



# 623

## Wheel Tractor-Scraper

# Technical Specifications

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

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# 623 Wheel Tractor-Scraper Specifications

## Engine

Engine Model: Tractor	Cat® C13	
Rated Engine Speed: Tractor	1,700 rpm	
Engine Power: Tractor (ISO 14396:2002)	304 kW	407 hp

- Meets U.S. EPA Tier 4 Final and EU Stage V emission standards, or equivalent to U.S. EPA Tier 2, or equivalent to U.S. EPA Tier 3 and EU Stage IIIA.
- Net power available at the flywheel when the engine is equipped with fan, air cleaner, aftertreatment, and alternator with engine speed at 1,700 rpm.

## Sound

The exterior sound pressure level for the standard machine (ISO 6395:2008) is 115 dB(A).

The interior sound pressure level for the standard machine (ISO 6396:2008) is 75 dB(A).

## General Data

Overall Width	3.57 m	11' 8"
Overall Shipping Height	3.77 m	12' 3"
Scraper Capacity:		
Struck	14.4 m <sup>3</sup>	18.8 yd <sup>3</sup>
Heaped	17.6 m <sup>3</sup>	23.0 yd <sup>3</sup>
Rated Load	25 038 kg 25.1 tonnes	55,200 lb 27.6 tons
Width of Cut	3.14 m	10' 4"
Maximum Depth of Cut	262 mm	10.3"
Maximum Depth of Spread	465 mm	18.3"
Top Speed (Loaded)	53.9 km/h	33.5 mph
180° Curb-to-Curb Turning Width	11.8 m	38' 7"
Tires:		
Tractor Drive	33.25R29**E3	
Scraper	33.25R29**E3	

## Transmission

Forward 1	5.0 km/h	3.1 mph
Forward 2	8.9 km/h	5.5 mph
Forward 3	12.1 km/h	7.5 mph
Forward 4	16.3 km/h	10.1 mph
Forward 5	21.9 km/h	13.6 mph
Forward 6	29.6 km/h	18.4 mph
Forward 7	39.9 km/h	24.8 mph
Forward 8	53.9 km/h	33.5 mph
Reverse 1	9.2 km/h	5.7 mph

## Implement Cycle Times

Bowl Raise	3.0 Seconds
Bowl Lower	3.5 Seconds
Ejector Extend	6.5 Seconds
Ejector Retract	9.7 Seconds

## Service Refill Capacities

Crankcase	37.0 L	9.7 gal
Transmission System	97.0 L	25.5 gal
Cooling System	42.0 L	11.0 gal
Fuel Tank	818.0 L	216.1 gal
Hydraulic System	83.0 L	21.9 gal
Diesel Exhaust Fluid (DEF)*	30.5 L	8.1 gal
Differential	158.0 L	41.7 gal
Final Drive (per side)	19.0 L	5.0 gal
Windshield Washer	5.0 L	1.3 gal
Rear Wheels (per side)	4.0 L	1.0 gal
Brake Cooling (Scraper)	33.0 L	8.7 gal

\*When equipped

## Safety Criteria Compliance Standards

Rollover Protective Structure (ROPS)	ISO 3471:2008 for up to 17 084 kg (37,664 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
Reverse Alarm	ISO 9533:2010

\*If equipped with optional secondary steering

## Air Conditioning System

- The air conditioning system on this machine contains the fluorinated greenhouse gas refrigerant R134a (Global Warming Potential = 1430). The system contains 1.9 kg (4.2 lb) of refrigerant which has a CO<sub>2</sub> equivalent of 2.71 metric tonnes (2.674 tons).

