657

Wheel Tractor-Scraper

Technical Specifications

Configurations and features may vary by region. Please consult your Cat® dealer for availability in your area.

Table of Contents

657 Wheel Tractor-Scraper Specifications

Engine – Tractor

Engine Model	Cat® C18	
Rated Engine Speed	2,000 rpm	
Net Power (SAE J1349:2011/ ISO 9249:2014)	436 kW	585 hp
Gross Power (SAE J1995:2014)	475 kW	637 hp
Engine Power (ISO 14396:2002)	469 kW	629 hp

Engine – Scraper

Engine Model	Cat C15	
Rated Engine Speed	2,100 rpm	
Net Power (SAE J1349:2011/ ISO 9249:2014)	333 kW	447 hp
Gross Power (SAE J1995:2014)	359 kW	481 hp
Engine Power (ISO 14396:2002)	353 kW	473 hp

- Meets U.S. EPA Tier 4 Final and EU Stage V emission standards.
- Net power available at the flywheel when the engine is equipped with fan, air cleaner, aftertreatment, and alternator with engine speed specified at 2,200 rpm.

Safety Criteria Compliance Standards

Rollover Protection Structure (ROPS)	ISO 3471:2008 for up to 26 600 kg (58,643 lb)
Falling Objects Protective Structure (FOPS)	ISO 3449:2005 Level II
Brakes	ISO 3450:2011
Steering System	ISO 5010:2019
Seat Belt	ISO 6683:2005, SAE J386
Forward Horn and Reverse Alarm	ISO 9533:2010
Exterior Sound Power Level for Standard Machine	ISO 6395:2008 is 116 dB(A)
Interior Sound Pressure Level for Standard Machine	ISO 6396:2008 is 77 dB(A)

Implement Cycle Times

Apron Lower	4.1 Seconds
Apron Raise	4.4 Seconds
Bail Lower	1.9 Seconds
Bail Raise	1.7 Seconds
Bowl Lower	4.5 Seconds
Bowl Raise	4.2 Seconds
Ejector Extend	9.2 Seconds
Ejector Retract	7.8 Seconds

Transmission

Forward 1	5.7 km/h	3.5 mph
Forward 2	10.5 km/h	6.5 mph
Forward 3	12.5 km/h	7.8 mph
Forward 4	17.0 km/h	10.6 mph
Forward 5	22.8 km/h	14.2 mph
Forward 6	30.9 km/h	19.2 mph
Forward 7	41.4 km/h	25.7 mph
Forward 8	56.1 km/h	34.9 mph
Reverse	10.8 km/h	6.7 mph

Service Refill Capacities

Crankcase:		
Tractor	38.0 L	10.0 gal
Scraper	34.0 L	9.0 gal
Transmission System:		
Tractor	136.0 L	35.9 gal
Scraper	121.0 L	32.0 gal
Cooling System:		
Tractor	88.6 L	23.4 gal
Scraper	63.2 L	16.7 gal
Fuel Tank	1628.0 L	430.1 gal
Hydraulic System	150.0 L	39.6 gal
Diesel Exhaust Fluid:		
Tractor	30.5 L	8.1 gal
Scraper	30.5 L	8.1 gal

General Data

Fuel Tank Refill Capacity	1628 L	430 gal
Shipping (Split Configuration):		
Tractor Width	3.90 m	12.8'
Tractor Height	4.52 m	14.8'
Scraper Width	4.08 m	13.4'
Scraper Height	4.04 m	13.3'
Scraper Capacity:		
Struck	24.5 m^3	32.0 yd^3
Heaped	33.6 m^3	44.0 yd^3
Rated Load	47 174 kg 46.4 tonnes	104,000 lb 52.0 tons
Width of Cut	3.8 m	12.5'
Maximum Depth of Cut (Cushion Hitch Locked)	440 mm	17.3"
Maximum Depth of Spread (Cushion Hitch Locked)	530 mm	20.9"
Maximum Depth of Spread	660 mm	26.0"
Top Speed (Loaded)	56.1 km/hr	34.9 mph
180° Curb-to-Curb Turning Width (Right)	13.6 m	44.6'
Tire Size	40.5/75 R39 ** E-3	
Operating Weight (Michelin Tires, Full Fuel, Without Operator)		
Unloaded	74 253 kg	163,700 lb
With Rated Load	121 427 kg	267,700 lb
Overall Length	17.97 m	58.96'

