Engine

Four-stroke cycle, six cylinder Caterpillar® 3306 turbocharged diesel engine with variable horsepower (vhp).

Power ratings (standard power)

Ratings at 1900 rpm*	kW	hp
Gross power	139	186
Net power	123	165

The following ratings apply at 1900 rpm when tested under the specified standard conditions for the specified standard:

Net power	kW	hp	PS
Caterpillar	123	165	—
ISO 9249	123	165	—
SAE J1349	122	163	—
EEC 80/1269	123	165	—
DIN 70020	—	—	171

Peak torque (net) @ 1200 rpm

	804 Nm	593 lb-ft
Torque rise		30 %

Dimensions

Bore	121 mm	4.75 in
Stroke	152 mm	6.00 in
Displacement	10.45 liters	638 cu in

Power ratings (VHP - high power)**

Ratings at 1900 rpm*	kW	HP
Gross power	154	206
Net power	138	185

The following ratings apply at 1900 rpm when tested under the specified standard conditions for the specified standard:

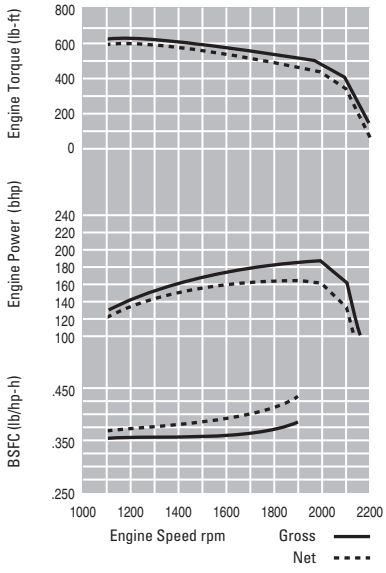
Net power	kW	hp	PS
Caterpillar	138	185	—
ISO 9249	138	185	—
SAE J1349	137	183	—
EEC 80/1269	138	185	—
DIN 70020	—	—	192

Peak torque (net) @ 1200 rpm

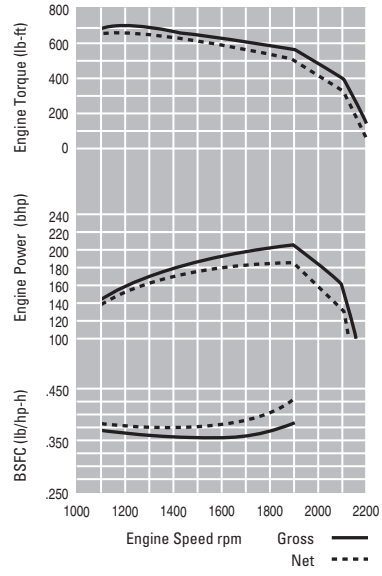
	904 Nm	665 lb-ft
Torque rise		30%

**VHP (variable horsepower) available in gears 4-8 forward and 3-6 reverse when All-Wheel Drive is not engaged. When All-Wheel Drive is engaged, VHP is available in all gears.

Standard



VHP



***Power rating conditions**

- based on standard air conditions of 25°C (77°F) and 99 kPA (29.32 in Hg) dry barometer
- used 35° API gravity fuel having an LHV of 42 780 kJ/kg (18,390 Btu/lb) when used at 30°C (86°F) [ref. a fuel density of 838.9 g/L (7.001 lb/U.S. gal)]
- net power advertised is the power available at the flywheel when engine is equipped with fan, air cleaner, muffler and alternator
- no derating required up to 2237 m (7339 ft) altitude

Features

- direct injection fuel system with individual adjustment-free injection pumps and nozzles
- 3-ring aluminum alloy pistons
- heat-resistant sil-chrome steel intake and stellite-faced exhaust valves
- forged steel connecting rods
- one-piece cylinder head designed with cast intake manifold
- cast cylinder block with replaceable wet liners
- induction-hardened, forged crankshaft
- direct electric 24-V starting and charging system
- two 12-V, 150 amp-hour, 950 CCA, low-maintenance batteries
- 50-amp alternator
- tube-type, water-cooled oil cooler
- vertical-flow, steel-fin, tube-type radiator
- dry-type, radial-seal air cleaner with primary and secondary elements
- resiliently mounted to rear frame

Hydraulic System

Proportional priority pressure compensated system.

