MONTANA
Department of Transportation

MDT-BRG-015 04/23

Montana Department of Transportation
Bridge Bureau
Approved Construction Equipment List

Make:	*CATERPILLAR*
Model:	*950G*
Equipment Type:	*WHEEL LOADER*
Contractor Modifications:	*NONE*

Interstate Approval Conditions

Approval Type	*CROSSING ONLY*
Speed:	*NO RESTRICTION*
Weight:	*39,200 LB OR LESS*
Traffic:	*APPROVED WITH REGULAR TRAFFIC*
Location Restrictions:	*REMAIN IN PAINTED LANE*

Non-Interstate Approval Conditions

Approval Type	*CROSSING ONLY*
Speed:	*NO RESTRICTION*
Weight:	*39,200 LB OR LESS*
Traffic:	*40,000 LBS*
Location Restrictions:	*REMAIN IN PAINTED LANE*

Comments:

Equipment configuration, weights, and specifications on following pages. Approval does not apply to posted bridges. Other construction equipment is not allowed to operate on or cross bridge at the same time this equipment is on the bridge. Equipment must be empty while crossing.

950G
Wheel Loader

CAT®



Cat® 3126 DITA Diesel Engine		
Flywheel Power	134 kW	180 hp
Maximum Flywheel Power	147 kW	197 hp
Bucket Capacities	2.5 to 3.5 m^3	3.25 to 4.5 yd^3
Operating Weight	17 782 kg	39,200 lb

Courtesy of Machine Market

950G Wheel Loader

State-of-the-art design, engine performance and operator comfort maximize productivity.

Engine

✔ *Cat 3126 DITA Diesel Engine is built for performance, durability, excellent fuel economy and meets emission regulations. The 3126 has many heavy-duty features normally found on larger displacement engines.*

pg. 4-5

Transmission

Planetary power shift transmission with automatic shift capability helps provide on-the-go speed and direction changes.

✔ *The Electronic Clutch Pressure Controls (ECPC) allow for smoother shifts and transmission neutralization, which let the operator adjust for specific site conditions.*

pg. 6

Axles and Frame

Larger diameter axle shafts on the high torque side of the final drive provide greater torsional strength. Durable, articulated frame has a full box-section which absorbs twisting and impact forces to provide a solid foundation for the entire structure. **pg. 7-8**

Performance and comfort you can feel.
Caterpillar® design delivers excellent breakout force, fast load and cycle times, precise maneuvering and smoother shifts for optimal performance and comfort.

Reliability you can trust.
Proven components, field-tested durability, combined with easy maintenance, ensures reliability over the life of the machine.

