CATERPILLAR

657B
Wheel Tractor-Scraper

Summary of features

- **32/44 cu. yd. (24.5/33.6 m³) capacity.** Extra-wide bowl allows fast, easy loading.
- **950 flywheel horsepower (708 kW)** Caterpillar diesel engines.
- **Eight forward speeds** up to 33 MPH (53 km/h) with Cat semiautomatic power shift transmissions in both tractor and scraper.
- **Cushion hitch** absorbs haul road shocks, stabilizes machine travel, substantially increases usable working speeds.
- **Hydraulic operation** for positive cutting edge penetration, apron closure and material ejection. Separate systems for steering and cushion hitch.

Caterpillar engine

	Tractor	Scraper
Flywheel horsepower	550	400
Kilowatts	410	298

(Kilowatts is the International System of Units equivalent of horsepower.)

The net power at the flywheel of the vehicle engine operating under SAE standard ambient temperature and barometric conditions, 85° F. (29° C) and 29.38" (995 mbar) Hg., using 35 API gravity fuel oil at 60° F. (15.6° C). Vehicle engine equipment includes fan, air cleaners, water pump, lubricating oil pump, fuel pump, air compressor, and alternator. Engines will maintain specified power up to 7,500 ft. (2300 m) and 5,000 ft. (1500 m) altitudes for D346 and D343 respectively.

Caterpillar four-stroke-cycle diesels with 5.4" (137 mm) bore and 6.5" (165 mm) stroke.

Tractor engine: Model D346, with eight cylinders and 1,190 cu. in. (19.5 litres) displacement.

Scraper engine: Model D343, with six cylinders and 893 cu. in. (14.6 litres) displacement.

Precombustion chamber fuel system with individual adjustment-free injection pumps and valves. Differential pressure regulator controlled turbocharger. Intake air aftercooler. Parallel manifold porting with two intake and two exhaust valves per cylinder. Overhead camshafts directly actuate valves. Stellite-faced valves, hard alloy steel seats, valve rotators. Variable-timing fuel injection system.

Cam-ground and tapered aluminum alloy pistons with 3-ring design, cooled by oil spray. Steel-backed aluminum bearings, Hi-Electro hardened crankshaft journals. Pressure lubrication with full-flow filtered and cooled oil. Dry-type air cleaner with primary and safety elements.

Uses economical No. 2 fuel oil (ASTM Specification D396), often called No. 2 furnace or burner oil, with a minimum cetane rating of 35. Expensive, premium quality diesel fuel can be used but is not required.

Direct electric diesel starting (24-volt motor).

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transmissions

Tractor:
Caterpillar-built, 8-speed semiautomatic. Single-lever shift control. Torque converter multiplies torque in 1st and 2nd for high rimpull and fast hydraulics during loading and dumping. Remaining 6 speeds 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 foot control holds transmission in any gear.

Scraper:
Planetary type, 8-speed semiautomatic. Torque converter drive in 1st and 2nd; remaining 6 gears are direct drive.

differential controls

Tractor:
Caterpillar-built differential lock, with operator-engaged foot pedal, positively prevents either drive wheel from spinning free in poor traction conditions. Allows normal differential action when not engaged.

Scraper:
Automatic locking type.

final drive

Compact planetary design and full-floating axles, removable independently of wheel mounting. Service-free, double-row roller bearings. Duo-Cone® floating ring seals protect vital assemblies.

steering

Two double-acting hydraulic cylinders with hydraulic follow-up mechanism. Positive, constant speed.

Width required for non-stop turn	45′ 1″ (13.7 m)
Width required for non-stop left turn with ROPS*	55′ 1″ (16.8 m)

*Steering capability to the left is restricted by ROPS. Right-hand steering unrestricted.

brakes

(System meets OSHA regulations.)
Air-actuated, cam-operated, expanding-shoe type (sequenced to brake scraper first). Drive wheels may be braked individually by hand lever. Hydraulic retarder, parking brake and emergency braking system are standard.

tires

Productive capabilities of the 657B are such that, under certain job conditions, Ton-MPH (tkm/h) 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.

