



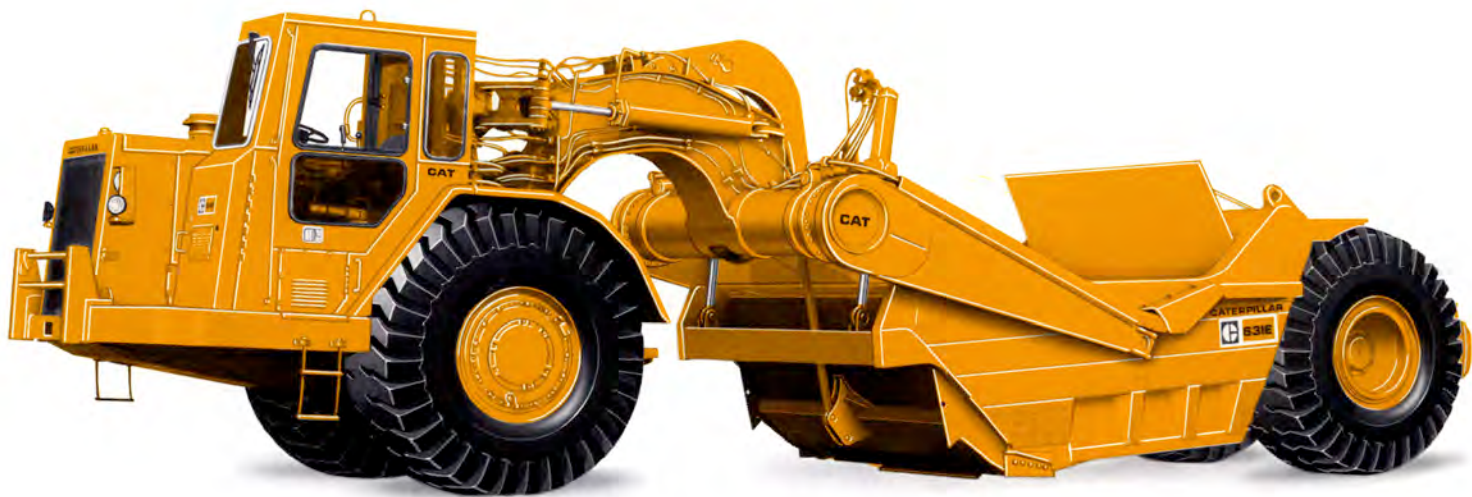
CATERPILLAR

631E

Wheel Tractor-Scraper

- 336 kW/450 HP flywheel power.
- 23.7 m³/31 yd³ heaped capacity (16.1 m³/21 yd³ struck).
- Travel speeds to 48 km/hr/30.0 mph.

Machine shown may have optional equipment.



Caterpillar Engine

Flywheel power @ 2000 RPM 336 kW/450 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. Fuel is 35° API (15.6° C/60° F) gravity having an LHV of 42 780 kJ/kg (18,390 Btu/lb) when used at 29.4° C/85° F and weighing 838.9 g/L (7.001 lb/U.S. gal). Engine is equipped with fan, air cleaner, alternator, water pump, fuel pump, muffler, and lubricating oil pump. No derating is required up to 1500 m/5,000 ft. altitude.

Caterpillar four-stroke-cycle 3408 turbocharged diesel Engine, 65° V-8 with 137 mm/5.4" bore, 152 mm/6.0" stroke and 18.0 liters/1,099 cu. in displacement.

Direct injection Cat fuel system with individual, adjustment-free injection pumps and valves, and variable injection timing.

Jacket water aftercooled. Integral inlet manifold porting with two intake and two exhaust valves per cylinder. Valves are actuated by a pushrod mechanism. Single camshaft is mounted in "V" of engine.

24-volt direct electric starting system. Ether starting aid for cold weather is standard.



design

Low, extra-wide scraper bowl is operated by high-speed hydraulics. Cutting edge near center of bowl for minimum material travel. Power-closing apron. Hydraulic dozer-type ejector. Reinforced box-section construction with extensive use of high-tensile-strength steel. Wide-mounted bowl lift cylinders. Minimum transporting width from inside-mounted apron arms and removable draft arms. Cantilever-mounted wheels with Lifetime-Lubricated bearings and Duo-Cone Floating Ring Seals.