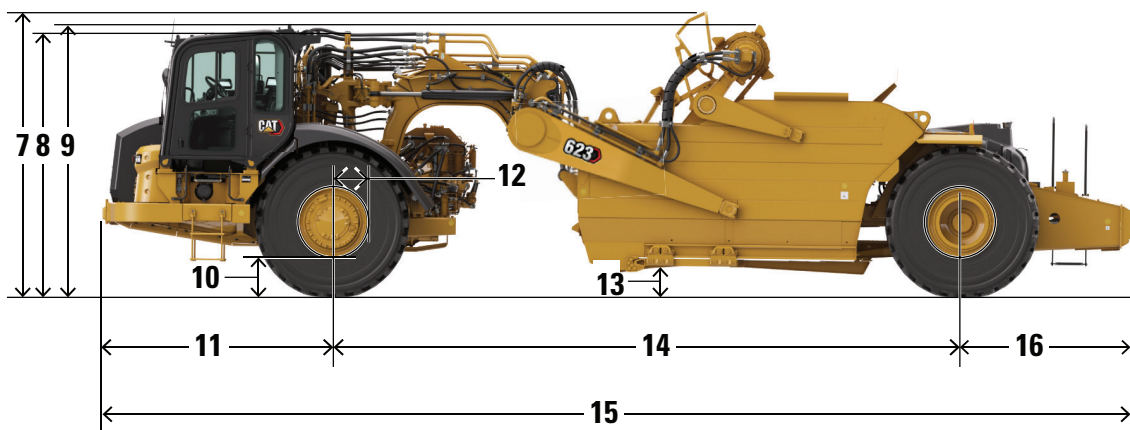
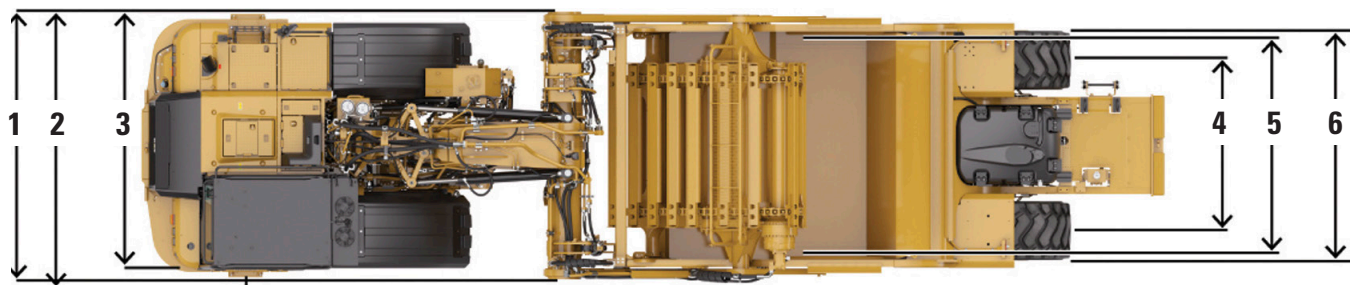
## Weights

<b>Standard</b>		
Shipping Weight – 10% fuel	39 020 kg	86,024 lb
Operating Weight – full fuel empty load	39 959 kg	88,095 lb
Loaded, based on rated load	66 126 kg	145,782 lb

# 623 Wheel Tractor-Scraper Specifications

## Dimensions

All dimensions are approximate.



<b>623</b>		
<b>1</b>	Overall Machine Width	3585 mm 141.1 in
<b>2</b>	Overall Machine Width – Ladder Down	3790 mm 149.2 in
<b>3</b>	Tractor Width	3381 mm 133.1 in
<b>4</b>	Rear Tire Centers Width	2290 mm 90.2 in
<b>5</b>	Inside of Bowl Width	3048 mm 120.0 in
<b>6</b>	Outside Rear Tires Width	3275 mm 128.9 in
<b>7</b>	Overall Shipping Height	4037 mm 158.9 in
<b>8</b>	Height to Top of Cab	3621 mm 142.6 in
<b>9</b>	Height to Top of Elevator	3768 mm 148.3 in
<b>10</b>	Tractor Ground Clearance	557 mm 21.9 in
<b>11</b>	Front of Tractor to Front Axle	3119 mm 122.8 in
<b>12</b>	Axle to Vertical Hitch Pin	432 mm 17.0 in
<b>13</b>	Scraper Blade Maximum Height	520 mm 20.5 in
<b>14</b>	Wheelbase	8370 mm 329.5 in
<b>15</b>	Overall Machine Length	13 767 mm 542.0 in
<b>16</b>	Rear Axle to Rear of Machine	2278 mm 89.7 in