Standard for tractor and scraper:	
Conventional, 37.5 - 39 (44 PR)	225 TMPH rating (329 tkm/h)*
Optional for tractor and scraper:	
Conventional, 37.5-39 (52 PR)	225 TMPH rating (329 tkm/h)*
Radial steel cord tires, 37.5-39	410 TMPH rating (599 tkm/h)*

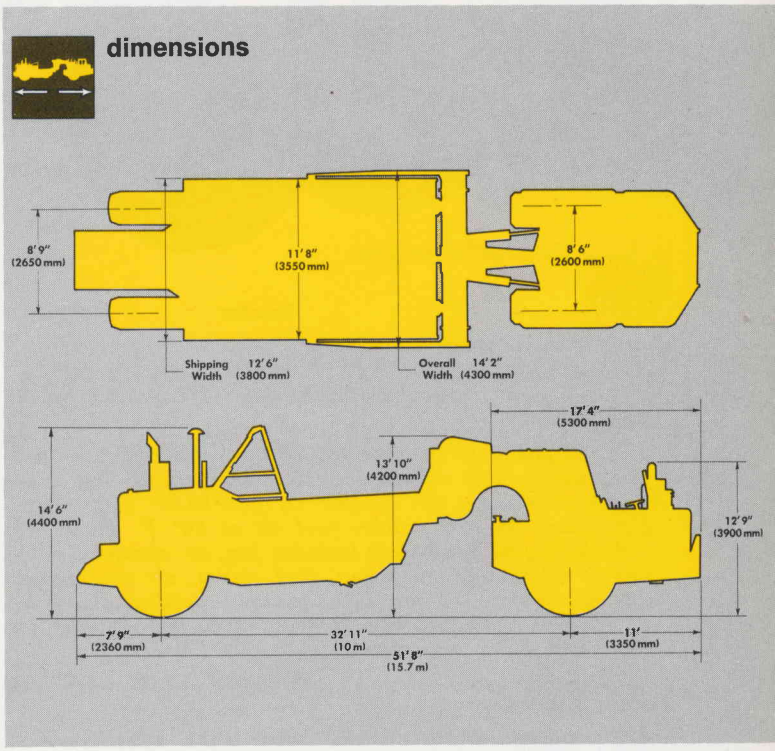
*Approximate Ton Mile Per Hour rating @ 100° F. (38° C) ambient temperature. Use as a guide only – consult tire manufacturers for specific data.

hitch

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. Cast center section increases draft tube strength.

Cushion hitch operation: Parallelogram-type linkage connects two-piece hitch. Vertically mounted hydraulic cylinder transfers road shocks to a nitrogen accumulator. 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.

dimensions



scraper

Low and 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. Box-section gooseneck reduces plate and weld stresses. Cast center section increases draft tube strength. Wide-mounted bowl cylinders improve the strength of the draft frame assembly. 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.

Capacities:

Rated load	104,000 lb. (47 200 kg)
Heaped, SAE rating	44 cu. yd. (33.6 m³)
Struck, SAE rating	32 cu. yd. (24.5 m³)
Maximum depth of cut	16″ (406 mm)
Width of cut (outside router bits)	11′ 11″ (3630 mm)

Cutting edge dimensions:

Center section	1¼″ x 19″ x 68¼″ (32 x 483 x 1730 mm)
Each end section	1⅛″ x 16″ x 35½″ (29 x 406 x 900 mm)
Maximum available hydraulic penetration force @ cutting edge (approximate)	268,800 lb. (122 000 kg)
Maximum depth of spread	20″ (510 mm)
Apron opening – bowl 6″ (152 mm) off ground level	7′ 8″ (2340 mm)
Apron closure force with cutting edge fully raised and apron opened 12″ (305 mm), approximate	34,800 lb. (15 800 kg)

hydraulics

Bowl uses two 9.25″ (235 mm) bore and 36.7″ (930 mm) stroke, double-acting cylinders with special, quick-drop valves. Carry check valves isolate circuit from load in "hold" position.

