

# 310L EP (IT4) Backhoe Loader

54 kW (72 gross hp) / 51 kW (69 net hp)



JOHN DEERE



<b>Engine</b>		<b>310L EP</b>	
Manufacturer and Model	Yanmar 4TNV98CT turbocharged		
Non-Road Emission Standard	EPA Interim Tier 4/EU Stage IIIB		
Displacement	3.3 L (203 cu. in.)		
Gross Peak Power	54 kW (72 hp) at 2,330 rpm		
<b>Power Ratings</b>			
Net Peak Power* (ISO 9249)	51 kW (69 hp) at 2,010 rpm		
Net Peak Torque (ISO 9249)	271 Nm (200 lb.-ft.) at 1,800 rpm		
Net Torque Rise	27%		
Lubrication	Pressure system with spin-on filter and cooler		
Air Cleaner	Dual-stage dry type with safety element and evacuator valve		
<i>*Net power advertised is the power available at the flywheel when the engine is equipped with cooling fan, air cleaner, muffler, and alternator at standard conditions. An engine power derate will occur with an elevation increase that may be perceivable beginning at ~3,000 ft., depending on application and conditions.</i>			
<b>Cooling</b>			
Fan Type	Viscous variable-rate (temperature-controlled) cooling fan standard		
Engine Coolant Rating	-40 deg. C (-40 deg. F)		
Engine Oil Cooler	Oil to water		
<b>Powertrain</b>			
<b>Transmission</b>	4-speed, helical-cut gears, full PowerShift™ transmission with hydraulic reverser standard; electric clutch cutoff on loader lever		
<b>Torque Converter</b>	Single stage, dual phase with 2.63:1 stall ratio, 280 mm (11 in.)		
Maximum Travel Speeds with Standard Engine, Measured with 19.5L-24 Rear Tires			
	<i>Forward</i>	<i>Reverse</i>	
Gear 1	5.3 km/h (3.3 mph)	6.7 km/h (4.2 mph)	
Gear 2	9.7 km/h (6.0 mph)	12.3 km/h (7.6 mph)	
Gear 3	20.1 km/h (12.5 mph)	—	
Gear 4	36.4 km/h (22.6 mph)	—	
<b>Axles</b>			
Axle Oscillation, Stop to Stop, Front Axle	22 deg.		
<b>Axle Ratings</b>		<i>Front</i>	<i>Rear</i>
SAE J43	5000 kg (11,000 lb.)	6000 kg (13,200 lb.)	
Dynamic	9000 kg (19,800 lb.)	10 000 kg (22,000 lb.)	
Static	23 500 kg (51,800 lb.)	26 500 kg (58,400 lb.)	
Ultimate	37 000 kg (81,600 lb.)	39 500 kg (87,100 lb.)	

