MONTANA
Department of Transportation

MDT-BRG-015 04/23

Montana Department of Transportation
Bridge Bureau
Approved Construction Equipment List

Make:	*Caterpillar*
Model:	*930M*
Equipment Type:	*Wheel Loader*
Contractor Modifications:	*None*

Interstate Approval Conditions

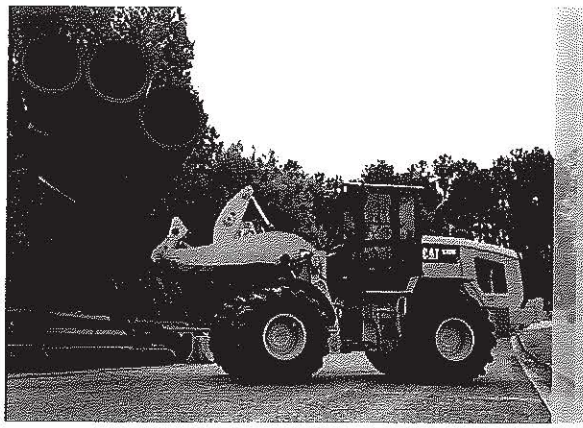
Approval Type	*Crossing only*
Speed:	*No Restriction*
Weight:	*31,364 lb or less*
Traffic:	*Approved with Regular Traffic*
Location Restrictions:	*No Restriction*

Non-Interstate Approval Conditions

Approval Type	*Crossing only*
Speed:	*No Restriction*
Weight:	*31,364 lb or less*
Traffic:	*Approved with Regular Traffic*
Location Restrictions:	*No Restriction*

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.



Cat® 930M

Wheel Loader

M Series – Making Your Choice Easy:

- **Enjoy All Day Comfort** – Have a seat in the new M Series Small Wheel Loader and enjoy automatic temperature control, class leading sound levels, excellent all around visibility and low-effort joystick controls that move with you on a fully adjustable seat suspension. A large spacious operator environment combined with Caterpillar's exclusive hydraulic cylinder damping and smooth predictable controls make this the most comfortable seat on your job site.
- **Work Made Easy** – Move more with Caterpillar's patented quick loading Performance Series buckets and optimized Z-bar linkage that combines the digging efficiency of a traditional Z-bar with tool carrier capabilities. The parallel lift and high tilt forces throughout the working range allow you to safely and confidently handle loads with precise control.

  Multi-function work has never been easier with dedicated pumps for each system and a flow sharing implement valve governed by an intelligent power management system. Simultaneously lift, steer and drive without compromise. The M Series Small Wheel Loader simply does what you ask it to do.
- **Efficiently Powerful** – Experience hybrid like fuel efficiency with an intelligent hydrostatic power train and industry leading fuel savings through a lower maximum engine speed of just 1,600 rpm in Standard Mode. Power when you need it with Caterpillar's exclusive Power-by-Range technology that increases power in Range 4 for improved speed on grade. For your toughest and most demanding applications a new Performance Mode will allow you to boost the power and hydraulic speed in all Ranges to get the job done even quicker. Meets U.S. EPA Tier 4 Final/EU Stage IV emission standards with a Cat® C7.1 ACERT™ engine that is designed to manage itself so you can concentrate on your work.
- **Customize Your Experience** – Meet your application requirements and individual preferences with Caterpillar's industry first Hystat™ Operator Modes featuring four unique power train settings. Select classic Torque Converter for smooth rollout, conventional Hystat for aggressive engine braking, an Ice Mode that maximizes your control on slippery underfoot, or default mode which blends the best of Hystat and Torque Converter characteristics. Fine tune machine performance with adjustments at your fingertips through the soft touch buttons and optional secondary display. Quickly set hydraulic response along with linkage kick-out positions, maximum wheel torque, and peak ground speed to efficiently perform a multitude of tasks.

Specifications

Engine

Engine Model	Cat C7.1 ACERT			
Power Mode	Standard Mode		Performance Mode	
Speed Range	Range 1-3*		Range 1-4	
Maximum Gross Power				
Maximum Engine Speed	1,600 rpm		1,800 rpm	
ISO 14396	119 kW	160 hp	122 kW	164 hp
ISO 14396 (DIN)	119 kW	162 hp	122 kW	166 hp
Rated Net Power	1,600 rpm		1,800 rpm	
SAE J1349	115 kW	154 hp	117 kW	157 hp
SAE J1349 at Maximum Fan Speed	105 kW	141 hp	107 kW	143 hp
ISO 9249 (DIN)	116 kW	158 hp	119 kW	162 hp

Engine (continued)

	Standard Mode		Performance Mode	
Maximum Gross Torque				
ISO 14396	804 N·m	592 lbf-ft	804 N·m	592 lbf-ft
Maximum Net Torque				
SAE J1349	768 N·m	566 lbf-ft	768 N·m	566 lbf-ft
ISO 9249 (1977)/EEC 80/1269	776 N·m	572 lbf-ft	776 N·m	572 lbf-ft
Displacement	7.01 L	427 in³	7.01 L	427 in³

- Engine meets Tier 4 Final/Stage IV emission standards.
- Net power shown is the power available at the flywheel when the engine is equipped with alternator, air cleaner and diesel exhaust filter.

