



# CATERPILLAR

## 416 Backhoe Loader

### Value Analysis:

- 46 kW/62 HP net flywheel power.
- 6087 kg/13,420 lb operating weight.
- 4315 mm/14'2" maximum backhoe digging depth.
- Variable Flow, load sensing, pressure compensating hydraulic system . . . provides full hydraulic power to cutting edges at all engine speeds, low fuel consumption and low control lever efforts.
- Extensive use of XT-3 hose with O-Ring face seal connectors . . . designed to provide a dry machine.
- Overcenter Backhoe in transport position . . . provides superior roading characteristics.
- Narrow loader tower, divergent loader arms and a single tilt cylinder provides excellent forward visibility.
- Fully synchronized 4F/4R power shuttle transmission provides on-the-go shifting in all gears, two or four wheel drive.
- 195° maximum backhoe bucket rotation . . . provides superior load retention and ability to dig vertical walls at deeper depths.

Model shown may include optional equipment



### engine

Flywheel power at 2400 RPM . . . . . 46 kW/62 HP (Kilowatts (kW) is the International System of Units equivalent of horsepower.)

*Net power at the flywheel of the vehicle engine is based on SAE J1349 standard conditions of 25° C/77° F and 100 kPa/29.61" Hg. Power is based on using 35° API (15.6° C/60° F) gravity fuel having an LHV of 42 780 kJ/kg (18,390 Btu/lb) when used at 29.4° C/85° F and with a density of 838.9 g/L (7.001 lb/U.S. gal). Power rating is adjusted for vehicle equipped with fan, air cleaner, alternator, water pump, fuel pump, muffler and lubricating oil pump. No derating is required up to 2300 m/7500 ft altitude.*

Perkins 4-stroke cycle 4.236 diesel Engine with four cylinders, 98.4 mm/3.87" bore, 127 mm/5.0" stroke and 3.86 liter/236 cu. in. displacement.

Dry type, slip fit liners — pre-finished for ease of run-in and service replacement.

Cast iron sump — resistance to impact damage.

Steel backed aluminum bearings. Heat treated crankshaft. Pressure lubrication with full-flow filtered oil. Dry-type air cleaner with primary and safety elements.

12-volt direct electric starting system with 52-amp alternator and ether starting aid standard.

## Backhoe Loader



### transmission

4-speed forward and reverse — full synchromesh in all gears. Constant mesh gears on all ratios permit on-the-go shifting all gears — up or down. Neutral start provision prevents starting machine in gear.

#### Transmission Disconnect

Hand operated power disconnect (no clutch) for on-the-go shifting and full engine RPM for fast loader lift.

#### Torque Converter

Single stage.

#### Forward/Reverse Power Shuttle

Conveniently placed, hand operated lever provides instant on-the-go direction changes from forward to reverse with power hydraulic clutches.

#### Travel Speeds

Travel speeds of 2-wheel-drive backhoe loader at full throttle equipped with 16.9 — 24, rear tires.

	1st		2nd		3rd		4th	
	Km/H	MPH	Km/H	MPH	Km/H	MPH	Km/H	MPH
Forward	5.3	3.3	10.0	6.2	17.9	11.1	32.2	20.0
Reverse	5.3	3.3	10.0	6.2	18.0	11.2	32.2	20.0



### axles

Axle Rating 2 and 4-wheel drive (SAE J43)

Front axle rating

Static . . . . . 4180 kg/9,216 lb

Rear axle rating

Static . . . . . 6370 kg/14,043 lb

#### Rear Axle

Heavy duty industrial axle with inboard planetary reduction and differential lock.

#### Front axle with standard 2-wheel drive

Oscillation 11° each direction from centerline

#### Front axle with optional 4-wheel drive

Oscillation 11° each direction from centerline.

Switch on instrument panel engages 4-wheel drive, on the move, in any gear, forward or reverse.

Drive from differential to front wheels via planetary reduction in each wheel. On-the-go shifting up or down in all gears is retained in 4-wheel drive.



### brakes

Two fully enclosed, self-energizing oil disc brakes on final drive input shaft. Foot operated, pedal interlock for roading, or independently for working applications. Parking brake uses service brake system.