Powertrain (continued)		310L EP	
<b>Differentials</b>			
Mechanical-Front-Wheel-Drive (MFWD) Axle	Open – standard; automatic, limited-slip traction control – custom or optional		
Rear Axle	Foot actuated, hydraulically engaged 100% mechanical lock		
<b>Steering (ISO 5010)</b>			
Axle	Hydrostatic power steering and emergency steering		
	<i>MFWD</i>	<i>Non-Powered Front</i>	
<b>Curb-Turning Radius</b>			
With Brakes	3.57 m (11 ft. 9 in.)	3.55 m (11 ft. 8 in.)	
Without Brakes	4.15 m (13 ft. 7 in.)	4.12 m (13 ft. 6 in.)	
<b>Bucket-Clearance Circle</b>			
With Brakes	9.99 m (32 ft. 9 in.)	9.98 m (32 ft. 9 in.)	
Without Brakes	10.86 m (35 ft. 8 in.)	10.84 m (35 ft. 7 in.)	
Steering Wheel Turns (lock to lock)	2.7	3.2	
<b>MFWD and Rear Axle</b>			
Heavy duty, outboard planetary final drives distribute shock loads over 3 gears			
<b>Brakes (ISO 3450)</b>			
Service	Power assisted, hydraulic wet disc, mounted inboard, self-adjusting and self-equalizing		
Parking	Spring applied, hydraulically released, wet, multi-disc, independent of service brakes with electric switch control		
<b>Hydraulics</b>			
Main Pump	Open-center system; axial-piston pump		
<b>Pump Flow at 2,200 rpm</b>			
Backhoe	128 L/m (33.7 gpm)		
Loader	104 L/m (27.5 gpm)		
<b>System Relief Pressure</b>			
Backhoe	24 993 kPa (3,625 psi)		
Loader	22 063 kPa (3,200 psi)		
<b>Controls</b>			
Backhoe	2-lever mechanical standard; pilot controls with pattern select and manual and/or electric auxiliary functions optional; field kits available for additional mechanical-control options		
Loader	Single-lever control with electric clutch cutoff switch and MFWD (momentary) standard; single-lever control with electric clutch cutoff switch, electrohydraulic (EH) proportional auxiliary roller, MFWD (momentary), and transmission quick-shift optional		
<b>Cylinders</b>			
Heat-treated, chrome-plated, polished rods; hardened steel (replaceable bushings) pivot pins			
	<i>Bore</i>	<i>Rod Diameter</i>	<i>Stroke</i>
<b>Loader Boom (2)</b>	80 mm (3.15 in.)	50 mm (1.97 in.)	790 mm (31.10 in.)
<b>Loader Bucket (1)</b>	90 mm (3.54 in.)	50 mm (1.97 in.)	744 mm (29.29 in.)
<b>Backhoe Boom (1)</b>	110 mm (4.33 in.)	56 mm (2.20 in.)	821 mm (32.32 in.)
<b>Backhoe Crowd (1)</b>	110 mm (4.33 in.)	63 mm (2.48 in.)	553 mm (21.77 in.)
<b>Backhoe Bucket (1)</b>	80 mm (3.15 in.)	50 mm (1.97 in.)	892 mm (35.12 in.)
<b>Backhoe Swing (2)</b>	80 mm (3.15 in.)	45 mm (1.77 in.)	310 mm (12.20 in.)
<b>Backhoe Extendable Dipperstick (1)</b>	63 mm (2.48 in.)	32 mm (1.26 in.)	1062 mm (41.81 in.)
<b>Backhoe Stabilizer (2)</b>	80 mm (3.15 in.)	50 mm (1.97 in.)	500 mm (19.69 in.)
<b>Non-Powered Axle (1)</b>	70 mm (2.76 in.)	42 mm (1.65 in.)	210 mm (8.27 in.)
<b>MFWD (1)</b>	65 mm (2.56 in.)	40 mm (1.57 in.)	210 mm (8.27 in.)
<b>Electrical</b>			
Voltage	12 volt		
Alternator Rating	120 amp with canopy and quarter cab / 130 amp with cab		
Lights	10 halogen: 4 front, 4 rear, and 2 side docking (32,500 candlepower each); turn signals and flashers: 2 front and 2 rear; stop and taillights; and 2 rear reflectors; factory-installed option for 2 LED spotlights and 8 LED floodlights in lieu of standard halogen light package		
<b>Operator Station</b>			
Type (ISO 3471)	Canopy, isolation mounted, ROPS/FOPS, left/right access, with molded roof; optional quarter cab (front glass only) and fully enclosed cab		
<b>Tires/Wheels</b>			
	<i>Front</i>	<i>Rear</i>	
Non-Powered Front Axle	12.5/80-18 F3 (12)	19.5L-24 R4 (12)	
	14.5/75-16.1 F3 (16)	19.5L-24 R4 (12)	
With MFWD	12-16.5 NHS (12)	19.5L-24 R4 (12)	
<b>Serviceability</b>			
<b>Refill Capacities</b>			
<b>Cooling System</b>			
Cab	19.3 L (20.4 qt.)		
Canopy	17.4 L (18.4 qt.)		
Rear Axle	18 L (19 qt.)		
Engine Oil (including vertical spin-on filter)	10.5 L (11.1 qt.)		
Torque Converter and Transmission	15.1 L (16 qt.)		
Fuel Tank (with ground-level fueling)	128.7 L (34 gal.)		
Hydraulic System	126.8 L (33.5 gal.)		
Hydraulic Reservoir	45 L (11.9 gal.)		
<b>MFWD Housing</b>			
Axle	6.5 L (6.9 qt.)		
Planetary (each)	0.9 L (1 qt.)		

**Operating Weights** **310L EP**

With Full Fuel Tank, 79-kg (175 lb.) Operator, Standard Equipment, and Bumper 6270 kg (13,822 lb.)