# 623 Wheel Tractor-Scraper Specifications

## Rimpull-Speed-Gradeability Curves

### USE OF RIMPULL-SPEED-GRADEABILITY CURVES

The following explanation applies to Rimpull-Speed-Gradeability curves for wheel tractor-scrapers, construction & mining trucks, tractors, and articulated trucks.

Maximum speed attainable, gear range, and available rimpull can be determined from curves on the following pages when machine weight and total effective grade (or total resistance) are known.

**Rimpull** is the force (in kg, lb, or kN) available between the tire and the ground to propel the machine (limited by traction).

**Weight** is defined as gross machine weight (kg or lb) = machine + payload.

**Total effective grade (or total resistance)** is grade resistance plus rolling resistance expressed as percent grade.

Grade is measured or estimated.

Rolling resistance is estimated (see tables section for typical values).

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

*Example:*

With a 6% grade and a rolling resistance of 40 kg/metric ton (80 lb/U.S. ton), find total resistance.

Rolling resistance =  $40 \text{ kg/t} \div 10 = 4\%$  effective grade  
(English:  $80 \text{ lb} \div 20 = 4\%$ )

Total resistance = 4% rolling + 6% grade = 10%

### Altitude Derating

Rimpull force and speed must be derated for altitude similar to flywheel horsepower. The percentage loss in rimpull force approximately corresponds to the percentage loss in flywheel horsepower. See tables section for altitude derations.

### Rimpull-Speed-Gradeability

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

*Example Problem:*

A 623 with an estimated payload of 37 013 kg (81,600 lb) is operating on a total effective grade of 10%. Find the available rimpull and maximum attainable speed.

Empty weight + payload = gross weight  
 $47\,628 \text{ kg} + 37\,013 \text{ kg} = 84\,641 \text{ kg}$   
 $(105,002 \text{ lb} + 81,600 \text{ lb} = 186,602 \text{ lb})$

**Solution:** Using graph on the next page, read from 84 641 kg (186,602 lb) (point A) on top of gross weight scale down the line to the intersection of the 10% total resistance line (point B).