### steering

Steering unit provides emergency steering capability in case of power failure.

Type . . . . .	Front wheel
Power steering . . . . .	Hydrostatic
Cylinder . . . . .	(1) double acting, bore 76 mm/3", stroke 220 mm/8.7", rod 47 mm/1.87"
Turning Radius, 2-wheel drive . . . . .	3953 mm/12'11.5"
4-wheel drive . . . . .	3886 mm/12'9"



### tires

Type	Size	Ply Rating
Front		
Standard 2wd	11L — 16	10
Standard 4wd	10.5 — 20	8
Rear		
Standard 2wd	16.9 — 24	8
Optional 2wd	16.9 — 24	10
Optional 2wd	19.5L — 24	8
Standard 4wd	19.5L — 24	8
Optional 2 or 4wd	19.5L — 24	10



### hydraulic system

Variable flow, load sensing, pressure compensating design provides efficient use of power and low-effort controls.

Type . . . . .	Closed center
Pump type . . . . .	Variable flow axial piston
Pump capacity . . . . .	108 l/min/28.5 gpm at 2400 RPM and 2700 psi



### service refill capacities

	Liters	U.S. Gallon
Cooling system . . . . .	21.7	5.75
Fuel tank . . . . .	83	22
Engine oil		
with filter . . . . .	6.6	7 qts.
Transmission . . . . .	9.5	10 qts.
Rear axle . . . . .	16	17 qts.
Hydraulic reservoir . . . . .	37.9	10
Hydraulic system . . . . .	79.5	21
4-wheel drive front axle . . . . .	7.0	1.8



### weights

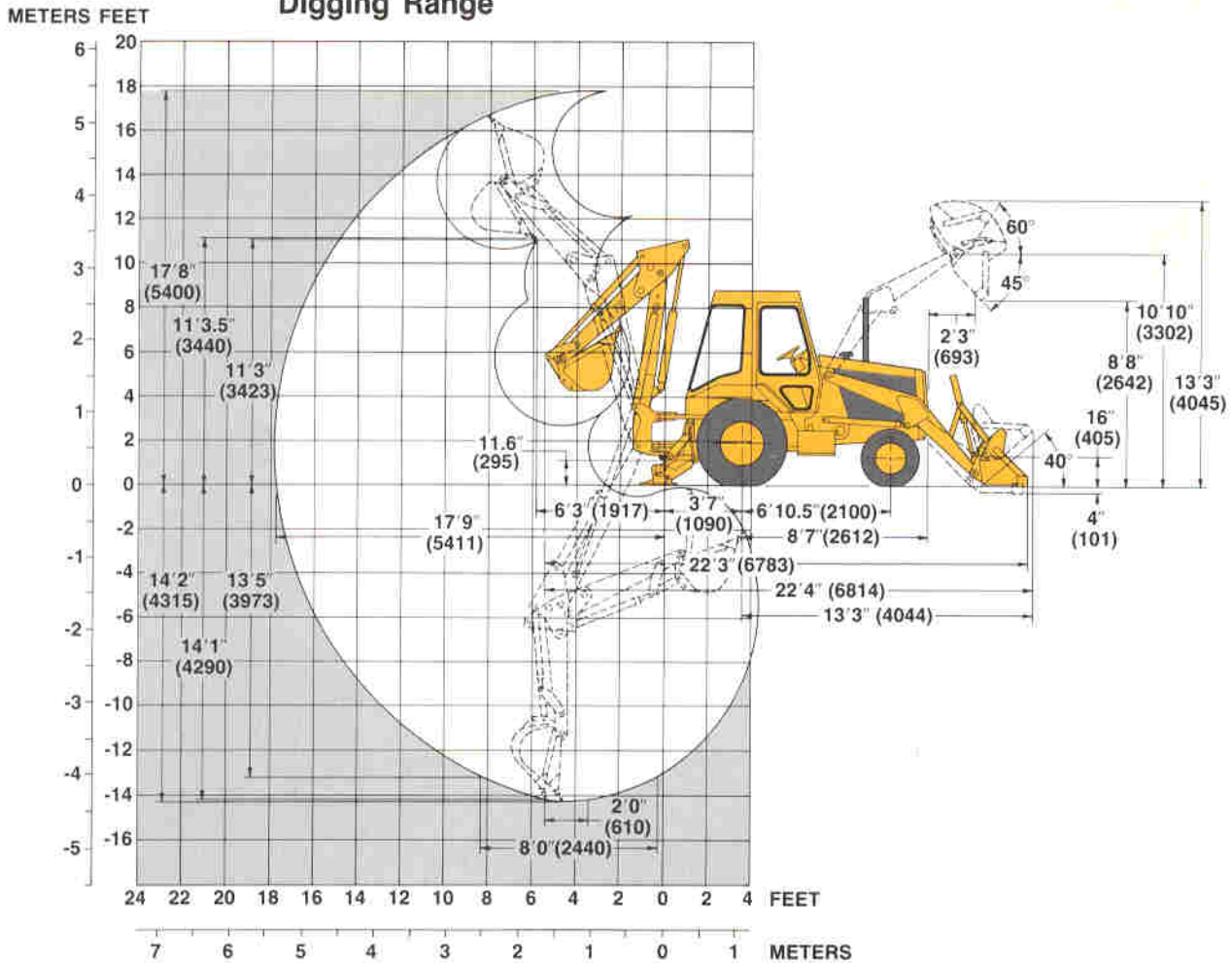
Backhoe loader with standard equipment: 2235 mm/88" General Purpose loader bucket, 610 mm/24" backhoe bucket, 79 kg/175 lb operator, full fuel tank, and standard 2-wheel drive tires.