Sound Performance

The exterior sound power level for the standard machine (ISO 6395:2008) is 116 dB(A).[1]

The interior sound pressure level for the standard machine (ISO 6396:2008) is 77 dB(A).[2]

- Hearing protection may be needed when operating with an open operator station and cab (when not properly maintained or doors/windows open) for extended periods or in a noisy environment.

(1) The measurement was conducted at 100% of the maximum engine cooling fan speed. The sound level may vary at different engine cooling fan speeds. The measurement was conducted with the cab doors and the cab windows closed. The cab was properly installed and maintained.

(2) This is a work cycle sound exposure level. The measurement was conducted with the cab doors and the cab windows closed. The cab was properly installed and maintained.

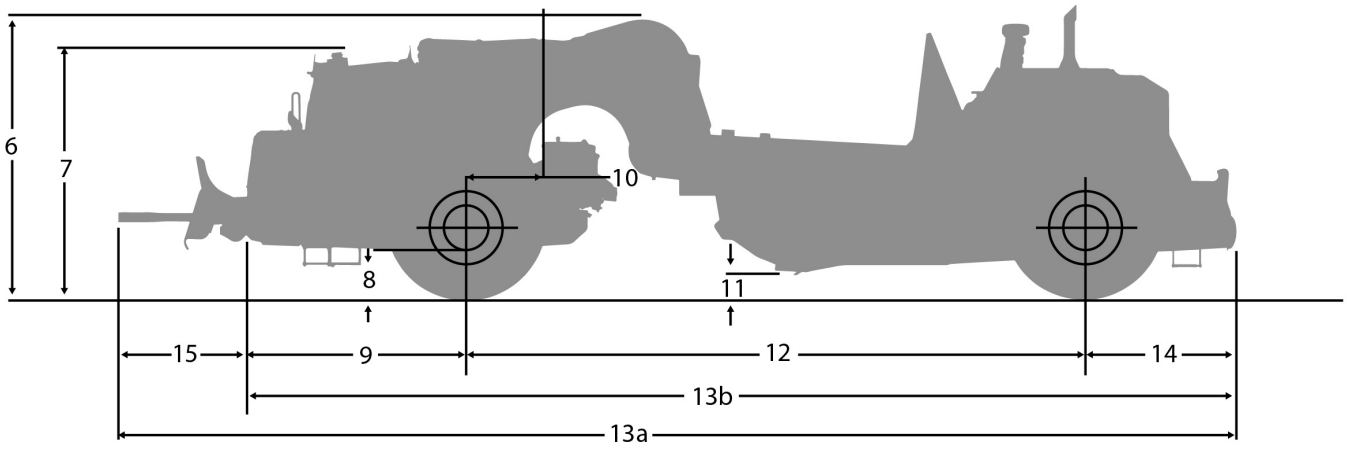
Air Conditioning System

- The air conditioning system on this machine contains the fluorinated greenhouse gas refrigerant R134a (Global Warming Potential = 1430). The system contains 2.0 kg (4.4 lb) of refrigerant which has a CO_2 equivalent of 2.86 metric tonnes (3.153 tons).

657 Wheel Tractor-Scraper Specifications

Dimensions

All dimensions are approximate.