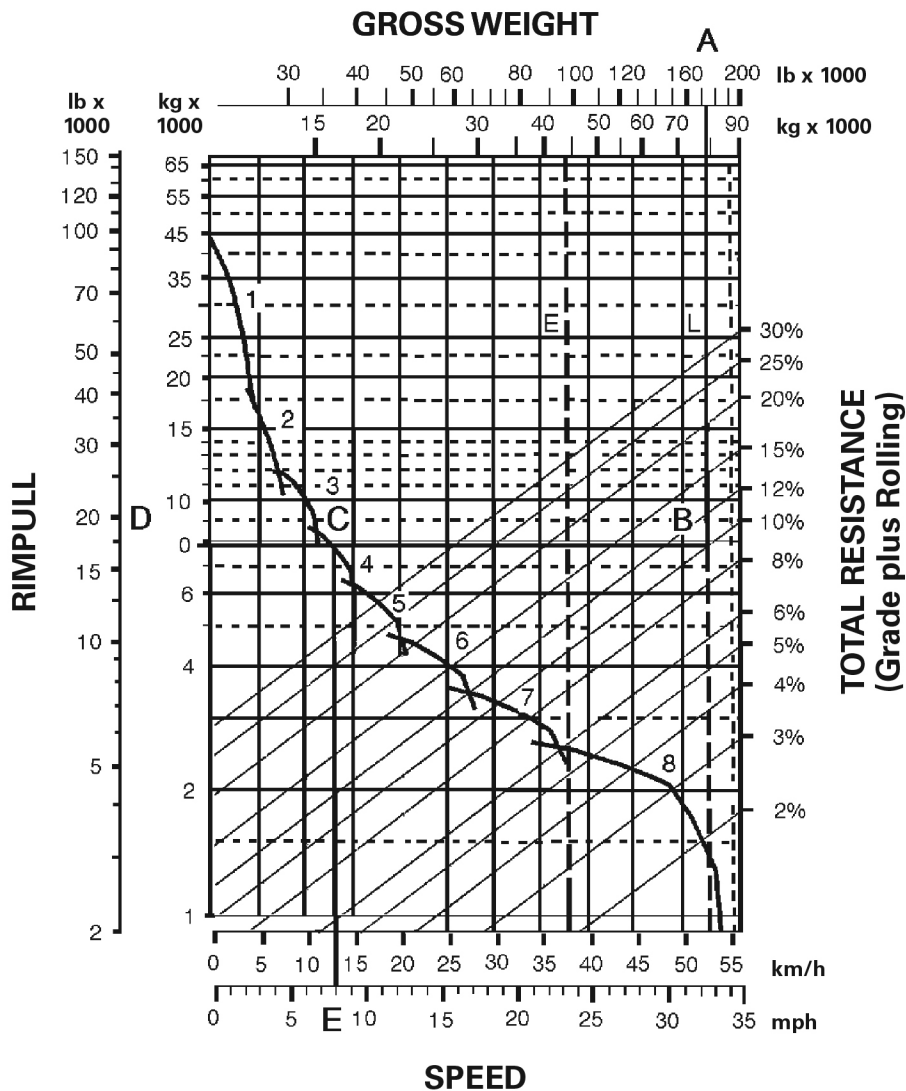
Go across horizontally from B to the rimpull scale on the left (point D). This gives the required rimpull: 7756 kg (17,100 lb).

Where the line cuts the speed curve (point C), read down vertically (point E) to obtain the maximum speed attainable for the 10% effective grade: 12.9 km/h (8 mph).

**Answer:** The machine will climb the 10% effective grade at a maximum speed of 12.9 km/h (8 mph) in 4th gear. Available rimpull is 7756 kg (17,100 lb).

# 623 Wheel Tractor-Scraper Specifications

## Rimpull-Speed-Gradeability Curves



# 623 Wheel Tractor-Scraper Specifications

## 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
657G	One D11	0.6	0.6
657G	Push Pull Self	1.1*	0.6
637K	Coal	0.8	0.7
657G	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-scrappers 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 623 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)

# 623 Wheel Tractor-Scraper Specifications

## 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 623 will descend the slope at 21.7 km/h (13.5 mph) in 5th gear. Travel time is 1.68 minutes.

