender-Edge(Opt.)



Hydraulic Oil Return Filter
The high-efficiency, large-capacity return filter manufactured with the glass-fibre media can eliminate foreign substances up to 99.5 percent to protect the costly hydraulic equipment and substantially extend the replacement cycle.

Front combination lamp
With the application of high-grade Hella products, the lamp lost longer.
Rear combination lamp
A semi-permanent lamp life has been secured with the application of LED-type stop and position lamps.

STANDARD AND OPTIONAL EQUIPMENT

* STANDARD EQUIPMENT

• Engine
- Three stage air cleaner with TURBO-3 pre-cleaner, inner filter, and external plugging indicator on the dashboard
- Water separator with fuel filter
- Crankcase Ventilation oiltrap system
- Preheating of induction air
- Two fuel filters
- Coolant filter
- Hydraulically driven fan with bi-direction flow for core cleaning Proportional to fluid temperature
- External drains for engine oil and coolant
- Electric driven fuel feeding pump
- Mode selector switch for the engine power (Standard / Economy mode)
- Self-diagnosis function

• Lifting and Hydraulic system
- Robust Z bar lifting system
- General purpose bucket 4.5m^3 (SAE,heaped)
- FNR mono lever with 3rd function lever
- Hydraulic control valve with two sections
- Automatic boom kick out
- Automatic bucket return to dig
- Fast couplers for hydraulic check
- Variable displacement piston pump and load sensing hydraulic system

• Steering system
- Load sensing steering system

• External equipments
- Lower protection plates
- Lifting hooks
- Articulation lock in the transport position
- Towing hitch
- Tools compartment
- Fenders

• Electric System
- Alternator 70A / 24 V
- Working lights : 2 at the front and 4 at the rear (6 x 70W)
- Driving lights: low and high beams
- Tail indicators, stop, reversing lights
- Reversing alarm

• Loader Linkage
- Z-bar loader linkage

• Drive line and Brake system
- Gear box which can be declutched when braking
- Gear box with diagnosis and monitoring indicator, and electronic plug for a fast adjustment
- Mode selector switch for the transmission (Manual / Auto 1 ↔ 4 / Auto 2 ↔ 4)
- Starting safety system
- Kickdown and travelling direction selection: lever at left of the steering wheel and on the joystick
- Limited slip differential on front and rear axles
- Dual brake circuits with accumulators
- Tyres 26.5-25-20PR(L3)
- Dual service brake pedals
- Secondary brake system
- Parking brake on the transmission, electric-hydraulic

• Cab
- Air-conditioning / heating with recirculation function
- Double Filtered cab air
- Mechanical suspension seat with safety belt(2")
- Adjustable steering column
- Compartment for cans
- Floor mat
- Tinted glasses
- Left sliding window
- Front and rear wiper
- Front and rear washers
- Sun visor
- Interior cab light
- Interior room mirror (2)
- Exterior rear view mirrors (2)
- Machine monitoring (condition, control & maintenance indicators in front of the driver by dials, gauges and lamps)
- Main switches in front of the driver (Starter & hazard switches)
- Switches for the general functions in the right console
- Electrical horn
- Cigarette lighter
- MP3 Player
- 12 Volt socket
- Cup holder
- Compartment for Shoes
- Glass antenna
- Heated mirrors
- ROPS Cabin(Rollover Protective Structure): ROPS Meets The Following Criteria - SAE 1040 , ISO 3471
- FOPS Cabin(Falling Objects Protective Structure): FORS Meets The Following Criteria - SAE J 231, ISO 3449
- Digital clock
- Coat hook

* OPTIONAL EQUIPMENT

Some of these optional equipments may be standard in some markets. Some of these optional equipments cannot be available in some markets. You must check with the local Doosan dealer to know about the availability or to release the adaptation following the needs of the application.