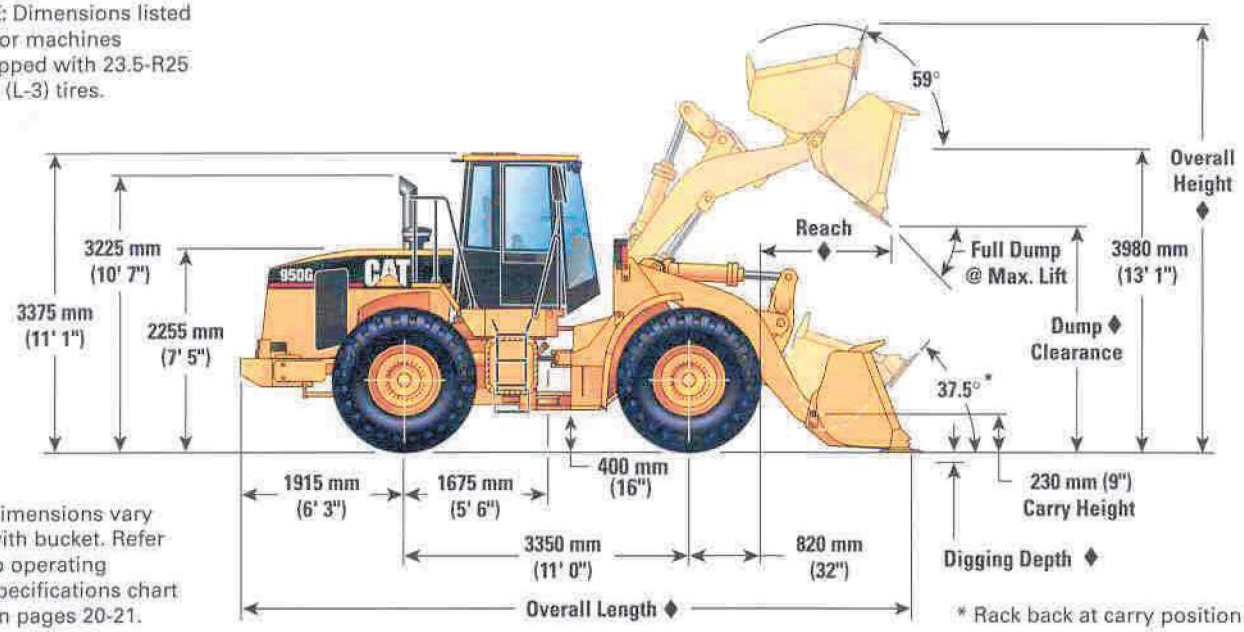


Courtesy of Machine.Market

Dimensions

All dimensions are approximate.

NOTE: Dimensions listed are for machines equipped with 23.5-R25 XHA (L-3) tires.



♦ Dimensions vary with bucket. Refer to operating specifications chart on pages 20-21.

* Rack back at carry position is 45°.

Tread width for all tires 2140 mm (84")

	Width over tires		Ground clearance		Change in vertical dimensions	
	mm	inches	mm	inches	mm	inches
23.5-25 16 PR (L-2)	2760	109	380	15	-20	-0.8
23.5-25 16 PR (L-3)	2810	111	360	14	-40	-1.7
23.5-R25 XHA (L-3) standard	2890	114	400	16	—	—
23.5-R25 XTLA (L-2) steel radial	2890	114	340	13	-60	-2.4
23.5-R25 GP-2B (L-2/3) steel radial	2750	108	380	15	-22	-0.9

Supplemental Specifications

	Change in operating weight		Change in static tipping load – straight	
	kg	lb	kg	lb
23.5-25 16 PR (L-2)	-408	-900	-300	-660
23.5-25 16 PR (L-3)	-300	-660	-221	-480
23.5-R25 XHA (L-3) standard	—	—	—	—
23.5-R25 XTLA (L-2) steel radial	-100	-220	-63	-130
23.5-R25 GP-2B (L-2/3) steel radial	-76	-160	-60	-130

NOTE: Tire options include tires and rims.

Bucket Controls

Pilot-operated lift and tilt circuits.

Lift circuit features

- four positions: raise, hold, lower and float
- mechanically adjustable lift height with automatic kickout on Conventional steering configuration
- in-cab, programmable high and low lift kickouts with cushioned stops on Command Control steering configuration

Tilt circuit features

- three positions: tilt back, hold and dump
- one mechanically adjustable kickout for return-to-dig bucket positioner on both steering versions