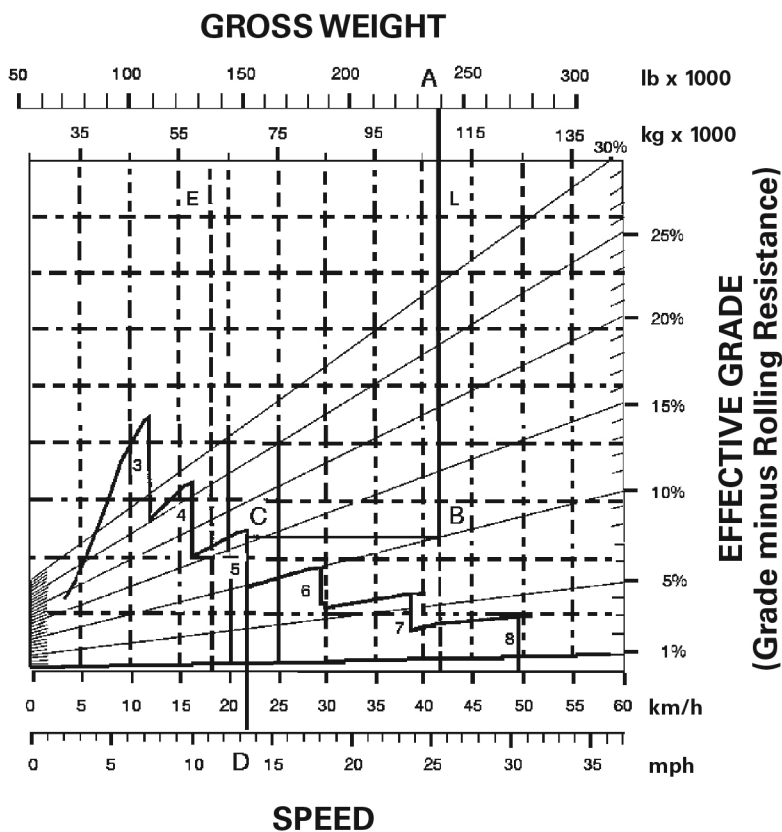
$$\frac{610 \text{ m}}{363 \text{ m/min}} = 1.68 \text{ min}$$

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

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

**Note:** The basic distance-speed-time formula is  $60 D \div S = T$  (or “60 D Street”), where 60 is minutes, D is distance, S is speed, and T is time. In the above problem,  $60 \times 610 \text{ m} \div 21.7 \text{ km/h} \times 1000 = T$ .

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



### KEY

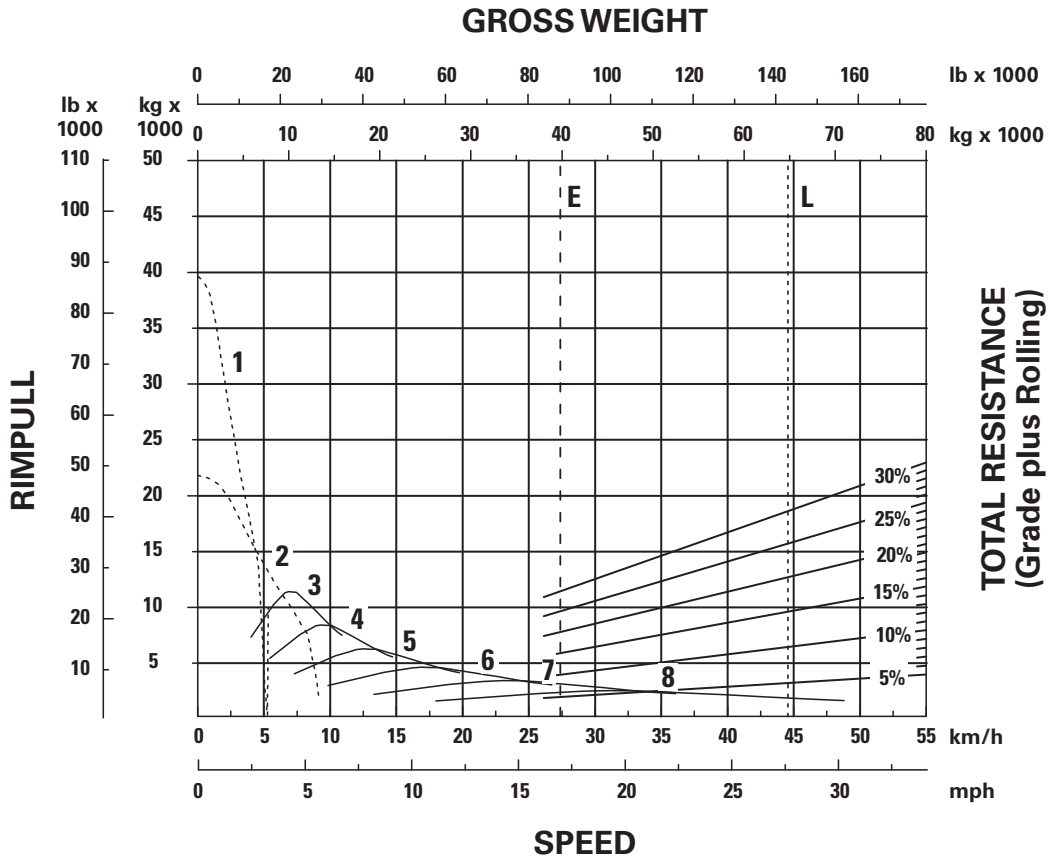
- 3 — 3rd Gear Direct Drive
- 4 — 4th Gear Direct Drive
- 5 — 5th Gear Direct Drive
- 6 — 6th Gear Direct Drive
- 7 — 7th Gear Direct Drive
- 8 — 8th Gear Direct Drive