		657	
1	Overall Machine Width	4.36 m	14.30 ft
2	Tractor Width	3.75 m	12.30 ft
3	Scraper Width	4.36 m	14.30 ft
4	Inside of Bowl Width	3.68 m	12.07 ft
5a	Outside Rear Tires Width	3.84 m	12.60 ft
5b	Outside Bowl Width	3.93 m	12.89 ft
6	Overall Machine Height	4.77 m	15.65 ft
7	Height to Top of Cab	3.92 m	12.86 ft
8	Tractor Ground Clearance	0.72 m	2.36 ft
9	Front of Tractor to Front Axle	4.55 m	14.93 ft
10	Axle to Vertical Hitch Pin	0.55 m	1.80 ft
11	Cutting Edge Height – Maximum	0.66 m	2.17 ft
12	Wheelbase	9.96 m	32.68 ft
13a	Overall Machine Length – Bail Down	17.97 m	58.96 ft
13b	Overall Machine Length – Bail Up or NA	17.05 m	55.94 ft
14	Rear Axle to Rear of Machine	2.46 m	8.07 ft

Typical Fixed Times Retarder Curves

TYPICAL FIXED TIMES FOR SCRAPERS

(Times may vary depending on job conditions)

Model	Loaded By	Load Time (Min.)	Maneuver and Spread or Maneuver and Dump (Min.)
613G	Self	0.9	0.7
623K	Self	0.9	0.7
621K	One D8	0.5	0.7
627K	One D8	0.5	0.6
621K	One D9	0.4	0.7
627K	One D9	0.4	0.6
627K/PP	Self	0.9*	0.6
631K	One D9	0.6	0.7
637K	One D9	0.6	0.6
631K	One D10	0.5	0.7
637K	One D10	0.5	0.6
637K/PP	Self	1.0*	0.6
657	One D11	0.6	0.6
657	Push Pull Self	1.1*	0.6
637K	Coal	0.8	0.7
657	Coal	0.8	0.6

*Load time per pair, including transfer time.

Note: Empty weights shown on the Wheel Tractor-Scraper charts include ROPS cab. When calculating TMPH loadings, any additional weight must be considered in establishing mean tire loads.

USE OF RETARDER CURVES

The following explanation applies to retarder curves for Wheel Tractor-Scrapers and Articulated Trucks.

The speed that can be maintained (without use of service brake) when the machine is descending a grade with retarder fully on can be determined from the retarder curves in this section if gross machine weight and total effective grade are known.

Total Effective Grade (or Total Resistance) is grade assistance minus rolling resistance.

10 kg/metric ton (20 lb/U.S. ton) = 1% adverse grade

Example:

15% favorable grade with 5% rolling resistance. Find Total Effective Grade.

Total Effective Grade = 15% Grade Assistance – 5%

Rolling Resistance = 10% Total Effective Grade Assistance

Example Problem:

A 657 with an estimated payload of 47 175 kg (104,000 lb) descends a 10% total effective grade. Find constant speed and gear range with maximum retarder effort. Find travel time if the slope is 610 m (2,000 ft) long.

Empty weight + payload = Gross Weight = 60 950 kg + 47 175 kg = 108 125 kg (134,370 lb + 104,000 lb = 238,370 lb)

Retarder Curves

Solution: Using the retarder curve below, read from 108 125 kg (238,370 lb) (point A) on top of Gross Weight scale down the line to the intersection of the 10% Effective Grade line (point B).

Go across horizontally from point B to the intersection of the retarder curve (point C). Point C intersects at the 5 (5th gear) range.

Where point C intersects the retarder curve, read down vertically to point D on the bottom scale to obtain the constant speed: 21.7 km/h (13.5 mph).

Answer: The 657 will descend the slope at 21.7 km/h (13.5 mph) in 5th gear. Travel time is 1.68 minutes.