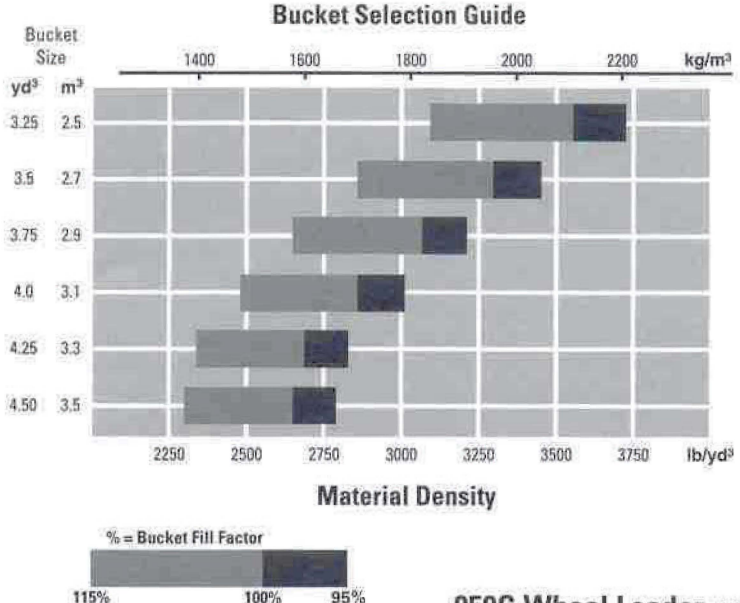
Controls

- two lever control (standard)
- three lever control (optional)
- wobble stick (optional) combines lift and tilt controls on Command Control steering configuration

Courtesy of Machine.Market

								Rock Buckets	
*Teeth & Segments	*Teeth	Bolt-on Edges	*Teeth & Segments	*Teeth	Bolt-on Edges	*Teeth & Segments	*Teeth	Bolt-on Edges	Bottom Strap Teeth
3.5 4.5	3.3 4.25	3.3 4.25	3.3 4.25	3.1 4.0	3.1 4.0	3.1 4.0	2.9 3.75	2.9 3.75	2.9 3.75
3.0 3.9	2.83 3.68	2.83 3.68	2.83 3.68	2.66 3.46	2.66 3.46	2.66 3.46	2.51 3.26	2.45 3.18	2.44 3.16
2995 9' 10"	2995 9' 10"	2930 9' 7"	2995 9' 10"	2995 9' 10"	2930 9' 7"	2995 9' 10"	2995 9' 10"	2985 9' 10"	2970 9' 9"
2700 8' 10"	2700 8' 10"	2845 9' 4"	2735 9' 0"	2735 9' 0"	2880 9' 5"	2770 9' 1"	2770 9' 1"	2880 9' 5"	2720 8' 11"
1300 4' 3"	1300 4' 3"	1175 3' 10"	1265 4' 2"	1265 4' 2"	1140 3' 9"	1230 4' 0"	1230 4' 0"	1315 4' 4"	1440 4' 9"
2745 9' 0"	2745 9' 0"	2555 8' 5"	2695 8' 10"	2695 8' 10"	2505 8' 3"	2645 8' 8"	2645 8' 8"	2605 8' 7"	2805 9' 2"
95 3.7"	95 3.7"	85 3.3"	95 3.7"	95 3.7"	85 3.3"	95 3.7"	95 3.7"	85 3.3"	125 4.8"
8200 26' 11"	8200 26' 11"	8010 26' 3"	8155 26' 9"	8155 26' 9"	7960 26' 1"	8100 26' 7"	8100 26' 7"	8060 26' 5"	8260 27' 1"
5435 17' 10"	5435 17' 10"	5390 17' 8"	5390 17' 8"	5390 17' 8"	5485 18' 0"	5485 18' 0"	5485 18' 0"	5350 17' 7"	5350 17' 7"
13 585 44' 7"	13 585 44' 7"	13 280 43' 7"	13 425 44' 1"	23 425 44' 1"	13 250 43' 6"	13 395 43' 11"	13 395 43' 11"	13 360 43' 10"	13 380 43' 11"
12 215 26,930	12 513 27,590	12 421 27,380	12 319 27,160	12 621 27,820	12 525 27,610	12 423 27,390	12 728 28,060	12 197 26,890	12 335 27,190
11 084 24,440	11 369 25,060	11 286 24,880	11 184 24,660	11 472 25,290	11 385 25,100	11 282 24,870	11 574 25,520	11 056 24,370	11 190 24,670
10 717 23,630	10 999 24,250	10 918 24,070	10 815 23,840	11 100 24,470	11 015 24,280	10 913 24,060	11 200 24,690	10 686 23,560	10 819 23,850
140.9 31,680	141.7 31,860	148.1 33,210	147.6 33,100	148.4 33,280	155.3 34,820	154.8 34,710	155.6 34,890	144.3 31,680	149.3 33,480
17 847 39,350	17 682 38,980	17 711 39,050	17 806 39,260	17 641 38,890	17 670 38,960	17 765 39,170	17 600 38,800	17 984 39,650	17 901 39,470