• Ground Engaging Tools
- Various types of buckets, Pallet fork, timber grapples and accessories

• Tires
- L3, L4, L5 following various types and manufacturers

• Hydraulic
- Hydraulic 3rd function control valve
- Finger tip control
- Two hydraulic levers for 2 sections function
- Three hydraulic levers for 3 sections function
- Load isolation system (LIS)
- Emergency steering pump driven by electric motor
- Hydraulically driven fan with adjustable speed proportional to fluid temperature and bi-direction flow for core cleaning

• Electric system
- Rotating beacon
- Additional lighting

• Cab
- Rear Camera (CCTV) and monitor
- MP3 / CD player
- Air suspension seat with 3" belt

• Various
- Additional counterweight
- Tool Kit
- Mudguard

• External equipments
- Full fenders with rubber protector
- Wheel chocks

• Bucket and Attachments
- Bolt-on teeth (BOT) 4.5m^3 (5.9 cu.yd.)
- Bolt-on cutting edge (BOC) 4.8m^3 (6.3 cu.yd.)
- Rock bucket 4.0m^3 (5.2 cu.yd.)

TECHNICAL SPECIFICATIONS

DL 450

ENGINE

General description
The high performance Cummins QSM11 combins a 6 cylinder in-line,
high-pressure unit injector fuel injection system with electronically controlled direct injection and turbo charged air to air intercooler offers low fuel consumption and emission.
(Phase I Area: Cummins QSM11)

-GROSS SAE J1995

• Model
CUMMINS QSM11

• Rated power :
224 kW @ 1,900rpm
301 HP @ 1,900rpm
305 ps @ 1,900rpm

• Max. power :
324 PS(234kW)@1,600 rpm

• Max torque :
161 kgf.m @ 1,400rpm
1,579 Nm @ 1,400rpm
1,165 lbf.ft @ 1,400rpm

• Displacement :
10,800cc (659cu.in)

• Bore dia & stroke :
∅ 125x147(4.9"x 5.8")mm

3 stages Air cleaner including a very efficent pre-cleaner, main and safety elements.

Hydraulically driven puller type fan with possibility of adjustment.

• Battery :
System voltage : 24V
Quantity : 12V x 2
Capacity(AMP) : 150Ah

• Starter power :
24V x 7.5kW

• Alternator output :
70A

AXLES

The front and rear axles with planetary hub reductions are built on the base of very reputed components.

Fitted as standard, the front and rear limited slip differentials, ensure the traction is optimal in all circumstances.

• Maker and model :
ZF MTL-3105 II Series

• LSD Differential
Front (30%) / Rear (30%)

• Oscillation angle :
+/- 11°

• Brake :
Dual circuit multi-plate wet discs.
Hydraulic actuation with pump and accumulator.

The sintered metal brake discs extended discs service intervals : increased three times

A spring applied and hydraulically released parking brake is mounted on the transmission shaft.

TRANSMISSION

"Full Power Shift" transmission. It can be used in manual or automatic modes.

This transmission is based on components having excellent worldwide reputations. It is equipped with a modulation system allowing soft gear shifting and inversion of travel direction. Safety devices also protect the transmission of bad operations.

The gear and direction shifting is operated by a single lever to the left of the steering wheel. A travel direction control is also mounted on the hydraulic joystick.

With a special electronic device, the transmission can be tested and adjusted easilyt for optimum performance and efficiently.

The transmission can be de-clutched by the operation of brake pedal to increase the power available to the hydraulic pumps.

A safety device prevents the starting of the engine when not in neutral.

• Transmission :
Type : 4speed, Full auto power-shift, Countershaft, Engine remote mounted with propeller shaft and damper.

• Torque converter :
Free wheel stator type
Stall ratio 2.51

• Gear box :
Maker and model
ZF 4 WG 260

• Speed Forward/Rearward :

1	6.5 / 6.5 km/h (4.0 / 4.0 mph)
2	12.4 / 12.4 km/h (7.7 / 7.7 mph)
3	19 / 19 km/h (11.8 / 11.8 mph)
4	38.0 km/h (23.6 mph)

HYDRAULIC SYSTEM

Two load-sensing axial piston pumps with variable displacement.

Main control valve of 2 double acting spools is controlled by standard single lever.

Automatic boom kick out and bucket return to dig. Is standard.