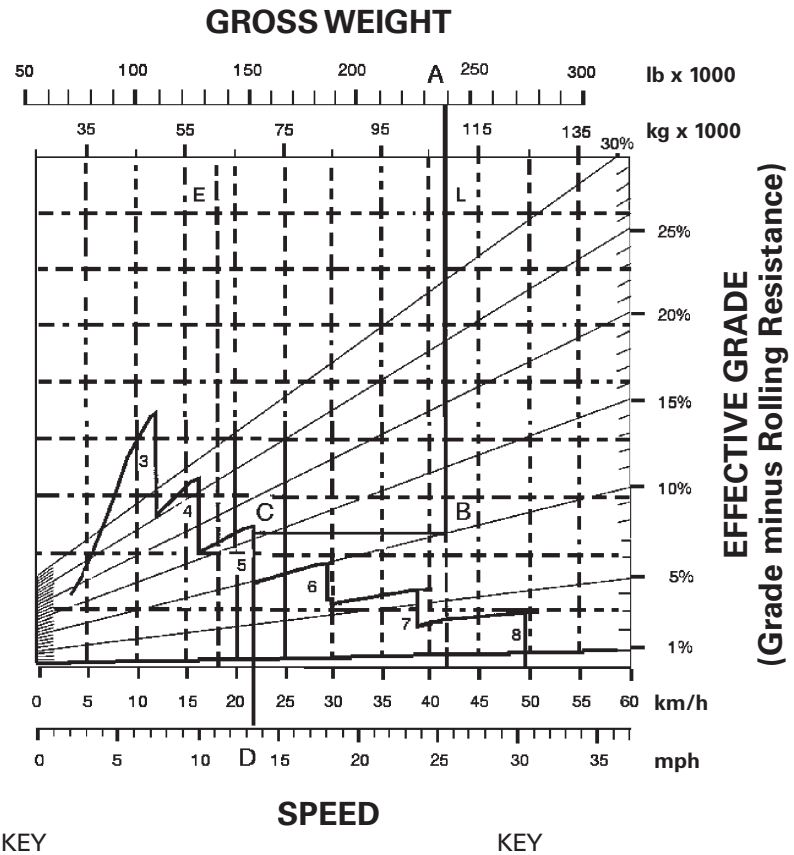
$$\frac{610\text{ m}}{363\text{ m/min}} = 1.68\text{ min}$$

$$\frac{2000\text{ ft}}{13.5\text{ mph} \times 88^*} = 1.68\text{ min}$$

* (mph x 88 = F.P.M.)

$$\frac{60 \times 610}{21.7 \times 1000} = T = (1.68)$$

Note: The basic Distance-Speed-Time formula is 60 D ÷ S = T (or "60 D Street"), where 60 is minutes, D is distance, S is speed, and T is time. In the above problem, 60 × 610 m ÷ 21.7 km/h × 1000 = T.