Bucket Selection Guide



Courtesy of Machine.Market

Operation Specifications

		General Purpose Buckets									Material Handling
		Bolt-on Edges	*Teeth & Segments	*Teeth	Bolt-on Edges	*Teeth & Segments	*Teeth	Bolt-on Edges	*Teeth & Segments	*Teeth	Bolt-on Edges
Rated capacity (§)	m^3	3.1	3.1	2.9	2.9	2.9	2.7	2.7	2.7	2.5	3.5
	yd^3	4.0	4.0	3.75	3.75	3.75	3.5	3.5	3.5	3.25	4.5
Struck capacity (§)	m^3	2.66	2.66	2.5	2.46	2.46	2.27	2.27	2.27	2.12	3.0
	yd^3	3.46	3.46	3.25	3.2	3.2	2.95	2.95	2.95	2.76	3.9
Width (§)	mm	2930	2995	2995	2930	2995	2995	2930	2995	2995	2930
	ft/in	9' 7"	9' 10"	9' 10"	9' 7"	9' 10"	9' 10"	9' 7"	9' 10"	9' 10"	9' 7"
Dump clearance at full lift and 45° discharge (§)	mm	2890	2785	2785	2935	2835	2835	2985	2880	2880	2810
	ft/in	9' 6"	9' 2"	9' 2"	9' 8"	9' 4"	9' 4"	9' 10"	9' 5"	9' 5"	9' 3"
Reach at full lift and 45° discharge (§)	mm	1270	1365	1365	1235	1330	1330	1200	1300	1300	1210
	ft/in	4' 2"	4' 6"	4' 6"	4' 1"	4' 4"	4' 4"	3' 11"	4' 3"	4' 3"	4' 0"
Reach with lift arms horizontal and bucket level	mm	2570	2710	2710	2510	2650	2650	2450	2590	2590	2605
	ft/in	8' 5"	8' 11"	8' 11"	8' 3"	8' 8"	8' 8"	8' 0"	8' 6"	8' 6"	8' 7"
Digging depth (§)	mm	85	95	95	85	95	95	85	95	95	85
	in	3.3"	3.7"	3.7"	3.3"	3.7"	3.7"	3.3"	3.7"	3.7"	3.3"
Overall length (§)	mm	8025	8165	8165	7965	8105	8105	7905	8045	8045	8060
	ft/in	26' 4"	26' 9"	26' 9"	26' 2"	26' 7"	26' 7"	25' 11"	26' 5"	26' 5"	26' 5"
Overall height with bucket at full raise (§)	mm	5400	5400	5400	5340	5340	5340	5280	5280	5280	5435
	ft/in	17' 9"	17' 9"	17' 9"	17' 6"	17' 6"	17' 6"	17' 4"	17' 4"	17' 4"	17' 10"
Loader clearance circle with bucket in carry position (§)	mm	13 290	13 430	13 430	13 255	13 395	13 395	13 220	13 360	13 360	13 460
	ft/in	43' 7"	44' 1"	44' 1"	43' 6"	43' 11"	43' 11"	43' 4"	43' 10"	43' 10"	44' 2"
Static tipping load straight** (§)	kg	12 195	12 094	12 388	12 311	12 210	12 508	12 430	12 329	12 631	12 317
	lb	26,890	26,660	27,310	27,140	26,920	27,580	27,400	27,180	27,850	27,150
Static tipping load at full 35° turn** (§)	kg	11 074	10 973	11 255	11 185	11 084	11 369	11 299	11 198	11 487	11 186
	lb	24,410	24,190	24,810	24,660	24,440	25,060	24,910	24,690	25,320	24,660
Static tipping load at full 40° turn** (§)	kg	10 710	10 609	10 887	10 820	10 719	11 000	10 932	10 832	11 116	10 820
	lb	23,610	23,390	24,000	23,850	23,630	24,250	24,100	23,880	24,510	23,850
Breakout force*** (§)	kN	146.3	145.8	146.6	154.5	154.0	154.8	163.1	162.7	163.4	141.9
	lb	32,810	32,690	32,870	34,640	34,530	34,710	36,570	36,480	36,640	31,910
Operating weight** (§)	kg	17 782	17 877	17 712	17 730	17 825	17 660	17 676	17 771	17 606	17 752
	lb	39,200	39,410	39,050	39,090	39,300	38,940	38,970	39,180	38,820	39,140