All of hydraulic lines are equipped with special seals (ORFS)

• Max flow main:
(With steering)
180 ℓ/ min
(Without steering)
415 ℓ/ min

• Working Pressure:
250 bars

• Pressure of the pilot circuit:
30 bar

• Filtration capacity on the return line:
10 microns

• Loading cycles time:
Lifting speed (loaded) :
6.5 sec
Dumping speed (loaded) :
1.9 sec
Lowering speed (empty) :
4.1 sec

OPERATOR' CAB

The modular cab allows excellent visibility in all directions. The optimal ventilation is obtained by numerous ventilation outlets. Touch buttons control the air re-circulation air conditioning and heating systems. The air of the cab is filtered.

All necessary information for the operator are centralized in front of him.

The main functions are actuated via switches located on a console at the right of the operator.

Generous storage places are well located. The cab, mounted on viscous element and equiped with an air suspended seat, offers a better comfort for the operator.

• Access door: 1

• Emergency exits: 1
The cab conforms ROPS ISO 3471 and FOPS : ISO 3449

• Guaranteed external noise level Lwa:
(following ISO 6395, 2000 / 14 / EC)
107 dB(A)

STEERING

The steering system is a load sensing type with a flow amplifier and a priority valve.

• Steering angle :
40°

• Oil flow :
235 ℓ/min@1900 rpm, rated

• Working pressure :
210 bars

• Steering cylinders (2) :
bore x stroke : 100 x 450 mm (3.9" x 1' 6")

Emergency steering system with hydraulic pump driven by electric motor.

LIFTING SYSTEM

The lifting system with two cylinders and Z configuration is designed for the toughest jobs. The breakout force (27.3 ton with a 4.8m³ bucket) is very important and the bucket movements are fast.

The bucket angles are kept in good positions throughout all the range of bucket movements.

• Lifting cylinders (2)
bore x stroke : 180 x 906 mm

• Bucket cylinders (1)
bore x stroke : 210 x 580 mm

MAINTENANCE

Maintenance is easy due to excellent access.

The transmission is electronically controlled. An error coding system allows easy diagnosis of the systems and proper intervention.