Output at 2100 rpm and 24 150 kPa (3500 psi)	206 liters/min	54.4 gpm
Standby pressure	3100 kPa	450 psi
Maximum system pressure	24 150 kPa	3500 psi

Pump features

- load-sensing, pressure-compensating, variable-displacement piston pump
- low standby pressure
- pump supplies only flow and pressure required to move implements plus 2100 kPa (300 psi) margin pressure

Control features

- eight, closed-center control valves standard:
  - — right blade lift
  - — left blade lift
  - — blade sideshift
  - — blade tip
  - — circle drive
  - — centershift
  - — front wheel lean
  - — articulation
- low effort, short throw controls
- controls spaced to allow use of several controls at once
- blade float position built into each blade lift control valve
- lock valves built into all control valves
- line relief valves for the blade lift, blade tip and blade sideshift circuits are incorporated into the control valves
- if flow requirements exceed pump output, control valves proportion flow to each implement circuit

Other features

- steering circuit given priority over implement circuits
- heavy-duty XT hose
- hose couplings with O-ring face seals
- full-flow filter

Transmission

Direct drive, power shift transmission with eight speeds forward.

Maximum travel speeds (at rated rpm with standard 14.00-24 tires)

		km/h	mph
Forward	1	3.5	2.2
	2	4.8	3.0
	3	7.0	4.3
	4	9.6	6.0
	5	15.1	9.4
	6	20.5	12.8
	7	28.3	17.6
	8	41.1	25.5
Reverse	1	2.8	1.7
	2	5.2	3.2
	3	7.6	4.7
	4	11.9	7.4
	5	22.3	13.9
	6	32.4	20.2

Features

- electronic shift control
- electronically controlled overspeed protection
- single lever controls direction, speed and parking brake
- inching pedal
- low efforts on shift lever and inching pedal
- internal parking brake serviceable without removing transmission
- diagnostic connector for easy troubleshooting
- resiliently mounted to frame

Service Refill Capacities

	liters	gallons
Fuel tank	341	90.0
Cooling system	40	10.4
Crankcase	27	7.0
Transmission, differential and final drives	47	12.2
Tandem housing (each)	65	16.9
Hydraulic system	98	25.5
Hydraulic tank	38	9.9
Circle drive housing	7	1.8
Front wheel spindle bearing housing	0.5	0.13

Steering

Two-cylinder, hydraulic steering with hand metering unit.

Dimensions		
Minimum turning radius (outside front tires)*	7.4 m	24' 3"
Steering range	50° Left/Right	
Articulation angle	20° Left/Right	

*Using front wheel steering, frame articulation, and with differential unlocked.

Features

- large steer stops and steering relief valve help prevent damage when object is hit during full turn
- consistent steering response to the left and right
- optional secondary steering system provides secondary steering capability in event of a complete loss of hydraulic pressure

143H Motor Grader

Frame

Flanged, box-section design.

Dimensions

Front frame	mm	in
Top and bottom plates		
Width	305	12
Thickness	25	1
Side plates		
Width	242	9.5
Thickness	12	0.5

Linear weights

Front frame	kg/m	lb/ft
Minimum	165	112
Maximum	213	144

Section modulus

Front frame	cm^3	in^3
Minimum	2083	127
Maximum	4785	291

Features

- single piece top and bottom plates run from bolster to articulation joint
- rear frame has two box-sectioned channels integral with fully welded differential case

Front Axle

Live spindle design.

Dimensions

Front axle

Ground clearance	625 mm	24.6"
Front wheel lean		18°
Oscillation angle		32°

Features

- allows use of large outboard bearings for high load-carrying capability of the wheel assembly
- wheel spindle rotates inside sealed compartment
- bearings bathed in oil

Tandems

Dimensions

	mm	in
Height	506	19.9
Width	201	7.9
Sidewall thickness		
Inner	16	0.63
Outer	18	0.71
Drive chain pitch	51	2
Wheel axle spacing	1522	60
Tandem oscillation	15° Forward 25° Reverse	

Brakes

Meets the following standards: SAE J1473 OCT 90 and ISO 3450-1996.