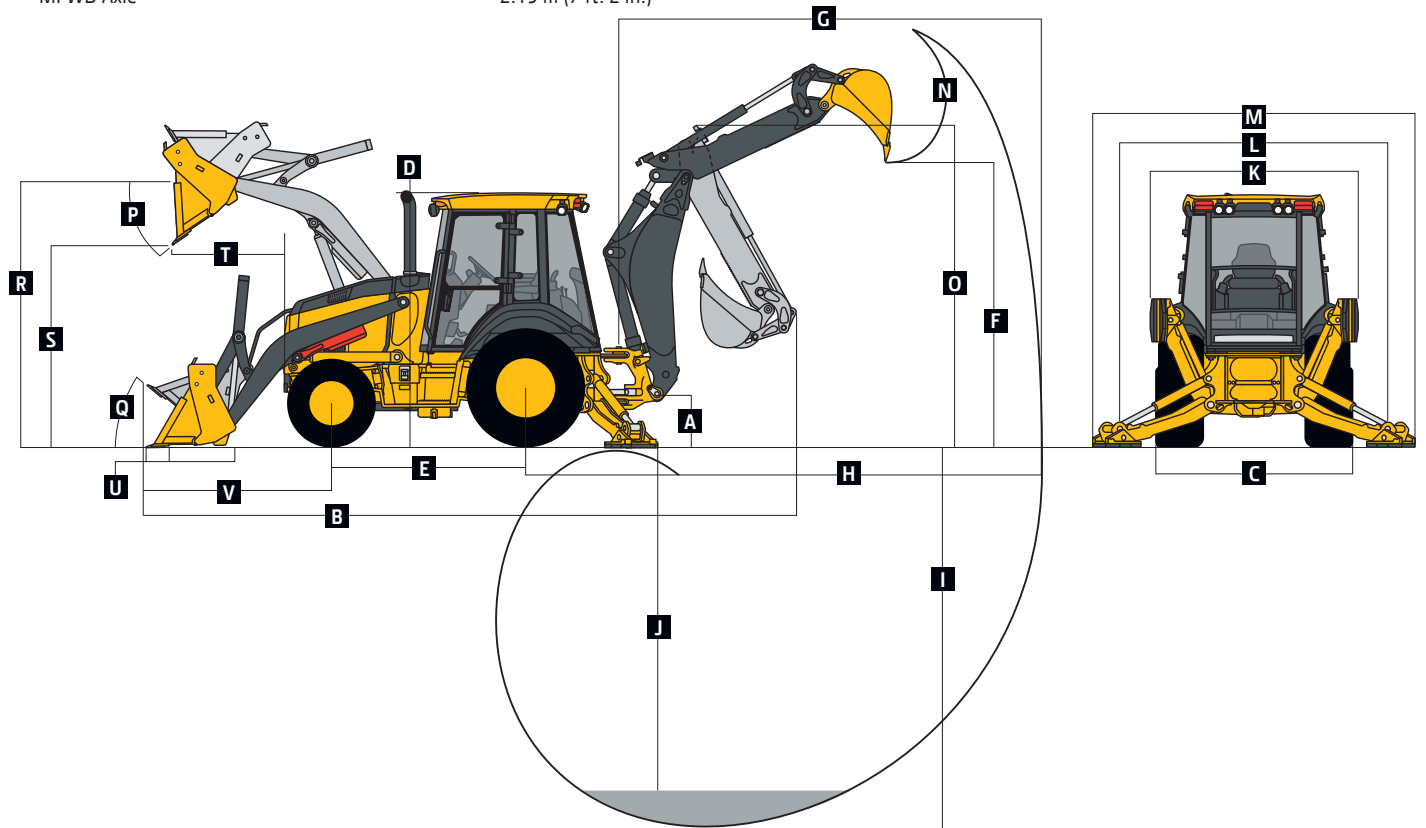
Typical with Cab, Extendable Dipperstick, MFWD, and 204-kg (450 lb.) Counterweight 7095 kg (15,642 lb.)

**Optional Components (weight difference between base equipment and option)**

Cab	263 kg (580 lb.)
MFWD with Tires	168 kg (370 lb.)
Extendable Dipperstick	191 kg (420 lb.)
Front Loader Coupler	257 kg (566 lb.)
Backhoe Bucket Coupler	59 kg (130 lb.)

**Overall Dimensions**

<b>A</b> Ground Clearance, Minimum	318 mm (13 in.)
<b>B</b> Overall Length, Transport	7.24 m (23 ft. 9 in.)
<b>C</b> Width Over Tires	2.20 m (7 ft. 3 in.)
<b>D</b> Height to Top of ROPS/Cab	2.81 m (9 ft. 3 in.)
<b>E</b> Length from Axle to Axle	
Non-Powered Front Axle	2.16 m (7 ft. 1 in.)
MFWD Axle	2.19 m (7 ft. 2 in.)



**Backhoe Dimensions and Performance** **310L EP**

Backhoe specifications are with 610-mm x 0.18-m<sup>3</sup> (24 in. x 6.5 cu. ft.) bucket; dipper lift specs are with a boom angle of 65 deg.