Operating Weight 6087 kg/13,420 lb.	kg	lb
Cab . . . . .	+231	+509
4-wheel drive . . . . .	+229	+505
Extendable stick* . . . . .	+260	+574
Multi-purpose bucket . . . . .	+188	+415

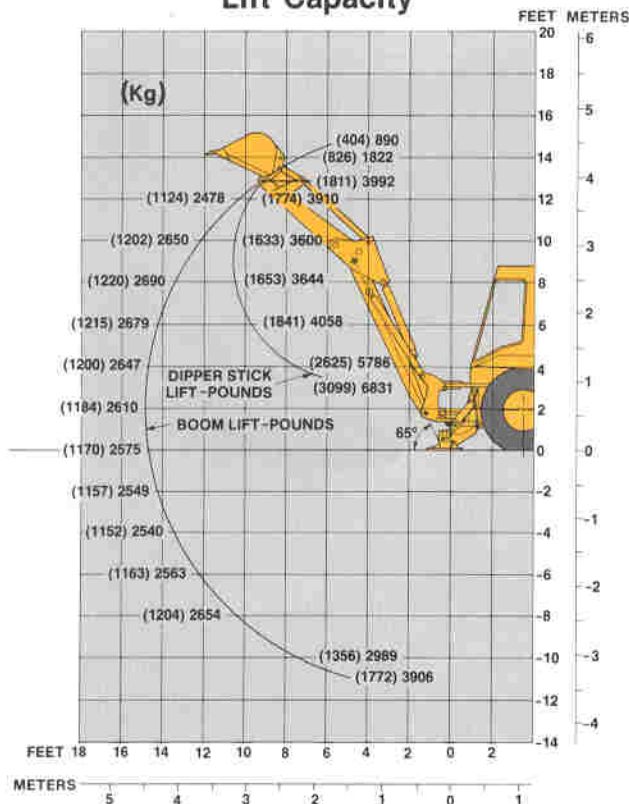
\*Includes 16.9 x 24 10PR tires.