operating data

Maximum depth of cut	437 mm/17.2"
Width of cut (outside router bits)	3490 mm/11'5.5"
Cutting edge dimensions:	
Standard, center section	22×406×1570 mm/ .88"×16"×62"
Each end section	22×330×900 mm/ .88"×13"×35"
Optional, center section	available in thickness up to 35 mm/1.38"
Each end section	available in thickness up to 35 mm/1.38"
Maximum available hydraulic penetration force @ cutting edge (approximate), empty	255 kN/57,375 lb
Maximum depth of spread	480 mm/18.9"
Apron opening — bowl 150 mm/6" off ground level	2007 mm/6'7"
Apron closure force with cutting edge fully raised and apron opened 300 mm/12", approximate	170 kN/38,250 lb
Ground clearance (tractor case)	533 mm/21"



hydraulics

Bowl, apron and ejector individually controlled. Bowl lever has raise, hold, power down and quick-drop positions. Trigger on bowl lever allows simultaneous apron closure with bowl actuation. Apron lever has open, hold, positive close and detented float positions. Ejector lever has forward, hold and detented return positions. Automatic kickout on return.

Bowl uses two 184 mm/7.2" bore and 873 mm/34.3" stroke, double-acting cylinders with special quick-drop valves. Carry check valves isolate circuit from load in hold position. Wide, low bowl for large payloads and excellent loadability.

Apron uses one 209.5 mm/8.2" bore and 727 mm/28.6" stroke, double-acting cylinder with multiplier linkage controlling force, speed and length of travel. Closure force regulated by relief valve protecting apron and bowl. Sequence relief valve protects circuit when bowl is raised with apron closed.

Ejector uses one 209.5 mm/8.2" bore and 1880 mm/74" stroke, double-acting cylinder.

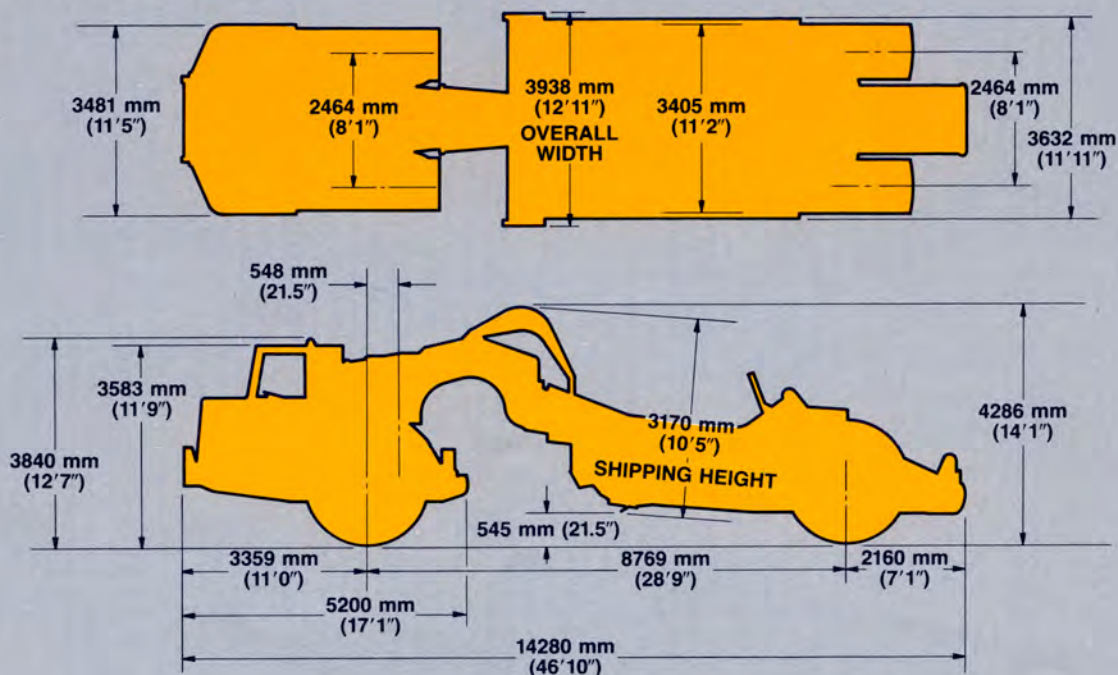
Hydraulic circuits are filtered closed systems. Single reservoir with separate pumps for scraper-steering control and cushion hitch:

Output @ 2000 RPM:

Steering	389 liters/min/102.7 gpm
Scraper	344 liters/min/90.8 gpm
Cushion hitch	34.5 liters/min/9.1 gpm
Relief valve setting:	
Scraper	13 790 kPa/141 bar/2000 psi
Steering	11 893 kPa/121 bar/1725 psi
Cushion hitch	15 858 kPa/162 bar/2300 psi



dimensions (approximate)



631E

Wheel Tractor-Scraper



transmission

Tractor — Caterpillar, 7-speed semi-automatic. Single-lever shift control. Torque converter multiplies torque in 1st and 2nd for high rimpull and fast hydraulics during loading and dumping. Second lock-up through 7th gear are direct drive for maximum efficiency on the haul. All shifts up or down from 2nd to the gear selected are automatic. Transmission will not shift upward from any gear selected. A new foot control holds transmission in any gear. A microprocessor monitors the transmission output shaft speed and can override the foot control to shift up or down one gear to ensure proper engine RPM.