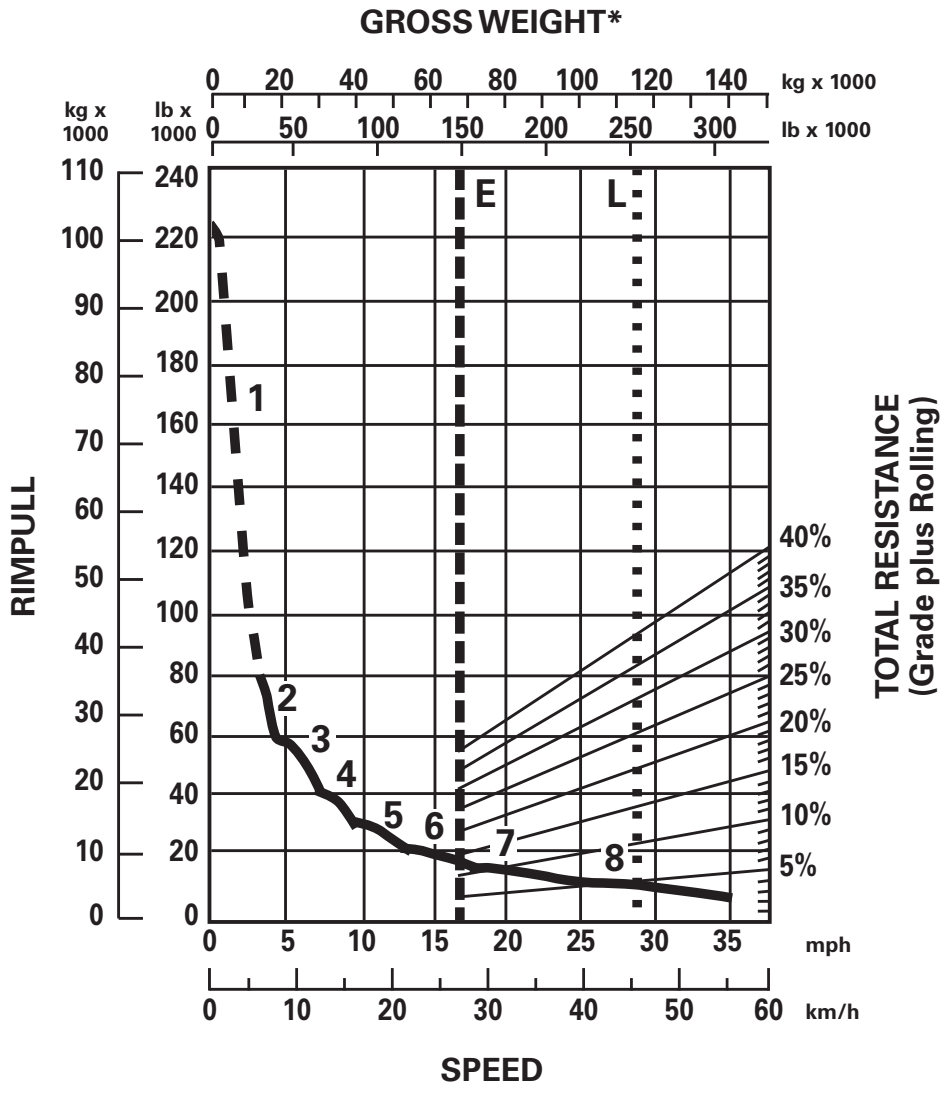
KEY

3 — 3rd Gear Direct Drive
4 — 4th Gear Direct Drive
5 — 5th Gear Direct Drive
6 — 6th Gear Direct Drive
7 — 7th Gear Direct Drive
8 — 8th Gear Direct Drive

KEY

A — Loaded 108 125 kg (238,370 lb)
B — Intersection with 10% effective grade line
C — Intersection with retarder curve (5th gear)
D — Constant speed 21.7 km/h (13.5 mph)