# 416 OPERATIONAL DATA

## Digging Range



## Lift Capacity



## Machine Dimensions

	mm	ft/in
Overall transport length	6814	22' 4"
Overall transport height	3423	11' 3"
Overall width	2235	7' 4"
Height to top of canopy	2713	8' 11"
Height to top of cab	2713	8' 11"
Height to top of exhaust stack	2760	9' 5"
Height to top of steering wheel	1951	6' 5"
Ground clearance (machine main frame)	295	11.6"
Front wheel tread	1780	5' 10"
Rear wheel tread	1710	5' 7"
Wheel base	2100	6' 10.5"

**NOTE:** Specifications shown with 11L - 16, 10 PR front tires, 16.9 - 24, 8 PR rear tires, ROPS canopy, 4.27 m<sup>3</sup>/14' backhoe with 610 mm/24" trenching bucket, loader with 2235 mm/88" .76 m<sup>3</sup>/1.0 yd<sup>3</sup> General Purpose bucket and standard equipment unless otherwise specified.

3  
17  
10  
20  
14  
8  
19  
10  
15  
5  
32  
74  
16  
13  
5

## Backhoe Dimensions

	Standard stick		Extendable stick			
			Retracted		Extended	
Digging depth — SAE (max) 610 mm/2' flat bottom	4315 mm	14'2"	4415 mm	14'6"	5624 mm	18'5"
Overall reach from rear axle centerline at groundline	4290 mm	14'1"	4389 mm	14'5"	5595 mm	18'4"
Overall reach from swing pivot at groundline	6501 mm	21'4"	6595 mm	21'7.5"	7753 mm	25'5"
Loading height	5411 mm	17'9"	5505 mm	18'1"	6663 mm	21'10"
Loading reach	3440 mm	11'3.5"	3430 mm	11'3"	4136 mm	13'7"
Swing arc	1917 mm	6'3"	2109 mm	6'11"	3103 mm	10'2"
Bucket rotation — #1 position for max. load retention	180°		180°		180°	
#2 position for max. power	195°		187°		187°	
	150°		144°		144°	
Stabilizer spread — operating position	2820 mm	9'3"	2820 mm	9'3"	2820 mm	9'3"
Stabilizer spread — transport position	2052 mm	6'9"	2052 mm	6'9"	2052 mm	6'9"
Digging force, bucket cylinder, SAE	47.2 kN	10,610 lb	46.4 kN	10,440 lb	46.4 kN	10,440 lb
Digging force, dipper cylinder, SAE	28.6 kN	6345 lb	28.0 kN	6300 lb	19.6 kN	4410 lb
Leveling angle (maximum slope on which backhoe will make vertical cut)	14°		14°		14°	

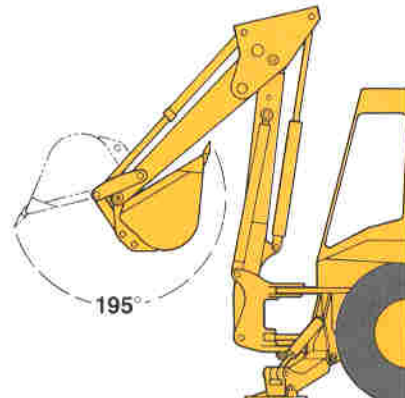
## backhoe bucket Capacities (SAE)

Width	Capacities				Weight	No. of Teeth
	mm	in	Heaped L	Struck L		
*305	12		80 cu ft	62 cu ft	84 lb	3
†*457	18		154 cu ft	119 cu ft	114 lb	4
†*610	24		214 cu ft	165 cu ft	130 lb	4
*762	30		284 cu ft	212 cu ft	146 lb	5
*914	36		355 cu ft	258 cu ft	161 lb	6

\*Heavy duty buckets available from factory  
†Rock buckets available from factory.