Bucket Range	305–762 mm (12–30 in.)
Digging Force	
Bucket Cylinder	48.2 kN (10,844 lb.)
Crowd Cylinder	31.1 kN (6,992 lb.)
Swing Arc	180 deg.
Operator Control	2 levers
Leveling Angle	14 deg.
Stabilizer Angle Rearward	18 deg.

*With Optional Extendable Dipperstick*

	<i>With Standard Backhoe</i>	<i>Retracted</i>	<i>Extended</i>
<b>F</b> Loading Height, Truck Loading Position	3.38 m (11 ft. 1 in.)	3.46 m (11 ft. 4 in.)	4.12 m (13 ft. 6 in.)
<b>G</b> Reach from Center of Swing Pivot	5.42 m (17 ft. 9 in.)	5.49 m (18 ft. 0 in.)	6.51 m (21 ft. 4 in.)
<b>H</b> Reach from Center of Rear Axle	6.49 m (21 ft. 3 in.)	6.55 m (21 ft. 6 in.)	7.57 m (24 ft. 10 in.)
<b>I</b> Digging Depth (SAE maximum)	4.30 m (14 ft. 1 in.)	4.38 m (14 ft. 4 in.)	5.43 m (17 ft. 10 in.)
<b>J</b> Digging Depth (SAE)			
610-mm (2 ft.) Flat Bottom	4.27 m (14 ft. 0 in.)	4.34 m (14 ft. 3 in.)	5.40 m (17 ft. 9 in.)
2440-mm (8 ft.) Flat Bottom	3.93 m (12 ft. 11 in.)	4.01 m (13 ft. 2 in.)	5.15 m (16 ft. 11 in.)
<b>K</b> Stabilizer Width, Transport	2.18 m (7 ft. 2 in.)	2.18 m (7 ft. 2 in.)	2.18 m (7 ft. 2 in.)
<b>L</b> Stabilizer Spread, Operating	3.10 m (10 ft. 2 in.)	3.10 m (10 ft. 2 in.)	3.10 m (10 ft. 2 in.)
<b>M</b> Stabilizer Overall Width, Operating	3.53 m (11 ft. 7 in.)	3.53 m (11 ft. 7 in.)	3.53 m (11 ft. 7 in.)
<b>N</b> Bucket Rotation	190 deg.	190 deg.	190 deg.
<b>O</b> Transport Height	3.38 m (11 ft. 1 in.)	3.39 m (11 ft. 1 in.)	3.39 m (11 ft. 1 in.)