Rimpull-Speed-Gradeability Curve



*at sea level

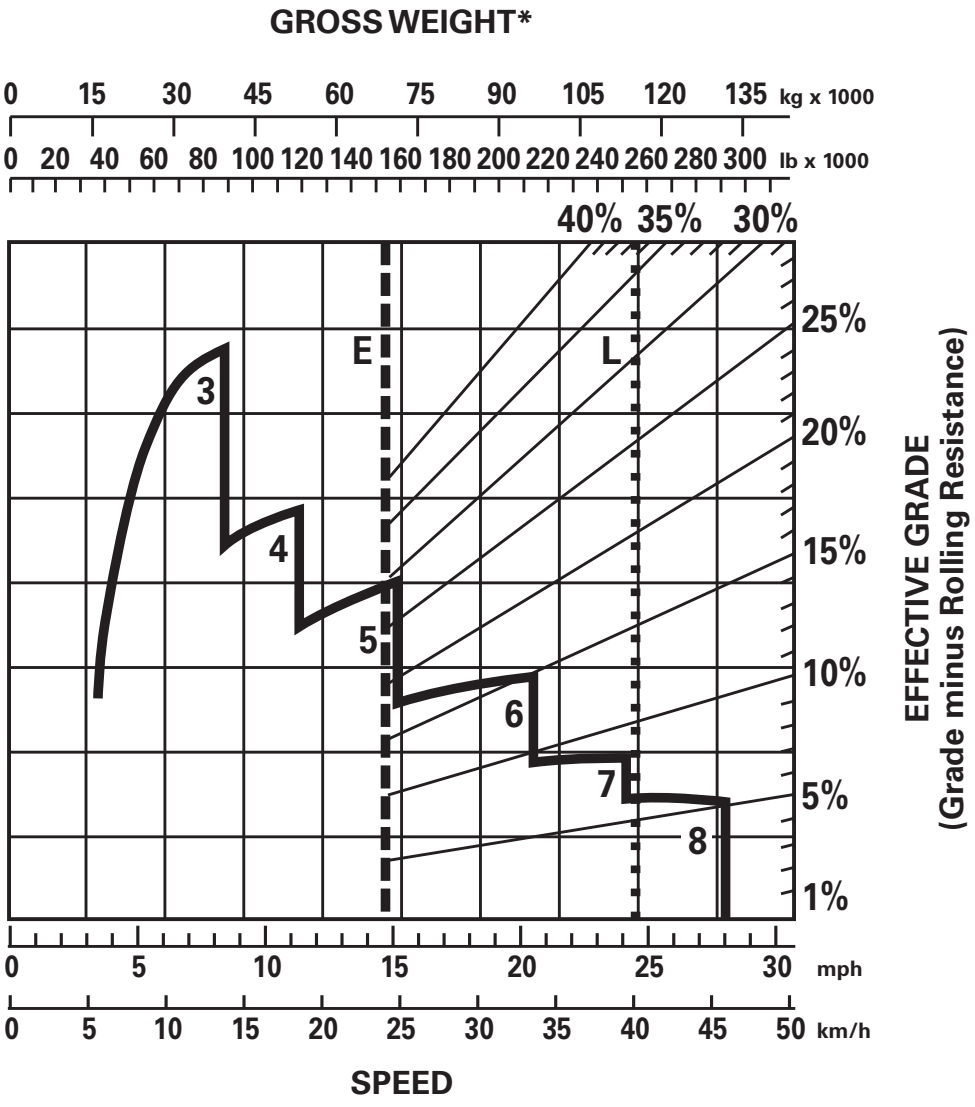
KEY

1 — 1st Gear Torque Converter Drive
2 — 2nd Gear Torque Converter Drive
3 — 3rd Gear Direct Drive
4 — 4th Gear Direct Drive
5 — 5th Gear Direct Drive
6 — 6th Gear Direct Drive
7 — 7th Gear Direct Drive
8 — 8th Gear Direct Drive

KEY

E — Empty 72 804 kg (160,505 lb)
L — Loaded 119 978 kg (264,505 lb)

Rimpull-Retarding Curve



*at sea level

KEY

3 — 3rd Gear Direct Drive
4 — 4th Gear Direct Drive
5 — 5th Gear Direct Drive
6 — 6th Gear Direct Drive
7 — 7th Gear Direct Drive
8 — 8th Gear Direct Drive

KEY

E — Empty 72 804 kg (160,505 lb)
L — Loaded 119 978 kg (264,505 lb)

Standard & Optional Equipment

Standard and optional equipment may vary. Consult your Cat® dealer for details.

	Standard	Optional
POWERTRAIN – TRACTOR		
Cat C18 (U.S. EPA Tier 4 Final only)	✓	
Cat engine brake	✓	
Electric start, 24V	✓	
Air cleaner, dry type	✓	
Fan, hydraulic	✓	
Ground level engine shutdown	✓	
Radiator	✓	
Guard, crankcase	✓	
Starting aid, ether	✓	
Braking system: primary and secondary, wet disc, hydraulic; parking, hydraulic-released, spring-applied	✓	
Differential lock (1)	✓	
Throttle lock	✓	
Transmission: 8-speed planetary powershift, Electronic Clutch Pressure Control (ECPC), Advanced Productivity Electronic Control Strategy (APECS) software, programmable top gear selection, transmission hold, guard – powertrain, ground speed control, machine speed limit	✓	
POWERTRAIN – SCRAPER		
Cat C15	✓	
Cat engine brake	✓	
Electric start, 24V	✓	
Fan, mechnical drive	✓	
Ground level engine shutdown	✓	
Starting aid, ether	✓	
Braking system: primary and secondary, wet disc, hydraulic; 8-speed planetary powershift, ECPC, guard – powertrain, APECS software, programmable top gear selection, transmission hold	✓	
ELECTRICAL – TRACTOR		
Alternator, 115 amp	✓	
Batteries (4), 12V, 1,000 CCA, maintenance free	✓	
Electrical system, 24V	✓	
Turn signals with hazard function	✓	
Starting/charging receptacle	✓	
ELECTRICAL – SCRAPER		
Alarm, backup	✓	
Batteries (4), 12V, 1,000 CCA, maintenance free	✓	
Lighting system: headlights – LED, turn signals with hazard functions – LED, floodlights, (2) cutting edge and (1) bowl, side vision – LED	✓	
Starting/charging receptacle	✓	