Electronic Transmission Control System features electronically controlled shifting and replaces the former hydraulic-mechanical control. Fewer moving parts reduces complexity and downtime. Individual Clutch Modulation (ICM) permits controlled pressure release on the clutch being disengaged while gradually increasing pressure on the clutch being engaged. The main benefit is faster, yet smoother shifts, and improved serviceability.



differential control

Tractor:

Cat differential lock, engaged by foot pedal, positively prevents either drive wheel from spinning free in poor traction conditions. Allows normal differential action when not engaged.



final drives

Compact planetary design and full-floating axles, independently removable from wheel mounting. Service-free double-row roller bearings. Assemblies protected with Duo-Cone Floating Ring Seals.



steering

Two double-acting hydraulic cylinders. Hydraulic follow-up system for automotive feel. Positive, well-modulated flow control for constant steering response. Full 90° right or left.

Width required for curb-to-curb turn 12.217 m/40'1"



brakes

(System meets OSHA regulations and SAE J1152 April 80 brake performance standards.)

Service brakes are air-applied, spring-released, cam operated expanding shoe type. Mounted on each wheel, two per axle.

Parking — Uses service brakes. Spring-applied, air released. Apply manually with button on dash.

Secondary Braking System — Uses service brakes. Spring-applied, air released. Can be applied with button on dash. If service air pressure drops to 414 kPa/4.1 bar/60 psi, audible and visual alarms warn operator. Brakes apply automatically when air pressure drops to 276 kPa/2.76 bar/40 psi.



tires

Productive capabilities of the 631E are such that, under certain job conditions, tkm/h/Ton-MPH capabilities of standard or optional tires could be exceeded and therefore limit production. Caterpillar recommends the user evaluate all job conditions in order to make proper tire selection. Consult tire manufacturer for specific data.

Standard
37.25-35, 30 PR (E-3)

Optional
33.25-35 radial steel cord
37.25-35, 30 PR (E-3)
37.25-35, radial steel cord



cushion hitch and gooseneck

Parallelogram-type linkage connects two-piece hitch. Vertically mounted hydraulic cylinder transfers road shocks to two nitrogen accumulators. Controlled oil flow dampens "rebound" oscillation. Leveling valve automatically centers piston in cylinder for all scraper loads. Cushion ride lockout control retains positive cutting edge down-pressure for scraper loading and fill spreading. Cushion hitch makes extensive use of steel castings, eliminating many welded joints. Double kingbolt design withstands high external forces, allows easy installation and removal. Box-section gooseneck reduces plate and weld stresses. One-piece fabricated draft tube and wide-mounted bowl lift cylinders reduce stress in draft frame.



ROPS

(ROPS cab is standard in U.S.A.)

ROPS (Rollover Protective Structure) offered by Caterpillar for this machine meet ROPS criteria SAE J320a, SAE J1040c and ISO 3471. They also meet FOPS (Falling Object Protective Structure) criteria SAE J231 and ISO 3449. When properly installed and maintained, cab equipped with climatizing equipment meets OSHA and MSHA requirements for operator sound exposure limits in effect at time of manufacture when tested according to ANSI/SAE J1166 SEP80.



service refill capacities

	Liters	U.S. Gallons
Fuel tank	745	197
Lubricating systems:		
Crankcase	45	12
Transmission	127	33.5
Differential	136	36
Final drive — each side	24.6	6.5
Cooling system	126	33
Total hydraulic system (steering and scraper)	190	50



weight (approximate)

Weight Distribution:

Shipping — with ROPS cab and 10% fuel

	Kg	Lb
Tractor	29 337	64,676
Scraper	14 028	30,926
Total	43 365	95,602

Operating — with ROPS cab, full fuel tanks, and operator

Empty		
Front axle — 67%	29 412	64,821
Rear axle — 33%	14 533	32,039
Total	43 945	96,880

Loaded — based on 34 020 kg/75,000 lb rated load

Front axle — 53%	41 426	91,327
Rear axle — 47%	36 538	80,551
Total	77 964	171,878



capacity

Rated load	34 020 kg/75,000 lb.
Heaped, SAE rating	23.7 m ³ /31 cu. yd.
Struck, SAE rating	16.1 m ³ /21 cu. yd.