Service brake features

- air-actuated, oil-disc brakes located in each of the four wheel spindle housings
- sealed and adjustment-free
- lubricated and cooled by tandem housing oil
- 23 948 cm^2 (3712 in^2) of total braking surface

Parking brake features

- multiple oil-disc unit
- located in the transmission on the output shaft
- manually actuated
- spring-engaged, air pressure-released
- engaged parking brake neutralizes transmission
- 1916 cm^2 (297 in^2) of total brake surface area

Secondary brake features

- separate circuits to right and left tandems
- malfunction of one circuit still leaves machine with at least half of original braking capacity
- dual chamber air tank provides air to actuate brakes five times after engine and compressor stop
- in the event of total braking loss, the spring-actuated parking/emergency brake can be used to lock the wheels on any surface

Tires and Rims

Tires	Rims	Type
14.00-24	10" x 24"	MP
17.5-25	14" x 25"	MP

MP = Multi-Piece Rim

Notes: An assortment of bias or radial tire models are available from various manufactures offering different sizes, strength indexes and industry types.

Dependent on the weight of additional equipment, the machine load may exceed certain tire capabilities. Caterpillar recommends that you carefully evaluate all conditions before selecting a tire model.

Drawbar

Solid steel bars fabricated into Y-frame design.

Dimensions

Drawbar frame	mm	in
Height	127	5
Thickness	76	3

Features

- yoke plate completely covers top of circle
- six shoes support circle
- all shoes have vertical and horizontal adjustment
- 11 replaceable nylon composite wear strips between circle and drawbar
- six replaceable nylon composite wear strips between the circle and support shoes

Circle

Single-piece, rolled ring forging.

Dimensions

Circle	mm	in
Circle diameter	1530	60.2
Blade beam thickness	30	1.2

Features

- 64 uniformly spaced, flame-cut teeth
- teeth surfaces hardened on front 240° of circle
- raised wear surfaces, top and bottom
- hydraulically driven, circle drive motor
- 360° circle rotation

Moldboard

Fabricated from wear-resistant, high-carbon steel.

Dimensions

Moldboard	mm	in
Length	3658	144
Height	610	24
Thickness	22	0.87
Arc radius	413	16.25
Throat clearance	120	4.7

Cutting edge	mm	in
Width	152	6
Thickness	16	0.63

End bit	mm	in
Width	152	6
Thickness	16	0.63

Features

- heat-treated sideshift rails
- replaceable metallic wear inserts
- cutting edge and end bit are Caterpillar through-hardened, curved DH-2 steel
- 16 mm (0.63") diameter bolts
- three sideshift mounting locations for optional 4267 mm (14') moldboard

Blade Range

Full range of blade positioning.

		mm	in
Circle centershift	Right	728	28.7
	Left	695	27.4
Moldboard sideshift	Right	660	26.0
	Left	524	20.6
Maximum shoulder reach outside of tires	Right	1978	77.9
	Left	1896	74.6
Maximum lift above ground		480	18.9
Maximum depth of cut		715	28.1
Maximum blade position angle			90° Both Sides
Blade tip range			40° Forward
			5° Backward

Features

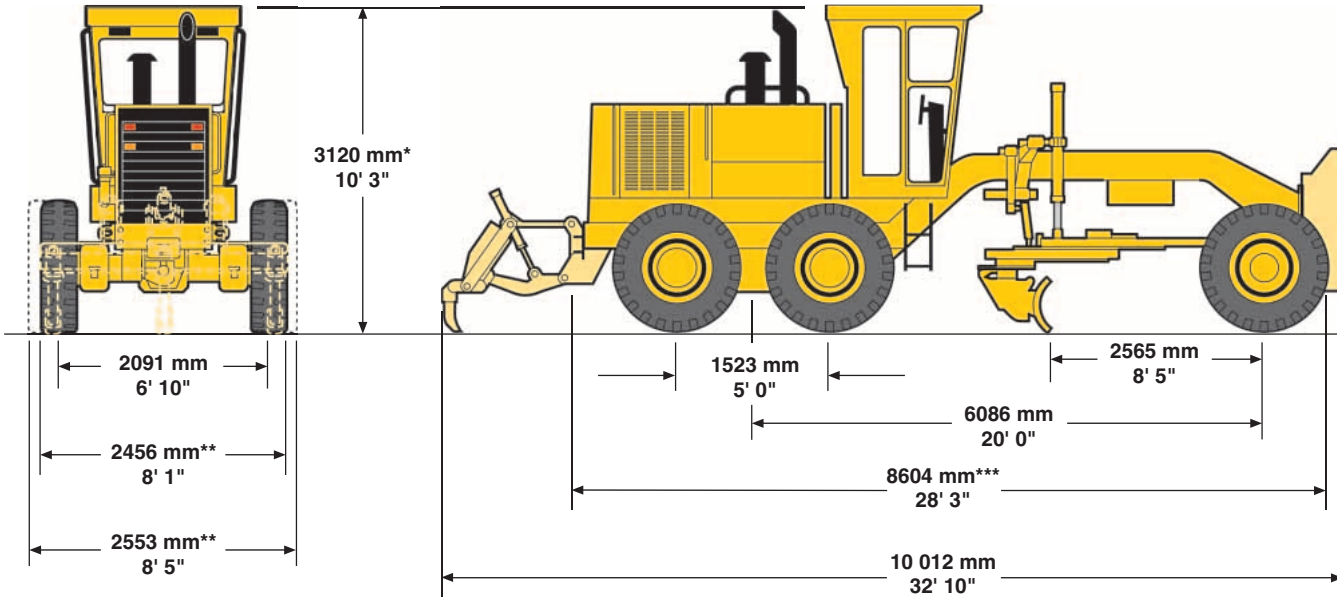
- steep ditch-cutting angles possible
- 1.5:1 and 2:1 backsloping can be done without putting front tire on slope
- aggressive blade-carrying angles possible