Apron uses one 9.25″ (235 mm) bore and 29.9″ (760 mm) stroke, double-acting cylinder with multiplier linkage controlling force, speed and length of travel. Closure force regulated by relief valve protecting apron and bowl. Circuit pressure is controlled by sequence relief valve when bowl is raised with apron closed.

Ejector uses two double-acting, two-stage, telescoping cylinders with 7.75″ (197 mm) to 6″ (152 mm) bore and 82″ (2080 mm) stroke.

Hydraulic circuits are filtered, closed systems utilizing swivel hydraulic joint at gooseneck. Single reservoir with separate pumps for steering, scraper controls and cushion hitch.

Output @ 2000 engine RPM:

Steering	115 gpm (435 litres)
Scraper	153 gpm (580 litres)
Cushion hitch	17.3 gpm (65 litres)

Relief valve setting:

Scraper	2000 psi (138 bar)
Steering	1700 psi (117 bar)
Cushion hitch	2600 psi (179 bar)

controls

Bowl, apron and ejector individually controlled, or bowl and apron can be controlled simultaneously. Bowl lever has raise, hold, power-down and quick-drop positions. Apron lever has open, hold, positive close and "float" positions. Ejector lever has forward, hold and return positions. Automatic kick out on return.

weights

(total unit, approximate)

	lb.	(kg)
Empty:		
Tractor	82,100	(37 200)
Scraper	57,000	(25 900)
Total	139,100	(63 100)
Loaded (based on 104,000 lb. (47,200 kg) rated load):		
Tractor	117,600	(53 300)
Scraper	125,500	(56 900)
Total	243,100	(110 200)

service refill capacities

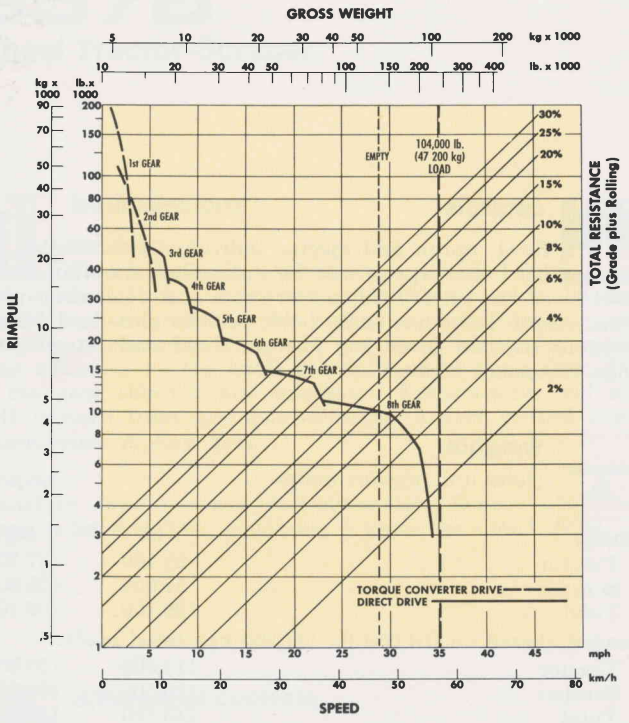
	Tractor U. S. Gallons	Tractor (Litres)	Scraper U. S. Gallons	Scraper (Litres)
Crankcase	16	(61)	9.75	(36.9)
Fuel tank	280	(1060)	200	(760)
Transmission	20	(76)	39	(148)
Differential	30	(114)	40	(151)
Final drive, each side	7	(26.5)	7	(26.5)
Cooling system	41	(155)	31	(117)
Hydraulic system	42	(159)	–	–