VALUE ANALYSIS

Power train

- Direct injection Cat diesel Engine with high torque rise for tough loading applications
- Semi-automatic, 7-speed planetary power shift transmission with individual clutch modulation (ICM) for smooth on-the-go shifting
- Cat differential lock, operator-engaged, for positive traction in poor underfooting
- Fuel efficient direct injection with performance proven reliability

Operator's compartment

- Precise, low-effort controls
- Good visibility to cutting edge
- Comprehensive Electronic Monitoring System
- Integral, vibration-isolated ROPS cab
- Tilt steering wheel for easy entrance and exit

Durability

- Cushion hitch for smooth hauling, less lobe, high haul speeds
- Large capacity, wide, low bowl design for easy loadability — designed for tough applications
- Hydraulic retarders extend brake life
- Larger brakes and wheel bearings provide long life

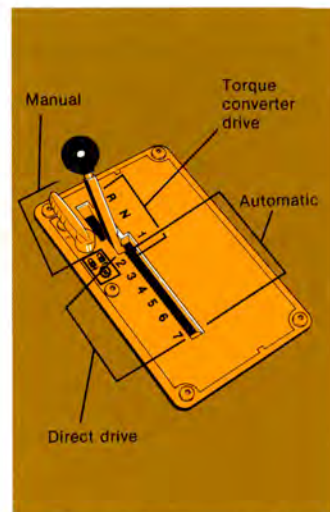
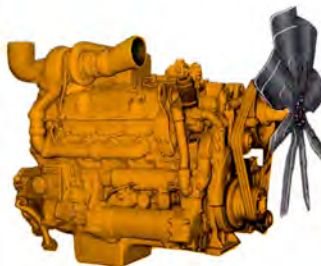
Serviceability

- Relocated fuel tank for easy service access and improved weight distribution
- Serviceable wiring connectors for easy component removal and assembly
- Diagnostic connectors and electrical service center aid troubleshooting and repair
- Clustered service points for quick, more complete service
- Folded core radiators provide reliability and easy servicing
- Independent removal of major components



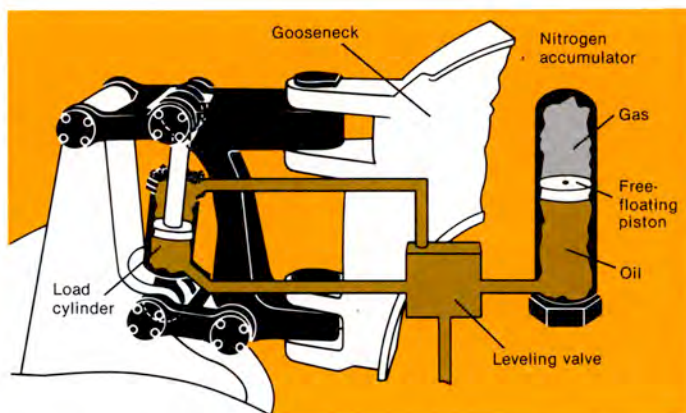
Large capacity, low, wide bowl design . . . coupled with 336 kW/450 HP adds up to excellent loadability, maximum loads and high productivity. Angle and height of ejector are designed for optimum load retention and material rolling action. Positive bulldozer ejection, powerful double-acting hydraulics with quick-drop valves for pump loading. Carry check valves isolate bowl cylinders from the rest of the circuit allowing lift cylinders to carry load rather than hydraulic lines. Wheels are cantilever-mounted.

Reliable Cat power train — power you can depend on.



Reliability and durability . . . that's what you get from Cat diesel Engines. The 336 kW/450 flywheel horsepower 3408, a 65° V-8 with 18.0 liters/1,099 cu. in. displacement, powers the tractor. Turbo-charged and aftercooled for efficient fuel combustion, the 3408 offers performance with serviceability, long component life, simplified rebuild procedures.

Cat 7-speed transmission combines automatic shifting with high torque multiplication and direct drive efficiency. The transmission shifts up and down automatically between 2nd and the highest selected gear. Reverse and Gears 1 and 2 are torque converter drive for powerful rimpull needed for loading and dumping. Gears 3 through 7 are direct drive for quick acceleration and efficient hauling speeds.