## Teeth Options

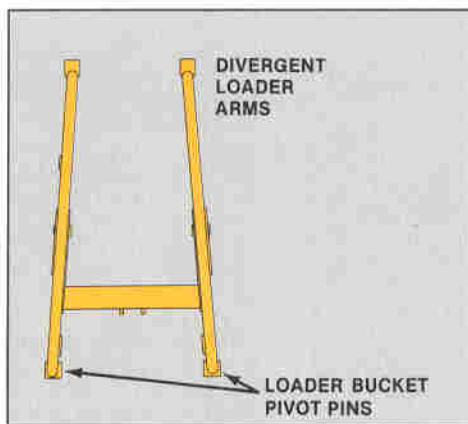
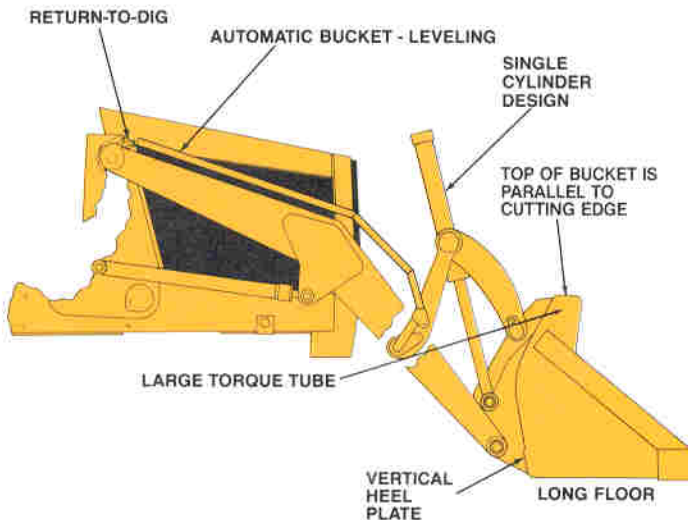
- Utility
- Penetration
- Abrasion
- Short
- Long



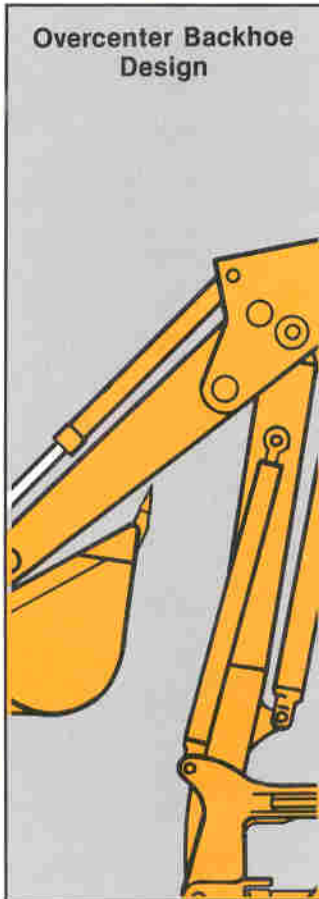
## Loader Dimensions and Features

### LOADER BUCKET Capacities (SAE)

Type	General Purpose	Multi-Purpose
Width	2235/88"	2235/88"
Heaped	.76/1	.76/1
Struck	.63/.82	.63/.82
Lift capacity at full height	2381/5,250	2396/5,280
Breakout force	3402/33.3	3781/37.0
	7500	8329
Hinge pin height	3300/10'10"	3300/10'10"
Dump angle full height	45°	45°
Dump height @ 45°	2642/8'8"	2673/8'9"
Reach @ full height/45°	692/27"	629/24.8"
Maximum rollback ground	40°	40°
Digging depth	101/4"	126/5"
Grading angle	113°	115°
Width of dozer cutting edge	—	2262/89.1"
Clam opening — maximum	—	960/37.8"
Weight	377/830	549/1210



## 416 Hydraulic System



**Overcenter Backhoe Design**

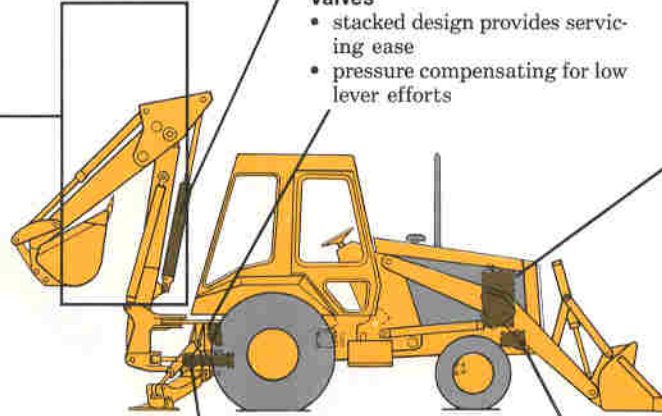
- transfers weight to the front axle for machine balance and superior roading capabilities