*Range 4 power is boosted to be the same as Performance Mode.

CAT®

Buckets

Bucket Capacities – General Purpose	2.1-2.7 m^3	2.7-3.5 yd^3
Bucket Capacities – Light Material	3.1-5.0 m^3	4.0-6.5 yd^3

Steering

Steering Articulation Angle (each direction)	40°	
Maximum Flow – Steering Pump	130 L/min	34 gal/min
Maximum Working Pressure – Steering Pump	24 130 kPa	3,500 psi
Maximum Steering Torque:		
0 degrees (straight machine)	50 375 N·m	37,155 lbf-ft
40 degrees (full turn)	37 620 N·m	27,747 lbf-ft
Steering Cycle Times (full left to full right):		
At 1,800 rpm: 90 rpm steering wheel speed	2.4 seconds	
Number of Steering Wheel Turns – full left to full right or full right to full left	3.5 turns	

Loader Hydraulic System

Maximum Flow – Implement Pump	190 L/min	50 gal/min
3rd Function Maximum Flow*	190 L/min	50 gal/min
4th Function Maximum Flow*	160 L/min	42 gal/min
Maximum Working Pressure – Implement Pump	25 000 kPa	3,626 psi
Relief Pressure – Tilt Cylinder	28 000 kPa	4,061 psi
3rd Function Maximum Working Pressure	25 000 kPa	3,626 psi
4th Function Maximum Working Pressure	25 000 kPa	3,626 psi

Hydraulic Cycle Times:	Standard Mode At 1,600 rpm	Performance Mode At 1,800 rpm
Raise (ground level to maximum lift)	5.7 seconds	5.1 seconds
Dump (at maximum lift height)	1.7 seconds	1.5 seconds
Float Down (maximum lift to ground level)	2.7 seconds	2.7 seconds
Total Cycle Time	10.1 seconds	9.3 seconds

*Adjustable from 20% to 100% of maximum flow through the secondary display, when equipped.

Service Refill Capacities

Fuel Tank	195 L	51.5 gal
Cooling System	30 L	7.9 gal
Engine Crankcase	20 L	5.3 gal
Transmission (gearbox)	8.5 L	2.2 gal
Axles:		
Front	26 L	6.9 gal
Rear	25 L	6.6 gal
Hydraulic System (including tank)	165 L	43.6 gal
Hydraulic Tank	90 L	23.8 gal
Diesel Exhaust Fluid (DEF) Tank	19 L	5 gal

- DEF used in Cat SCR systems must meet the requirements outlined in the International Organization for Standardization (ISO) standard 22241-1.

Transmission

Forward and Reverse:		
Range 1*	1-13 km/h	0.6-8 mph
Range 2	13 km/h	8 mph
Range 3	27 km/h	17 mph
Range 4	40 km/h	25 mph

*Creeper control allows maximum speed range adjustability from 1 km/h (0.6 mph) to 13 km/h (8 mph) in Range 1 through the secondary display, when equipped. Factory default is 7 km/h (4.4 mph).

Tires

Standard Size	20.5 R25, radial (L-3)	
Other Choices Include:	20.5 R25, radial (L-2)	20.5-25 16PR (L-5)
	20.5 R25, radial (L-5)	600/65 R25 radial (L-3)
	20.5-25 12PR (L-2)	Skidder/Agriculture
	20.5-25 12PR (L-3)	Flexports Gen II

- Other tire choices are available. Contact your Cat dealer for details.
- In certain applications, the loader's productive capabilities may exceed the tire's tonnes-km/h (ton-mph) capabilities.
- Caterpillar recommends that you consult a tire supplier to evaluate all conditions before selecting a tire model.