	Standard	Optional
OPERATOR ENVIRONMENT – TRACTOR		
HVAC system, heat, AC, defrost	✓	
Thermostat control of HVAC system	✓	
Coat hook	✓	
Lunchbox platform with holding strap	✓	
Diagnostic connection (2)	✓	
12V power ports (2)	✓	
Dome courtesy light	✓	
Horn, electric	✓	
T-handle implement control	✓	
Radio ready	✓	
Rollover protective structure/falling objects protective structure (ROPS/FOPS) cab, pressurized	✓	
Keypad switches: rear engine start; throttle lock; wipers/washers; hazard lights; worklights on, off; information mode; parking brake	✓	
Seat belt, static two-piece	✓	
Windows, sliding	✓	
Windows, laminated, zipped in	✓	
Windshield wipers, front and rear windows, includes washers	✓	
Door lock	✓	
Messenger display gauges, warnings include: coolant temp; engine oil temp; hydraulic oil temp; DPF temp; fuel level; park brake; implement lockout; brake system, regeneration required; throttle lock; system voltage; secondary steering; bail down; differential lock; apron float; transmission hold; high beam lights; action lamp; engine speed, rpm; gear selection; DPF fill levels	✓	
Powered access ladder	✓	
Safety tab rocker switches	✓	
Seat – Cat Advanced Ride Management (ARM), Cat Comfort Series III, rotates 30 degrees	✓	
Steering wheel, tilt, telescoping, padded	✓	
Windows, right side emergency egress	✓	
FLUIDS		
Extended life coolant to -37° C (-34° F)	✓	

657 Wheel Tractor-Scraper Standard & Optional Equipment

Standard & Optional Equipment

Standard and optional equipment may vary. Consult your Cat dealer for details.

	Standard	Optional
OTHER STANDARD EQUIPMENT – TRACTOR		
Accumulators (brake and cushion hitch) with EU and Canadian Registration Number (CRN) and EU certified accumulators dependent on region of machine sales	✓	
Fast oil change	✓	
Vandalism locks	✓	
Heater, engine coolant 120V	✓	
Cushion push plate/bail – standard open bowl only	✓	
OTHER STANDARD EQUIPMENT – SCRAPER		
Bowl	✓	
Fast oil change	✓	
Steering locks	✓	
Vandalism locks	✓	
Rear hook/radiator guard – standard open bowl only	✓	
Guard, overflow – standard open bowl only	✓	
Heater, engine coolant 120V	✓	
Hydraulic position sensing cylinders (bowl lift and apron)	✓	

	Standard	Optional
OTHER ATTACHMENTS		
Cab beacon with air horn		✓
STEERING ARRANGEMENTS		
Secondary steering (ground driven)	✓	
INTEGRATED TECHNOLOGIES		
Camera arrangement – Work Area Vision System (WAVS)	✓	
Product Link™	✓	
Sequence Assist and Cat Payload	✓	
SERVICE INSTRUCTIONS		
Film arrangement – U.S. (ANSI)	✓	
Film arrangement – International (ISO)	✓	

657 Environmental Declaration

The following information applies to the machine at the time of final manufacture as configured for sale in the regions covered in this document. The content of this declaration is valid as of the date issued; however, content related to machine features and specifications are subject to change without notice. For additional information, please see the machine's Operation and Maintenance Manual.

For more information on sustainability in action and our progress, please visit https://www.caterpillar.com/en/company/sustainability.