Specifications and ratings conform to all applicable standards recommended by the Society of Automotive Engineers. SAE Standards J732c govern loader ratings and are denoted in the text by (§).

* Dimensions are measured to the tip of the bucket teeth to provide accurate clearance data. SAE Standards specifies the cutting edge.

** Static tipping load and operating weight shown are based on standard machine configuration with 23.5-R25 XHA (L-3) tires, air conditioning, crank case guard, power train guard, full fuel tank, lubricants and operator.

*** Measured 102 mm (4.0"): behind tip of cutting edge with bucket hinge pin as pivot point in accordance with SAE J732c.

Courtesy of Machine.Market

Steering

Full hydraulic power steering. Meets SAE J1511 FEB94 and ISO 5010:1992

Ratings

Minimum turning radius (over tire)	6025 mm (19' 9")
Steering angle, each direction	40°
Hydraulic output at 2,280 rpm and 7000 kPa (1,015 psi)	160 liters/min (42.3 gpm)
Relief valve setting	19 980 kPa (2,897 psi)

Features

- center-point frame articulation
- load sensing hydraulic steering pump
- front and rear wheels track
- flow-amplified, closed-center, pressure-compensated system
- steering wheel operated pilot valve controls flow to steering cylinders on Command Control steering
- steering wheel-operated, hand-metering unit controls flow to steering cylinders on Conventional steering version
- full-flow filtering
- adjustable steering column

Tires

Tubeless, nylon, loader-design tires.

- 23.5-25 16 PR (L-2)
- 23.5-25 16 PR (L-3)
- 23.5-R25 XHA (L-3) standard
- 23.5-R25 XTLA (L-2) steel radial
- 23.5-R25 GP-2B (L-2/3) steel radial
- 625/70-R25 (L-3) low profile

NOTE:
In certain applications (such as load-and-carry work) the loader's productive capabilities might exceed the tires' tonnes-km/h (ton-mph) capabilities. Caterpillar recommends that a tire supplier be consulted to evaluate all conditions before selecting a tire model.

Using low profile tires will affect the following specs:

Width over tires	- 5 mm	-0.1 "
Ground clearance	-70 mm	-2.7 "
Vertical bucket dimension	-70 mm	-2.7 "
Dig depth	+70 mm	+2.7 "
Reach	+70 mm	+2.7 "
Operating weight	-194 kg	-420 lb
Straight tip load	-137 kg	-300 lb
Full turn static tip load	-121 kg	-260 lb
Run out speeds	-7 %	
Rimpull	+9 %	
Departure angle	-3 %	

Cab

Caterpillar cab and Rollover Protective Structure (ROPS) are standard in North America, Europe and Japan.