Notes:
Add 305 mm (12") for maximum right or left moldboard sideshift when using optional 4267 mm (14') blade.

With the machine in the crab position, add 940 mm (37") to maximum right or left moldboard sideshift.

Dimensions

All dimensions are approximate.



Operating weights (approximate)

on front wheels	4214 kg	9290 lb
on rear wheels	10 809 kg	23,830 lb
total machine	15 023 kg	33,120 lb

Dimensions and operating weights based on standard machine configuration with 14.00-24 10PR (G-2) tires, full fuel tank, coolant, lubricants and operator.

* add 225 mm (8.9") for optional full height cab
** add 193 mm (7.6") for optional 17.5-25 tires
*** add 201 mm (7.9") for front push plate
add 1207 mm (4') for rear-mounted ripper-scarifier

Scarifiers and Ripper-Scarifier

Type	V-Type Scarifier (mid-mounted)	Straight Scarifier (mid-mounted)	Ripper-Scarifier (rear-mounted)
Working width	1184 mm 46.6"	1800 mm 71"	2300 mm 91"
Scarifying depth, maximum	292 mm 11.5"	317 mm 12.5"	411 mm 16.2"
Scarifier shank holders:			
number	11	17	9
spacing	116 mm 4.6"	111 mm 4.38"	267 mm 10.5"
Ripping depth, maximum	—	—	462 mm 18.2"
Ripper shank holders:			
numbers	—	—	5
spacing	—	—	533 mm 21"
Increase in machine length, beam raised	—	—	970 mm 38.2"
Penetration force*	—	—	8047 kg 17,740 lb
Pryout force	—	—	9281 kg 20,460 lb

*Varies with machine configuration.

All-Wheel Drive System

Three operating modes: automatic, manual or off.

Pump output at 2500 rpm and 35 000 kPa (5080 psi)	175 liters/min	46.2 gpm
Maximum operating pressure	35 000 kPa	5080 psi
Minimum operating pressure	5500 kPa	800 psi
Motor displacement:		
High displacement	1650 cc/rev	100.7 cu in/rev
Low displacement	660 cc/rev	40.2 cu in/rev

Features

- variable horsepower is available in all gears when system is turned on
- variable displacement piston pump driven directly from the transmission
- dual displacement, wheel motors
- high motor displacement used in gears 1-4 forward and 1-3 reverse
- low motor displacement used in gears 5-7 forward and 4-5 reverse
- front wheels freewheel in 8 forward and 6 reverse
- pump displacement and motor displacement are electronically controlled
- flow divider valve allows differential flows to the inside and outside motors during a machine turn and limits flow to a spinning wheel to assure adequate flow to the wheel with traction

Cab with ROPS/FOPS

Caterpillar cab and Rollover Protective Structure (ROPS) are standard.