standard equipment

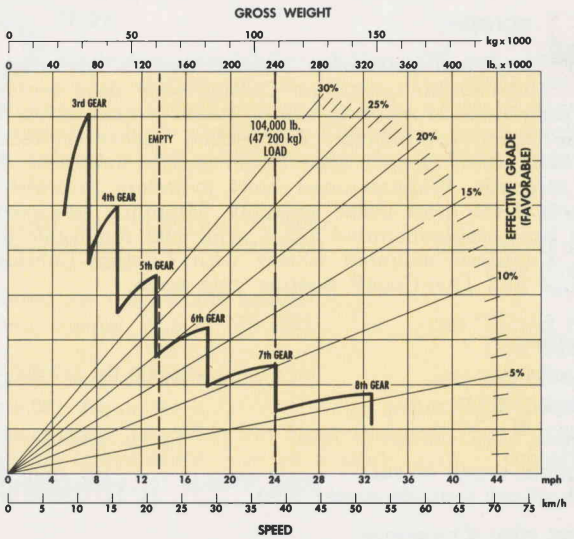
Emergency braking system. Parking brake. Hydraulic retarder. Dry-type air cleaner with automatic dust ejector. Muffler. Blower fan. Charging alternator with built-in, full-transistor voltage regulator and two 217-amp, 12-volt batteries. Air horn. Suspension seat. Steel tractor fenders. Seat belt. Safety glass windshield. Rear floodlight. Dash lights. Headlights. ROPS mounting. Semiautomatic power shift transmission. Combination bowl-apron control lever. Cushion hitch. Windshield wiper. Instrument panel guard. Vandalism protection locks. 37.5-39, 44 PR (E-3) Rock tires.

optional equipment

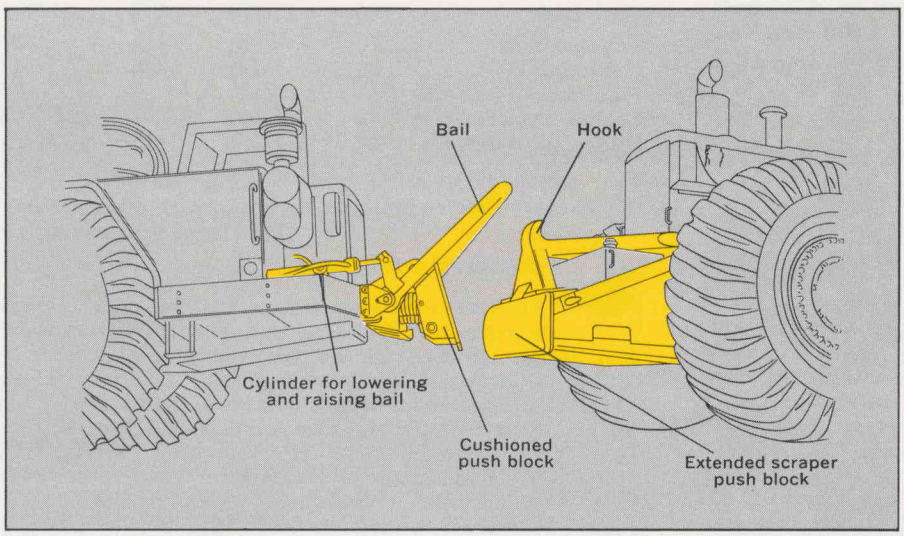
Air conditioning compressor. Brake shields. ROPS cab (meets OSHA ROPS regulations). ROPS canopy (meets OSHA ROPS regulations). Hood side doors. Reversible fan. Fast-fill fuel system. Crankcase guard. Power train guard. Engine coolant heater. Oil change system for quick service. Radiator core protector grid. Auxiliary starting receptacle. Back-up alarm (meets OSHA). Scraper fenders. 37.5-39, 52 PR (E-3) Rock tires. 37.5-39 Radial steel cord tires. Tool kit.



To determine gradeability performance: Read from gross weight down to the % of total resistance. (Total resistance equals actual % grade plus 1% for each 20 lb./ton (10 kg/t) 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.



To determine retarder performance: Read from gross weight down to the % effective grade. (Effective grade equals actual % grade minus 1% for each 20 lb./ton (10 kg/t) of rolling resistance.) From this weight-effective grade point, read horizontally to the curve with the highest obtainable speed range, then down to the maximum speed. Retarding effect on these curves represents full application of retarder.



657B Push-Pull

The Push-Pull arrangement permits two 657B Tractor-Scrapers to assist each other to self-load without the assistance of a push tractor. The arrangement includes a cushion push block and bail for the tractor and an extended push block and hook for the scraper.

Materials and specifications are subject to change without notice.

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