Features

- meets OSHA and MSHA limits for operator and sound exposure with doors and windows closed (according to ANSI/SAE J1166 MAY90)
- ROPS meets the following criteria:
  - SAE J394
  - SAE 1040 APR88
  - ISO 3471-1:1986
  - ISO 3471:1994
- also meets the following criteria for Falling Objects Protective Structure:
  - SAE J231 JAN81
  - ISO 3449:1992 LEVEL II

NOTE:
When properly installed and maintained, the cab offered by Caterpillar 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. The operator sound pressure level is 75 dB(A) when measured per ISO 6396 or 86/662/EEC.

Service Refill Capacities

	Liters	Gallons
Fuel tank (dry fill)	295	78
Cooling system	49	12.9
Crankcase	30	7.9
Transmission	34	9.0
Differentials and final drives		
Front	36	9.5
Rear	36	9.5
Hydraulic system (including tank)	153	40.4
Hydraulic tank	88	23.2

Courtesy of Machine.Market

Loader Hydraulic System

Open-centered, interrupted series system with full-flow filtering. System is completely sealed.

Implement system, vane-type pump		
Output at 2,200 rpm and 6900 kPa (1000 psi) with SAE 10W oil at 66° C (150° F)	292 liters/min	77.2 gpm
Relief valve setting	20 700 kPa	3,000 psi
Cylinders, double acting: lift, bore and stroke	152.4 x 800 mm	6.0 x 31.5"
Cylinder, double acting: tilt, bore and stroke	177.8 x 540 mm	7.0 x 21.25"

Pilot system, vane-type pump		
Output at 2,200 rpm and 6900 kPa (1000 psi) with SAE 10W oil at 66° C (150° F)	34 liters/min	9.0 gpm
Working pressure		
–EH system	3450 kPa	500 psi
–pilot system	2600 kPa	375 psi

Hydraulic cycle time	seconds
Raise	6.3
Dump	2.2
Lower, empty, float down	2.2
Total	10.7

Features

- completely enclosed system
- low effort, electro-hydraulic controls on Command Control steering version
- low effort, pilot-operated controls on Conventional steering version
- full-flow filtering
- reusable couplings with O-ring face seals
- pilot shutoff valve on Conventional steering or electrical lockout switch on Command Control steering disable implement functions
- tilt-out hydraulic oil cooler is standard
- Caterpillar XT hoses
- pressure taps
- automatic Ride Control System is available

Axles

Fixed front, oscillating rear (±13°).

Features

- maximum single-wheel rise and fall: 470 mm (19")
- differentials, enclosed brakes and final drives included
- conventional differentials are standard; limited slip differentials are available
- corrosion-resistant alloy steel
- bronze sleeve bearings in the planet gears; bronze spherical thrust washers on differential pinions
- Patented Duo-Cone Seals between axle shaft and housing
- threaded nuts to set bearing pre-load
- uses SAE 30W (oil change interval: 2,000 hours or one year)

Brakes

Meet the following standards: OSHA, SAE J1473 OCT90, ISO 3450-1996.

Service brake features

- full-hydraulic actuated, oil-disc brakes
- completely enclosed and sealed
- self adjusting; modulated engagement
- separate circuits for front and rear axles
- dual pedal braking system
- left pedal functions as brake or brake/neutralizer

Parking brake features

- spring applied, hydraulically released, dry drum
- mounted on transmission output

Final Drives

Planetary final drives consist of ring gears and planetary carrier assemblies.

Features

- ring gears are pressed in and doweled to axle housings
- carrier assemblies include:
  - planet gears with full-floating bronze sleeve bearings
  - planet shafts
  - retaining pins
  - bearings
  - sun gear shafts
  - planetary carriers

Courtesy of Machine Market

Engine

Four-stroke cycle, six-cylinder 3126 Turbocharged Diesel Engine.