### 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)

# 623 Wheel Tractor-Scraper Specifications

## Rimpull-Speed-Gradeability – 33.25R29 Tires



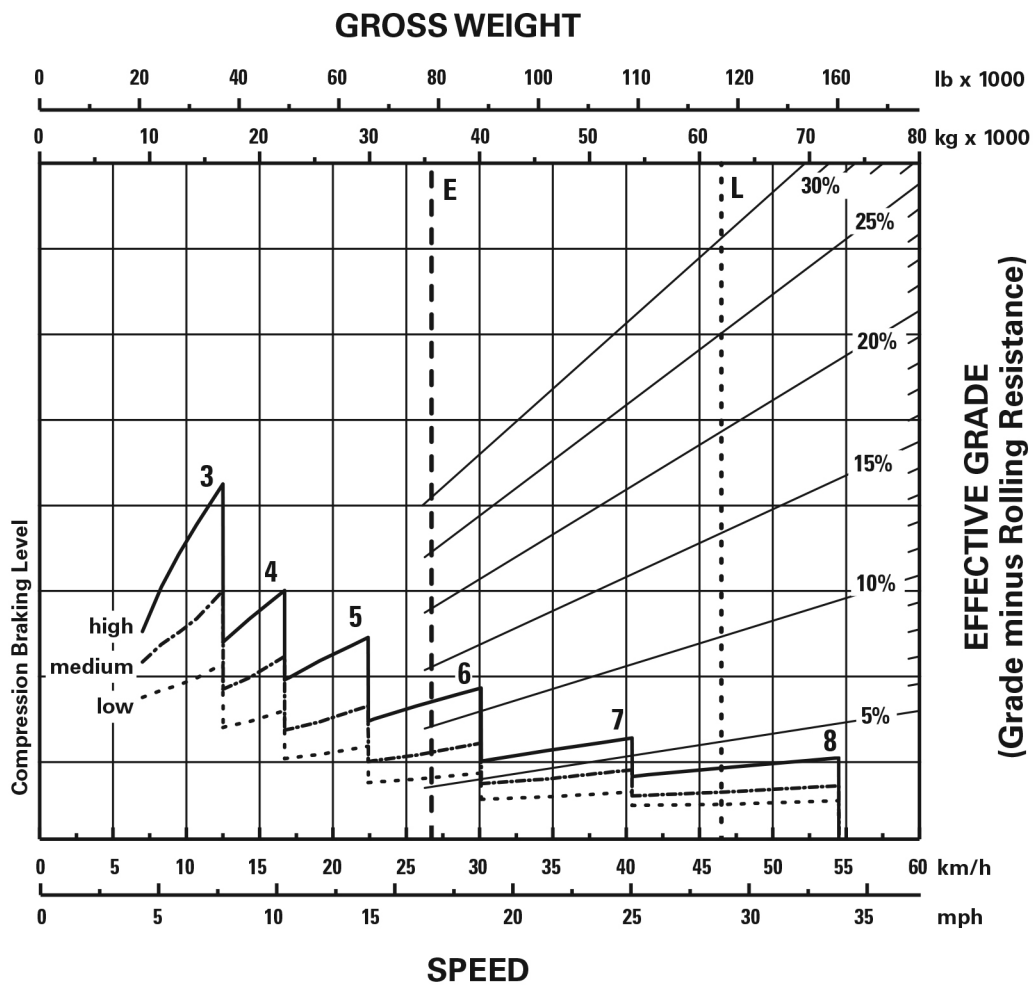
- KEY**
- 1 — 1st Gear Torque Converter Drive
  - 2 — 2nd Gear Torque Converter Drive
  - 3 — 3rd Gear Direct Drive
  - 4 — 4th Gear Direct Drive
  - 5 — 5th Gear Direct Drive
  - 6 — 6th Gear Direct Drive
  - 7 — 7th Gear Direct Drive
  - 8 — 8th Gear Direct Drive