Cab features

- 77 dB(A) operator sound pressure level when measured per SAE J919 at rated speed
- low profile, sound-suppressed cab is standard
- optional full height, sound-suppressed cab
- engine key start/shutoff switch
- back-lit rocker switches
- adjustable control console
- tilt adjustable steering wheel
- cloth-covered, contour suspension seat with multiple adjustments
- retractable seat belt
- fuse panel in steering control console
- optional 24-V to 12-V 25-amp converter
- optional heater/air conditioner systems with adjustable vents and three-speed fan
- optional defroster fans
- gauges located in the cab
  - — fuel
  - — hydraulic oil temperature
  - — brake air pressure, two
  - — engine coolant temperature
  - — articulation
  - — optional speedometer/tachometer
- service hour meter on steering console
- EMS operator warning system
- wipers and washers, windshield and lower front windows
- optional rear wiper and washer
- optional rear window sunshade
- fixed lower front windows
- optional opening lower front windows
- optional sliding side windows
- 10° slanted rear window
- low effort, suspended foot pedals
- sweep-out cab floor
- ground-level door release
- cupholder
- ashtray and 24-V lighter
- optional 12-V power port
- lunch box location
- coat hanger
- location and wiring for two-way or entertainment radio

Note:
When properly installed and maintained, the Caterpillar cab, when tested with doors and windows closed according to ANSI/SAE J1166 MAY90, meets OSHA and MSHA requirements for operator sound exposure limits in effect at time of manufacture.

ROPS/FOPS features

- ROPS (Rollover Protective Structure) meets the following criteria:
  - — SAE J396
  - — SAE J1040 MAY94
  - — ISO 3471-1994
- also meets the following FOPS (Falling Object Protective Structure) criteria:
  - — SAE J231 JAN81
  - — ISO 3449-1992

Functions analyzed by Electronic Monitoring System (EMS)

- **Category I** — Flashing indicator for alternator problem and parking brake engagement.
- **Category II** — Flashing action lamp and indicator for engine coolant and hydraulic oil heating problem and transmission electrical problem. Requires change in machine operation.
- **Category III** — Loud action alarm, plus flashing action lamp and indicator to signal problem with engine oil pressure, brake air pressure, supplemental steering, also parking brake applied with transmission engaged. Requires immediate machine shutdown.

Optional Equipment

With approximate change in operating weight.

	kg	lb
Accumulators, blade lift	71	156
Air conditioner with heater and pressurizer	73	162
Air dryer	13	29
Alternator, 75-amp	10	23
Alternator, 100-amp	11	25
Autoshift, transmission	—	—
Batteries, extreme-duty, 1300 CCA	15	32
Blade, 4267 mm x 610 mm x 22 mm (14' x 24" x 7/8")	75	166
Blade, 4267 mm x 688 mm x 25 mm (14' x 27" x 1")	261	574
Cab, ROPS, high profile, sound suppressed	77	170
Canopy, ROPS, high profile, with rear wall and window	-41	-90
Converter, 25-amp, 24-V to 12-V	5	11
Covers, louver	7	15
Cutting edges, 203 mm x 19 mm (8" x 3/4")	20	44
End bits, overlay, reversible	11	24
Ether starting aid	0	1
Extensions, blade, 610 mm (2')	114	250
Fuel tank, 454-liter (120-gallon)	23	50
Fan, defroster, front and rear	2	4
Fan, reversible, with rear grill cover	9	20
Graderbit system, penetration bit type	163	360
Guard, transmission	98	215
Guard, lower platform	23	50
Heater, engine coolant	1	3
Heater, with pressurizer	18	40
Hydraulic arrangements with one or more additional hydraulic valves are available for front scarifier, rear ripper-scarifier, dozer, dozer angle, snow plow and snow wing		
Instrument panel cover, canopy	4	10

	kg	lb
Lighting systems:		
bar mounted lights, directional and headlights	13	28
cab mounted lights, directional and headlights	9	20
cab and bar mounted lights, directional, headlights and work lights	22	48
work lights, front and rear	6	13
snow wing light, right	18	40
warning light, cab or canopy mounted	3	6
Mirrors, dual, inside mounted	—	—
Mirrors, outside mounted	8	18
Power port, 12-V	2	5
Protection, tire chain	18	39
Push plate, front mounted	497	1095
Radio ready, entertainment	4	9
Rims, refer to Tires and Rims section, page 15		
Ripper-scarifier, rear	961	2119
Ripper, shank/tooth, one	33	72
Scarifier, front mounted, V-type	845	1862
Scarifier, front mounted, straight type	903	1988
Scarifier, shanks/teeth, nine	65	144
Seat, vinyl-covered, contour suspension	—	—
Snow arrangements, refer to Snow Arrangement Supplement		
Speedometer/tachometer	0	1
Steering system, secondary	50	111
Sunshade, rear window	3	7
Tires, refer to Tires and Rims section, page 15		
Windows, lower front, opening	3	6
Windows, sliding side	4	8
Wiper and washer, rear	7	16