Ratings*	kW	hp
Flywheel @ 2,200 rpm	134	180
Maximum flywheel @ 1,900 rpm	147	197

The following ratings apply at 2,200 rpm when tested under the specified standard conditions for the specified standard:

Flywheel power	kW	hp	PS
Caterpillar	134	180	—
ISO 9249	134	180	—
SAE J1349	134	180	—
EEC 80/1269	134	180	—
DIN 70020	—	—	187

Maximum torque (net) @ 1,400 rpm	932 Nm	687 lb-ft
Total torque rise		56%

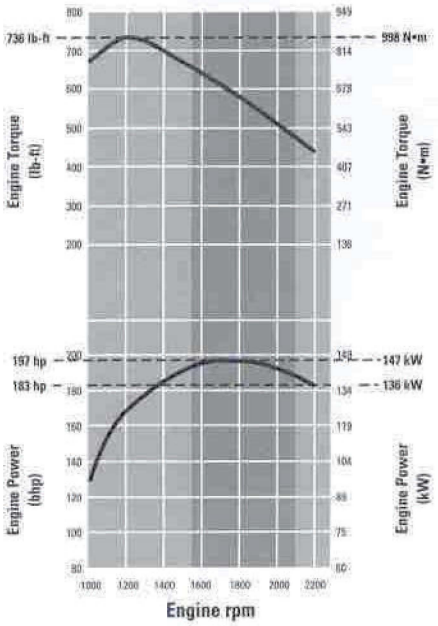
Dimensions

Bore	110 mm	4.3 in
Stroke	127 mm	5.0 in
Displacement	7.2 liters	439 in^3

Exhaust emissions

The 3126 meets the following emissions requirements:

- EU
- US EPA
- Japan MOC



*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)]
- flywheel power advertised is the power available when the engine is equipped with hydraulic fan drive, alternator, air cleaner, and muffler
- no derating required up to 2300 m (7,500 ft) altitude

Features

- direct-injection fuel system with individual adjustment-free unit injectors for cylinders
- water jacket aftercooled
- aluminum-alloy skirt and steel crown, 3-ring, 2-piece articulated pistons, cam-ground, tapered and cooled by oil spray
- Chrome Ceramic Surface (CCS) ring package, designed for high load/high temperature application
- induction-hardened, forged crankshaft
- uniflow cylinder head design with two alloy-steel valves per cylinder
- deep-skirted cast cylinder block
- tapered connecting rods
- oscillating roller-followers
- direct-electric 24-volt starting and charging system with two 12-volt, 950 CCA Caterpillar maintenance-free batteries, heavy-duty starter and a 70-amp alternator

High Torque Rise

The unit-injected fuel system delivers a controlled increase of fuel as the engine lugs back from rated speed. This results in horsepower greater than rated power. The combination of increased torque rise and maximum horsepower improves response, provides greater rimpull, more lift force and faster cycle times. The 147 kW (197 hp) maximum flywheel power occurs at 1,900 rpm when power is needed during the working cycle.

Transmission

Planetary power shift transmission with automatic shift capability has four speeds forward and four reverse.

Maximum travel speeds (standard 23.5-R25 XHA L-3 tires)

		km/h	mph
Forward	1	6.9	4.3
	2	12.7	7.9
	3	22.3	13.9
	4	37.0	23.0
Reverse	1	7.6	4.7
	2	13.9	8.7
	3	24.5	15.3
	4	40.5	25.3

Features

- single control for both speed and direction
- separate control to lock in neutral
- single-stage, single-phase torque converter
- automatic shift capability
- high energy friction material provides extended clutch life
- externally mounted controls with quick disconnects for easy diagnostic checks
- high contact ratio gears are precision ground for quieter operation
- thumb operated upshift/downshift rocker switch on Command Control steering version
- quick gear kickdown button included on Conventional steering version
- Electronic Clutch Pressure Control (ECPC) modulates clutch engagement
- transmission can be recalibrated using Electronic Technician (ET) service tool

Courtesy of Machine.Market