### Hydraulic Cylinders

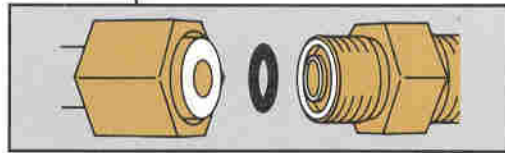
- large wear bands for rod and piston alignment

### Valves

- stacked design provides servicing ease
- pressure compensating for low lever efforts



### XT-3 Hose and O-Ring Face Seals

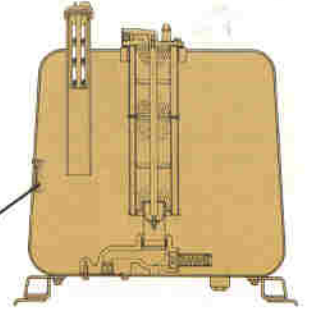


- long hose life
- dry machine

### Excellent Hose Routing

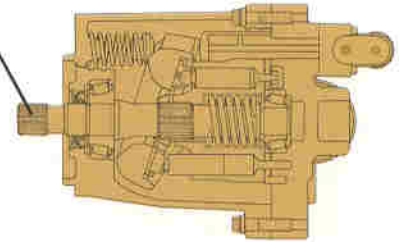
- reduces hose damage
- easy accessibility

### Hydraulic Tank and Filter Assembly

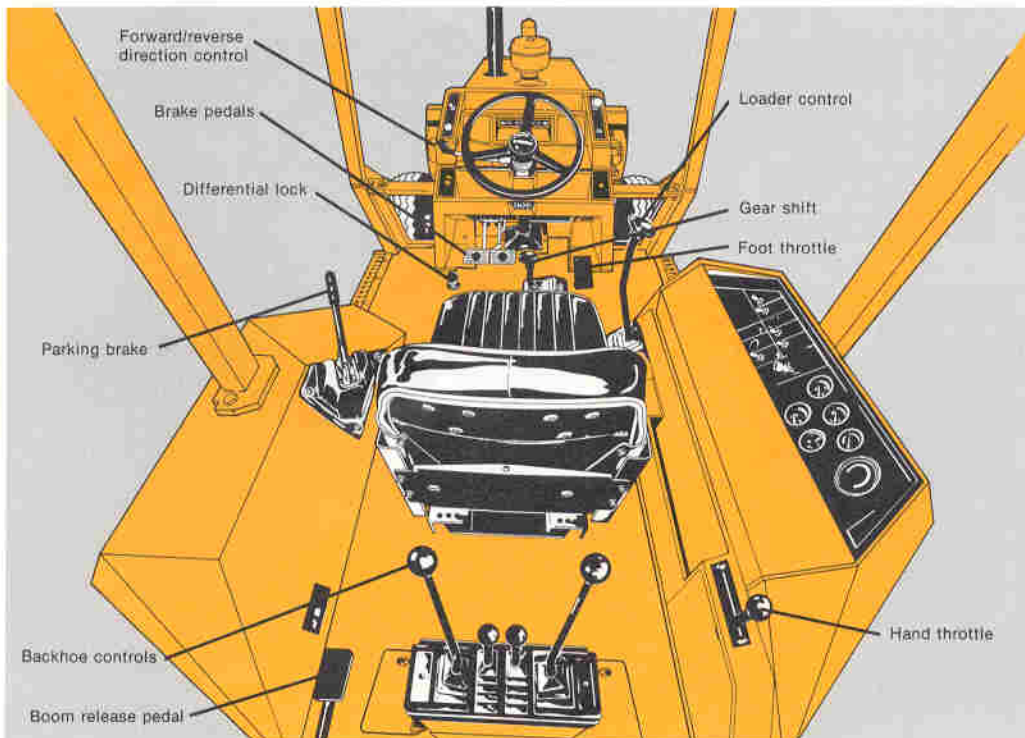


- strategically positioned for optimum weight distribution
- two stage filter has large filtration area