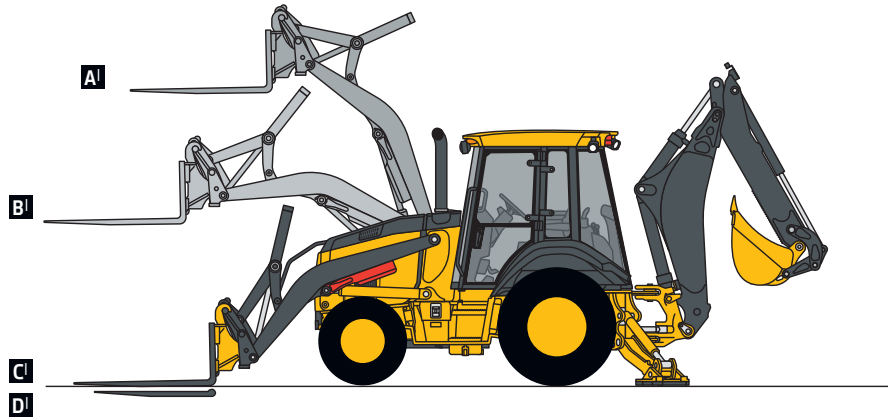
### Loader Dimensions and Performance

### 310L EP

<b>P</b> Bucket Dump Angle, Maximum	45 deg.			
<b>Q</b> Rollback Angle at Ground Level	40 deg.			
	<i>Heavy-duty</i>	<i>Heavy-duty</i>	<i>Heavy-duty long lip</i>	<i>Multipurpose</i>
Bucket Capacity	0.77 m <sup>3</sup> (1.00 cu. yd.)	0.86 m <sup>3</sup> (1.12 cu. yd.)	0.96 m <sup>3</sup> (1.25 cu. yd.)	0.96 m <sup>3</sup> (1.25 cu. yd.)
Width	2184 mm (86 in.)	2184 mm (86 in.)	2184 mm (86 in.)	2184 mm (86 in.)
Weight	363 kg (800 lb.)	390 kg (860 lb.)	405 kg (892 lb.)	794 kg (1,750 lb.)
Breakout Force	41.6 kN (9,361 lb.)	42.3 kN (9,512 lb.)	40.0 kN (8,983 lb.)	37.0 kN (8,321 lb.)
Lift Capacity, Full Height	2919 kg (6,435 lb.)	2995 kg (6,602 lb.)	2760 kg (6,085 lb.)	2427 kg (5,352 lb.)
<b>R</b> Height to Bucket Hinge Pin, Maximum	3.48 m (11 ft. 5 in.)	3.48 m (11 ft. 5 in.)	3.48 m (11 ft. 5 in.)	3.48 m (11 ft. 5 in.)
<b>S</b> Dump Clearance, Bucket at 45 deg.	2.74 m (9 ft. 0 in.)	2.78 m (9 ft. 1 in.)	2.68 m (8 ft. 9 in.)	2.68 m (8 ft. 9 in.)
<b>T</b> Reach at Full Height, Bucket at 45 deg.	702 mm (27.7 in.)	667 mm (26.3 in.)	793 mm (31.2 in.)	705 mm (27.8 in.)
<b>U</b> Digging Depth Below Ground, Bucket Level	70 mm (2.8 in.)	71 mm (2.8 in.)	51 mm (2.0 in.)	111 mm (4.4 in.)
<b>V</b> Length from Front Axle Centerline to Bucket Cutting Edge	2.02 m (6 ft. 8 in.)	1.97 m (6 ft. 6 in.)	2.12 m (6 ft. 11 in.)	2.10 m (6 ft. 10 in.)

### Lift Capacity with Quick-Coupler Forks

Hydraulic Capacity	1219-mm (48 in.) Tines	1524-mm (60 in.) Tines
<b>A</b> <sup>1</sup> Maximum Height	1711 kg (3,772 lb.)	1592 kg (3,510 lb.)
<b>B</b> <sup>1</sup> Maximum Reach	2690 kg (5,931 lb.)	2530 kg (5,578 lb.)
<b>C</b> <sup>1</sup> At Ground Line	3393 kg (7,480 lb.)	3203 kg (7,061 lb.)
<b>D</b> <sup>1</sup> Below Ground Line	185 mm (7.3 in.)	185 mm (7.3 in.)

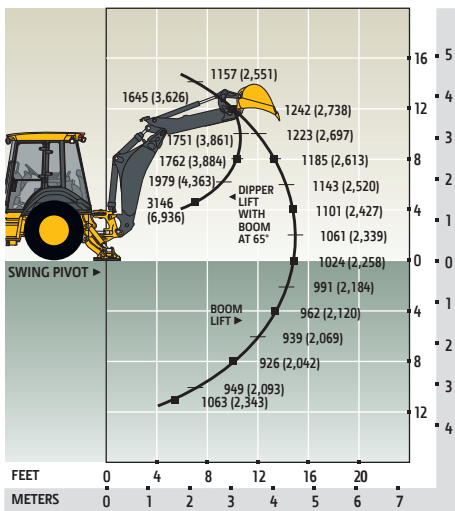


### Lift Capacity with Bucket

Lift capacities are over-end values in kg (lb.) according to SAE J31. Figures listed are 87% of the maximum lift force available. Calculated with 610-mm x 0.18-m<sup>3</sup> (24 in. x 6.5 cu. ft.) bucket. Bucket impacts overall lift capacity.

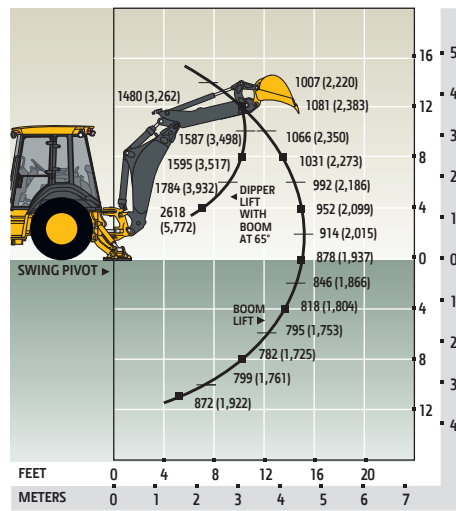
#### STANDARD LIFT

#### With Standard Dipperstick



#### STANDARD LIFT

#### With 1.06-m (3 ft. 6 in.) Extendable Dipperstick, Retracted



#### STANDARD LIFT

#### With 1.06-m (3 ft. 6 in.) Extendable Dipperstick, Extended