Engine

- The Cat C18 engine meets U.S. EPA Tier 4 Final and EU Stage V emission standards.
- The Cat® C15 engine meets U.S. EPA Tier 4 Final and EU Stage V emission standards.
- Cat diesel engines are required to use ULSD (ultra-low sulfur diesel fuel with 15 ppm of sulfur or less) or ULSD blended with the following lower-carbon intensity fuels** up to:
  - ✓ 20% biodiesel FAME (fatty acid methyl ester)*
  - ✓ 100% renewable diesel, HVO (hydrotreated vegetable oil) and GTL (gas-to-liquid) fuels

  Refer to guidelines for successful application. Please consult your Cat dealer or "Caterpillar Machine Fluids Recommendations" (SEBU6250) for details.

**Engines with no aftertreatment devices can use higher blends, up to 100% biodiesel (for use of blends higher than 20% biodiesel, consult your Cat dealer)*

***Tailpipe greenhouse gas emissions from lower-carbon intensity fuels are essentially the same as traditional fuels.*

Air Conditioning System

- The air conditioning system on this machine contains the fluorinated greenhouse gas refrigerant R134a (Global Warming Potential = 1430). The system contains 2.0 kg (4.4 lb) of refrigerant which has a CO_2 equivalent of 2.86 metric tonnes (3.153 tons).

Paint

- Based on best available knowledge, the maximum allowable concentration, measured in parts per million (PPM), of the following heavy metals in paint are:
  – Barium < 0.01%
  – Cadmium < 0.01%
  – Chromium < 0.01%
  – Lead < 0.01%

Sound Performance

The exterior sound power level for the standard machine (ISO 6395:2008) is 116 dB(A).[1]

The interior sound pressure level for the standard machine (ISO 6396:2008) is 77 dB(A).[2]

- Hearing protection may be needed when operating with an open operator station and cab (when not properly maintained or doors/windows open) for extended periods or in a noisy environment.

(1) The measurement was conducted at 100% of the maximum engine cooling fan speed. The sound level may vary at different engine cooling fan speeds. The measurement was conducted with the cab doors and the cab windows closed. The cab was properly installed and maintained.

(2) This is a work cycle sound exposure level. The measurement was conducted with the cab doors and the cab windows closed. The cab was properly installed and maintained.

Oils and Fluids

- Caterpillar factory fills with ethylene glycol coolants. Cat Diesel Engine Antifreeze/Coolant (DEAC) and Cat Extended Life Coolant (ELC) can be recycled. Consult your Cat dealer for more information.
- Cat Bio HYDO™ Advanced is an EU Ecolabel approved biodegradable hydraulic oil.

Additional fluids are likely to be present, please consult the Operations and Maintenance Manual or the Application and Installation guide for complete fluid recommendations and maintenance intervals.

Features and Technology

- The following features and technology may contribute to fuel savings and/or carbon reduction. Features may vary. Consult your Cat dealer for details.
  – Ground speed control helps lower fuel burn by allowing the operator to set the desired top speed and the machine will find the optimal gear for the engine and transmission
  – Optional Sequence Assist automates repetitive tasks, such as loading, hauling and dumping, to help reduce operator fatigue and rework caused during manual operation and to help reduce fuel burn and greenhouse gas emissions
  – Advanced Productivity Electronic Control System (APECS) allows the engines and transmission to communicate on a high level to better utilize the power and torque
  – Optional Cat Grade Control helps operators of all skill levels avoid costly rework, wasteful fuel burn and greenhouse gas emissions to execute the design plan with greater speed and accuracy.
  – On-demand hydraulic fan helps reduce fuel consumption and under-hood heat for longer component life
  – Improve jobsite efficiency with lower operating costs with Product Link™ and VisionLink® insights

For more complete information on Cat products, dealer services, and industry solutions, visit us on the web at **www.cat.com.**

Materials and specifications are subject to change without notice. Featured machines in photos may include additional equipment. See your Cat dealer for available options.

AEXQ2994-02 (12-2024)
Replaces AEXQ2994-01
Build Number: 11A
(Global, excluding Japan)