### Variable Flow Axial Piston Pump (load sensing)



- automatically matches power to work demands
- reduces fuel consumption



Forward/reverse direction control

Brake pedals

Differential lock

Parking brake

Backhoe controls

Boom release pedal

Loader control

Gear shift

Foot throttle

Hand throttle

## Operator's Compartment

- **Dual access**, either-side entry with canopy or optional cab level, uncluttered floor.
- **Resiliently mounted** for operator isolation from noise.
- **Convenient**, easy to reach, low effort controls for day-long productivity.
- **Advanced warning system** provides continuous operator awareness of machine condition.
- **Side mounted gauge panel** is visible to operator while operating either loader or backhoe.
- **Optional adjustable suspension seat** designed for added operator comfort.
- **Transmission disconnect switches** on loader lift and gear shift levers . . . fast, convenient actuation.
- **Rear-mounted hand throttle** for easy actuation from backhoe position.
- **Forward/Reverse direction control** easily operated with hand on steering wheel.



**standard equipment**

*NOTE: Standard and optional equipment may vary outside U.S.A. Consult your Caterpillar Dealer for specifics.*

Alternator, 52 amp, 12 volt.  
Electric starting.  
Suction fan.  
Ether cold weather starting aid.  
Fenders (rear).  
Four speed synchro-mesh transmission.

Power steering.  
Fast reversing shuttle, all gears.  
Torque converter.  
Oil disc brakes.  
Parking brake.  
ROPS canopy.  
Adjustable seat.  
Seat belt. (76 mm/3").

Front and rear halogen working lights (4).  
Stop and tail lights (2).  
Flashing hazard/signal lights.  
Dry-type air cleaner.  
Warning horn, front (electric).  
Engine enclosures.

Mirror, rear view.  
Tires —  
Front 11L-16 10PR  
Rear 16.9-24 8PR  
Loader, self-leveling with transmission disconnect switch on single lever control.  
Differential lock.  
Tool box.  
Instrument panel lights.  
Throttles — hand and foot.  
Vandalism protection.

Front grill, impact absorbing.  
Backhoe, 4315 mm/14'2" center-pivot, 2 lever control.  
**Indicators:** Air cleaner service. Clock hour meter. Hydraulic oil level sight gauge. Fuel level gauge, ammeter, voltmeter, tachometer. Oil pressure and coolant gauges (also have audible alarms). Torque converter oil temperature gauge.



**optional equipment**

(with approximate change in operating weights)

	Kg	Lb
Air conditioner .....	39	86
Altitude compensating turbocharged engine .....	20	45
Backup alarm (required in U.S.A.) .....	1	2
Backhoe control lever options (each) .....	9	20
Buckets .....	see page 5	
Cab, ROPS (includes heater, defroster and pressurizer) .....	231	509
Cooler, hydraulic oil .....	8	18
Cutting edge, bolt-on for loader bucket .....	39	85
Fan, operator's compartment .....	2	5
Floor mat, ROPS canopy .....	5	10
Four wheel drive .....	229	505
Guards:		
Hose guard, boom base .....	1	2
Boom cylinders .....	39	86
Stabilizer cylinders .....	59	129

	Kg	Lb
Hydraulic arrangement:		
3rd valve (for loader) .....	12	27
7th valve (backhoe) for stick mounted attachments .....	5	10
7th & 8th valve (backhoe) for additional circuits on std. stick .....	9	20
8th valve (backhoe) for unit equipped with extendable stick and second additional circuit .....	6	14
Additional hydraulic line to boom .....	4	8
Mirrors, outside mounted .....	17	39
Rotating beacon .....	5	10
Sound suppression, exterior .....	11	25
Speedometer .....	2	5
Stabilizer street pads .....	37	82
Stick, extendable .....	260	574
Suspension seat — vinyl .....	21	46
Suspension seat — fabric .....	15	33
Tooth tips options .....	See page 5	

**To build your future, a new generation of Caterpillar muscle.**



**D3B**  
48 kW  
(65 hp)



**IT12**  
48 kW  
(65 hp)



**206**  
53 kW  
(71 hp)



**931**  
48 kW  
(65 hp)

**See your Cat Dealer for the most complete line available.**

Materials and specifications are subject to change without notice.