- KEY**
- E — Empty 39 866 kg (87,809 lb)
  - L — Loaded 64 904 kg (143,009 lb)



# 623 Wheel Tractor-Scraper Specifications

## Retarder Curve – 33.25R29 Tires



**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 35 808 kg (78,943 lb)
- L – Loaded 61 935 kg (136,553 lb)

# 623 Wheel Tractor-Scraper Standard Equipment

## Standard Equipment

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

	Standard	Optional		Standard	Optional
<b>POWERTRAIN – TRACTOR</b>			<b>OPERATOR ENVIRONMENT – TRACTOR (CONTINUED)</b>		
Cat C13 engine with Mechanically Actuated Electronic Unit Injection (MEUI™)	✓		Rollover protective structure/falling objects protective structure (ROPS/FOPS) cab, pressurized		✓
Cat engine brake	✓		Keypad switches: throttle lock, wipers/washers, hazard lights, retarding level select, work lights on/off, information mode on messenger display		✓
Electric start, 24V	✓		Safety tab rocker switches: parking brake		✓
Air cleaner, dry type with precleaner	✓		Seat belt, static two-piece		✓
Fan, hydraulic	✓		Seat – Cat Advanced Ride Management (ARM), Cat Comfort Series III, rotates 30 degrees		✓
Ground level engine shutdown	✓		Steering wheel, tilt, telescoping, padded		✓
Radiator, aluminum unit core, 9 fins per inch	✓		Windows, right side emergency egress		✓
Guard, crankcase	✓		Windows, sliding		✓
Muffler*	✓		Windows, laminated, zipped in		✓
Starting aid, ether	✓		Windshield wipers, front and rear windows, includes washers		✓
Braking system: primary and secondary, wet disc, hydraulic; parking, hydraulic-released, spring-applied	✓		Door lock		✓
Transmission: 8-speed planetary power shift, Electronic Clutch Pressure Control (ECPC), Advanced Productivity Electronic Control Strategy (APECS) software, programmable top gear selection, transmission hold, differential lock, transmission guard, ground speed control, machine speed limit	✓		Gauges, warnings include: coolant temperature, engine oil temperature, hydraulic oil temperature, fuel level, park brake, implement lockout, brake system, regeneration required, throttle lock, system voltage, secondary steering, ejector auto, differential lock, transmission hold, cushion hitch, high beam lights, action lamp, engine speed – rpm, gear selection		✓
<b>POWERTRAIN – SCRAPER</b>			Camera arrangement – Work Area Vision System (WAVS)		✓
Braking system: primary and secondary, wet disc, hydraulic	✓		<b>FLUIDS</b>		
<b>ELECTRICAL – TRACTOR</b>			Extended life coolant to -37° C (-34° F)		✓
Alternator, 115 amp	✓		<b>OTHER STANDARD EQUIPMENT – TRACTOR</b>		
Batteries (4), 12V, 1,000 CCA, maintenance free	✓		Advanced cushion hitch		✓
Electrical system, 24V	✓		Accumulators (cushion hitch and brake) with Canadian registration number (CRN)		✓
LED low beam, high beam, and work lights	✓		Fast oil change (engine)		✓
Starting/charging receptacle	✓		Fenders, non-metallic		✓
<b>ELECTRICAL – SCRAPER</b>			Heater, engine coolant 120V		✓
Alarm, backup	✓		Rims (2)		✓
Lighting system: brake lights – LED, turn signals with hazard function – LED	✓		Tow pin, front		✓
<b>OPERATOR ENVIRONMENT – TRACTOR</b>			Vandalism locks		✓
HVAC system, heat, AC, defrost	✓		<b>OTHER STANDARD EQUIPMENT – SCRAPER</b>		
Thermostat control of HVAC system	✓		Bowl: 17.6 m <sup>3</sup> (23 yd <sup>3</sup> ) – heaped, 13.5 m <sup>3</sup> (17.6 yd <sup>3</sup> ) – struck		✓
Coat hook	✓		Vandalism locks		✓
Lunchbox platform with holding strap	✓		Elevator with 15 flights		✓
Diagnostic connection (2)	✓		Hydraulic position sensing cylinders (bowl lift)		✓
12V power ports (2)	✓		Fender, scraper		✓
Differential lock (1)	✓		Bowl overflow guard		✓
Dome courtesy light	✓		Fast-fill fuel tank		✓
Horn, electric	✓				
T-handle implement control	✓				
Radio ready	✓				