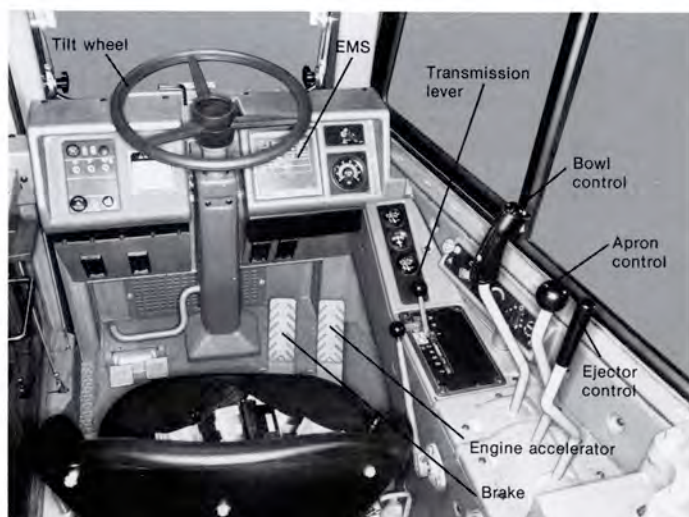


Cushion hitch provides smoother hauling and higher usable speeds. It connects two separate tractor and scraper castings at the top and bottom by mechanical links, forming a pivoting parallelogram arrangement which allows vertical movement between the two sections. A hydraulic cylinder connects the links from the bottom tractor pivot to the top scraper pivot. When the machine hits a bump, the load cylinder forces oil into two nitrogen-over-oil accumulators. The accumulators cushion the bump like a shock absorber. The system can handle several shocks at the same time to reduce machine bounce. And that means greater productivity . . . longer machine life . . . reduced haul road maintenance . . . less operator fatigue.

Built-in convenience and comfort.



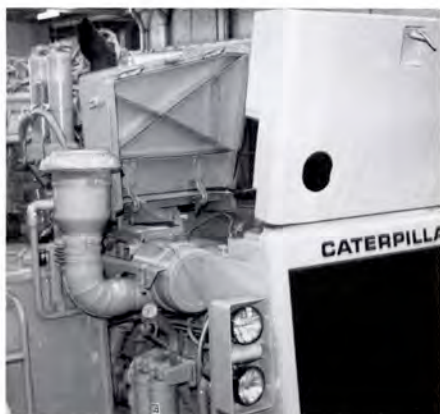
Machine and operator protection is designed in. Standard ROPS sound-suppressed cab and optional ROPS canopy rest entirely on rubber mountings, with no metal-to-metal contact. Sound is further suppressed with insulated right and back walls, roof headliner and positive seals around windows and door. Seat belt, windshield, windshield wiper are standard. Air conditioner and heater are available options. Seat belt, windshield, windshield wiper and backup alarm are standard . . . supplemental steering optional.



Convenient controls are designed to improve operator efficiency:

- Bowl-apron trigger control enables operator to position bowl and lower apron with one lever.
- Apron "float" and ejector "return" positions are detent-held to free operator's hand for other controls.
- Manually applied lock holds throttle in high idle position during long hauls or when climbing grades.
- Familiar location of transmission console and scraper controls at operator's right.
- Secondary braking system designed so that failure of a single component on the line will not cause total loss of brakes — control button located on dash.

More work time.



Servicing ease reduces downtime on the 631E:

- Two-piece hinged hood with access door on left front of tractor for easy engine access.
- Independent removal of major components.
- Central location of filters.
- Easily accessible hydraulic lines and wiring.
- Hydraulic tank mounted on right front deck for easy access.
- Sight gauges for transmission and differential.
- Hinged crankcase guard.
- Push-button air tank drains.

Operating protection.



Electronic Monitoring System (EMS) shows status of important machine systems with three different warning signals. Each indicates status of system and appropriate operator response.

- I **Operator Awareness:** LED light on instrument panel indicates a potential but not critical problem.
- II **Operator Response Required:** Main warning light in front of operator indicates continued operation could cause eventual component failure.
- III **Immediate Operator Shut-Down Required:** Flashing light and horn warn that continued operation may cause immediate failure of a component.

A circuit test switch verifies system reliability.