• Engine (oil) : **34 ℓ (8.9 gal)**

• Radiator (cooling liquid) : **55 ℓ (14.5 gal)**

• Fuel : **385 ℓ (101.7gal)**

• Hydraulic oil : **240 ℓ (63.4 gal)**

• Gear box and torque converter : **54 ℓ (14.2 gal)**

• Front axle : **51 ℓ (13.5 gal)**

• Rear axle : **51 ℓ (13.5 gal)**

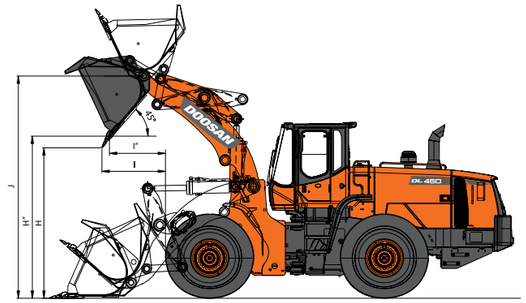
OPERATIONAL DATA

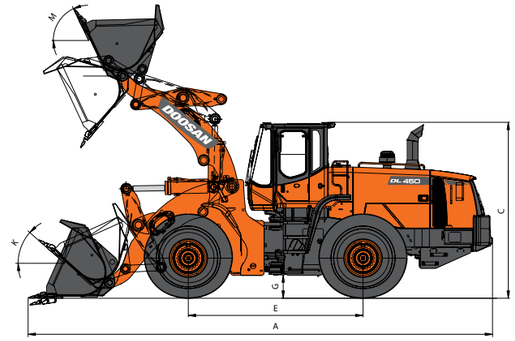
Bucket type			General purpose		Rock
Configuration			Teeth(std.)	Bolt-on edge	Teeth
Capacity heaped ISO/SAE		m^3	4.5	4.8	4
		yd^3	5.9	6.3	5.2
Tooth type			Adapter tooth		Adapter tooth
Bucket width	B	mm	3,300	3,300	3,300
		ft.in	10′10″	10′10″	10′10″
Static tipping load (straight)		kg	20,587	19,946	21,097
		lb	45,387	43,973	46,511
Static tipping load (40°)		kg	17,578	17,013	18,029
		lb	38,753	37,507	39,747
Dump height (at 45°)[1)]	H	mm	3,150	3,290	3,135
(at fully raised)		ft.in	10′4″	10′10″	10′3″
Dump reach (at 45°)[1)]	I	mm	1,405	1,262	1,420
(at fully raised)		ft.in	4′7″	4′2″	4′8″
Dump height (at max. dump)[1)]		mm	1,640	1,570	1,645
(at max. reach)		ft.in	5'5"	5'2"	5'5"
Digging depth		mm	140	140	140
		ft.in	6″	6″	6″
Height at bucket pivot point	J	mm	4,520	4,520	4,520
		ft.in	14′10″	14′10″	14′10″
Max. tilt angle at carry position			49	49	49
Max. tilt angle at fully raised			63	63	63
Max. tilt angle at ground	K		44	44	44
Max. tilt angle at max. reach	J		6,450	6,450	6,450
Max. dump angle at max. reach	K		21′2″	21′2″	21′2″
Max. dump angle at ground	L		7,050	6,850	7,070
Max. dump angle at fully raised	M		23′2″	22′6″	23′2″
External radius at tire side	O	mm	3,550	3,550	3,550
		ft.in	11′8″	11′8″	11′8″
External radius at bucket edge	Q	mm	3,026	3,026	3,026
		ft.in	9′11″	9′11″	9′11″
Wheel base	E	mm	2,300	2,300	2,300
		ft.in	7′7″	7′7″	7′7″
Tread	F	mm	500	500	500
		ft.in	1′8″	1′8″	1′8″
Ground clearance	G	mm	9,380	9,180	9,400
		ft.in	30′9″	30′1″	30′10″
Overall length	A	mm	3,540	3,540	3,540
		ft.in	11′7″	11′7″	11′7″
Operating weight		kg	25,326	25,476	25,504
		lb	55,834	56,165	56,227

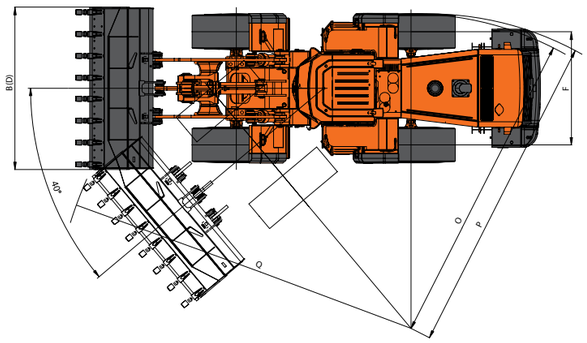
1) Measured to the tip of the bucket teeth or bolt-on edge, with tyres 26.5R25(L3).

DIMENSIONS

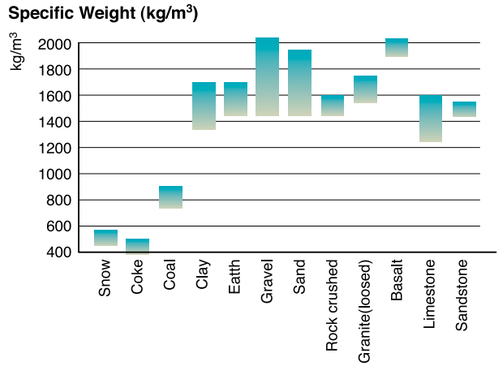
DL 450



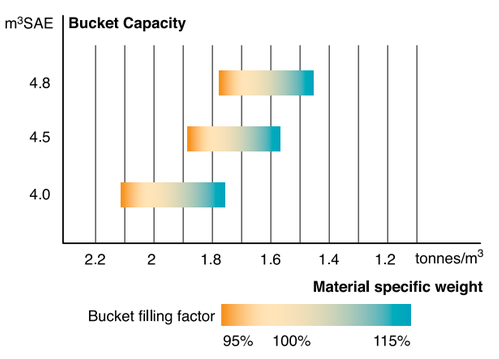




Measured to the tip of the bucket teeth or bolt on edge with tires 26.5R25(L3)



The specific weight of material largely depends on moisture rate, compacting value, percentage of various components etc... This chart is given only for information.



The Bucket filling factor depends also of the nature of material, the working conditions and the operator ability.