\*Only for U.S. EPA Tier 2 and U.S. EPA Tier 3 engines

# 623 Wheel Tractor-Scraper Standard and Optional Attachments

## Standard and Optional Attachments

Optional attachments may vary. Consult your Cat dealer for details.

	Standard	Optional
<b>STEERING ARRANGEMENTS</b>		
Secondary steering (electrically powered)		✓
<b>INTEGRATED TECHNOLOGIES</b>		
Sequence Assist and Cat Payload	✓	
Product Link™		✓
Cat Grade Control, Cat Payload, Sequence Assist, and Load Assist		✓
<b>SERVICE INSTRUCTIONS</b>		
Film arrangement – U.S. (ANSI)		✓
Film arrangement – International (ISO)		✓

	Standard	Optional
<b>OTHER ATTACHMENTS</b>		
Steering lock – external	✓	
Cab beacon with air horn		✓
Cab powered access ladder		✓
Cold start engine flywheel clutch		✓
Air horn		✓
Year of manufacture plate		✓

# 623 Wheel Tractor-Scraper 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® C13 engine is available in configurations that meet U.S. EPA Tier 4 Final and EU Stage V emission standards or equivalent to U.S. EPA Tier 2, or equivalent to U.S. EPA Tier 3 and EU Stage IIIA.
- Cat U.S. EPA Tier 4 Final and EU Stage V 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
- Cat engines emitting equivalent to U.S. EPA Tier 2, or equivalent to U.S. EPA Tier 3 and EU Stage IIIA, are compatible with diesel fuel blended with the following lower-carbon intensity fuels up to:
  - ✓ 100% 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 1.9 kg (4.2 lb) of refrigerant which has a CO<sub>2</sub> equivalent of 2.71 metric tonnes (2.674 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

With cooling fan speed at maximum value:

Interior Sound Pressure Level (ISO 6396:2008) – 75 dB(A)

Exterior Sound Power Level (ISO 6395:2008) – 115 dB(A)

- When properly installed and maintained, the cab offered by Caterpillar, when tested with doors and windows closed according to ANSI/SAE J1166 OCT98, meets OSHA and MSHA requirements for operator sound exposure limits in effect at time of manufacture.
- 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.

## 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 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 Load Assist helps shorten the learning curve for inexperienced operators
  - 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
  - Reduced chain wear with the enhanced elevator drive sprocket
  - Decreased sprocket wear, chain wear, and chain jumping with improved scissor-style chain
  - 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](http://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.

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AEXQ3560-01 (11-2024)  
Replaces AEXQ3560-00  
Build Number: 11A  
(Global)