CAT PLUS services — the most comprehensive, total product support system in the industry — comes with every product. Your Caterpillar Dealer provides product application counseling and flexible finance planning before you buy, and these services after:

- Planned inspection programs.
- Preventive maintenance programs.
- Parts support.
- Parts Exchange Service.
- In-field service.
- Machine customizing services.
- Complete range of technical assistance.
- Personnel training for operators and mechanics.
- CAT CARE seminars.



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

24-volt direct electric starting. 35-amp alternator. Two 220-amp-hour, 12-volt batteries. Suction fan. Muffler. Crankcase guard. Dry-type air cleaner with automatic dust ejector. 7-speed semi-automatic power shift transmission. Downshift inhibitor. Differential lock. Coolant flow indicator. Cushion hitch. Quick-drop bowl control valve. Combination bowl-apron control lever. Parking brake. Secondary braking system. Brake shields. Horn. ROPS cab (U.S.A.). ROPS mounting. Hydraulically adjustable suspension seat. Seat belt. Operator's station with vibration isolators. Electric hour meter. Windshield wiper. Dash lights. Headlights. Rear-mounted floodlight. Vandalism protection group. Ether starting aid. Backup alarm.



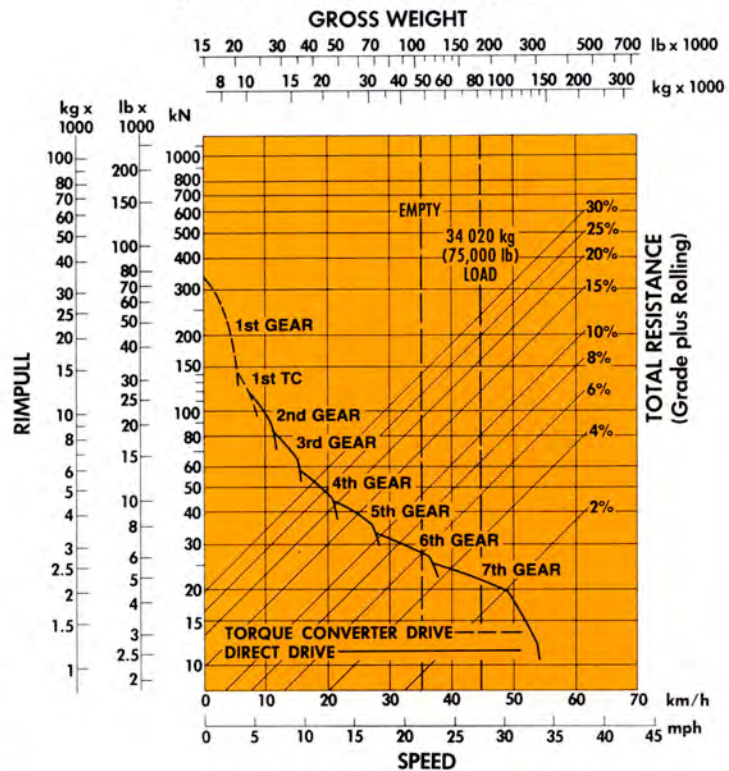
optional equipment

(with approximate installed weights)

	Kg	Lb
Air conditioner/heater (includes 50-amp alternator) . . .	119	262
Alternator, 75-amp	5	11
Cab, ROPS, sound suppressed (removed)	-374	-825
Canopy, ROPS	+272	+600
Cutting edges,		
Special application, three section (stinger and ends) 349 mm/1-3/8"	99	218
Special application, three section (stinger and ends) 413 mm/1-5/8"	185	407
Three section (stinger and ends) 413 mm/1-5/8"	63	138
Special application (provides level cut) 413 mm/1-5/8"	171	378
Fast-fill fuel system, automatic	3	7
Fast oil change system	5	10
Fenders, scraper	154	340
Heater, cab	96	212
Heater, engine coolant	2	5
Hood door, right side	10	22
Power train guard	154	340
Retarder, hydraulic	168	371
Starting receptacle	9	20
Supplemental steering system	102	225
Throttle lock	6	14
Tires, set of two, tractor and scraper:		
37.25-35, 30 PR (E-3)	222	490
33.25-35, radial steel cord	56	124
33.25-35, radial steel cord	-213	-470
Tool kit	10	23
Travel brackets	249	550

Materials and specifications are subject to change without notice.

gradeability/speed/rimpull



To determine gradeability performance: Read from gross weight down to % of total resistance. (Total resistance equals actual % grade plus 1% for each 10 kg/t/20 lb./ton of rolling resistance.) From this weight-resistance point, read horizontally to the curve with the highest obtainable speed range, then down to maximum speed. Usable rimpull depends upon traction available and weight on drive wheels.