Cab

ROPS	SAE J1040 MAY94, ISO 3471-1994
FOPS	SAE J/ISO 3449 APR98, Level II, ISO 3449 1992 Level II

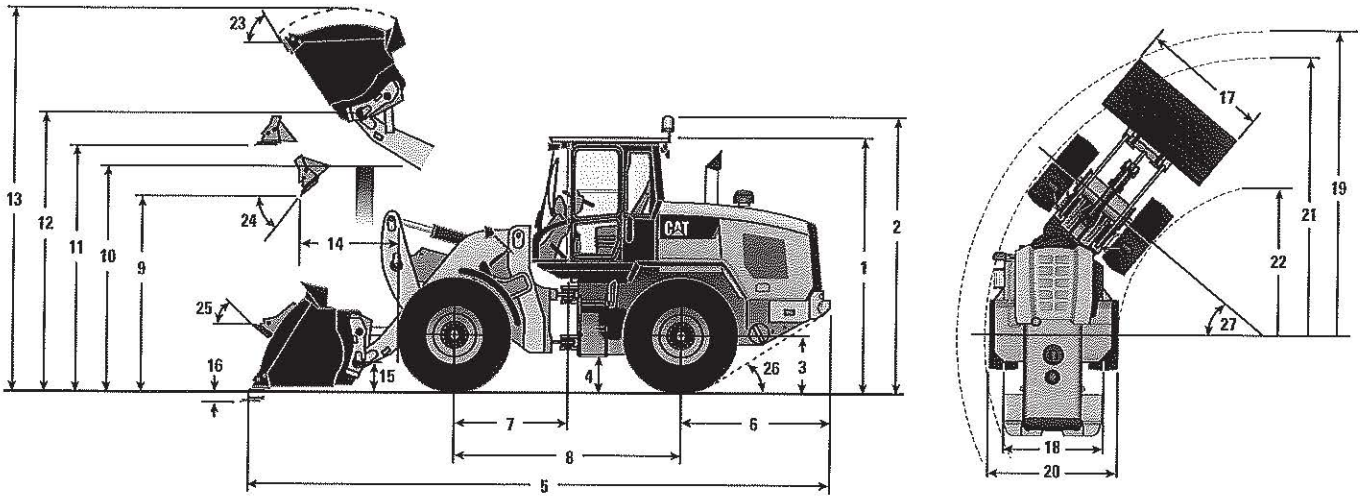
- Cab and Rollover Protective Structures (ROPS) are standard in North America and Europe.
- The declared dynamic operator sound pressure levels per ISO 6396:2008*, when properly installed and maintained, are:
  - Standard cab: 68 ±3 dB(A)
  - Deluxe cab: 66 ±2 dB(A)

*The measurements were conducted with the cab doors and windows closed and at 70% of the maximum engine cooling fan speed. The sound level may vary at different engine cooling fan speeds.

Axles

Front	Fixed
	Locking differential (standard)
Rear	Oscillating ±11 degrees
	Open differential (standard)
	Limited slip differential (optional)

Dimensions and Operating Specifications (All dimensions are approximate. Dimensions vary with bucket and tire choice.)



		Standard Lift		High Lift	
** 1	Height: Ground to Cab	3340 mm	(10'11")	3340 mm	(10'11")
** 2	Height: Ground to Beacon	3669 mm	(12'0")	3669 mm	(12'0")
** 3	Height: Ground Axle Center	685 mm	(2'2")	685 mm	(2'2")
** 4	Height: Ground Clearance	397 mm	(1'3")	397 mm	(1'3")
* 5	Length: Overall	7530 mm	(24'8")	8324 mm	(27'3")
6	Length: Rear Axle to Bumper	1993 mm	(6'6")	1993 mm	(6'6")
7	Length: Hitch to Front Axle	1500 mm	(4'11")	1500 mm	(4'11")
8	Length: Wheel Base	3000 mm	(9'10")	3000 mm	(9'10")
* 9	Clearance: Bucket at 45 degrees	2828 mm	(9'3")	3421 mm	(11'2")
** 10	Clearance: Loadover Height	3331 mm	(10'11")	3540 mm	(11'7")
** 11	Clearance: Level Bucket	3580 mm	(11'8")	4173 mm	(13'8")
** 12	Height: Bucket Pin	3907 mm	(12'9")	4500 mm	(14'9")
** 13	Height: Overall	5147 mm	(16'10")	5740 mm	(18'9")
* 14	Reach: Bucket at 45 degrees	1064 mm	(3'5")	1385 mm	(4'6")
15	Carry Height: Bucket Pin	458 mm	(1'6")	692 mm	(2'3")
** 16	Dig Depth	100 mm	(3.9")	135 mm	(5.3")
17	Width: Bucket	2550 mm	(8'4")	2550 mm	(8'4")
18	Width: Tread Center	1930 mm	(6'3")	1930 mm	(6'3")
19	Turning Radius: Over Bucket	5945 mm	(19'6")	6329 mm	(20'9")
20	Width: Over Tires	2540 mm	(8'4")	2540 mm	(8'4")
21	Turning Radius: Outside of Tires	5402 mm	(17'8")	5402 mm	(17'8")
22	Turning Radius: Inside of Tires	2851 mm	(9'4")	2851 mm	(9'4")
23	Rack Angle at Full Lift	54 degrees		53 degrees	
24	Dump Angle at Full Lift	49 degrees		48 degrees	
25	Rack Angle at Carry	45 degrees		50 degrees	
26	Departure Angle	33 degrees		33 degrees	
27	Articulation Angle	40 degrees		40 degrees	
*	Tipping Load – Straight (ISO 14397-1)	9946 kg	21,928 lb	7146 kg	15,755 lb
*	Tipping Load – Full Turn (ISO 14397-1)	8474 kg	18,683 lb	6021 kg	13,274 lb
*	Breakout	12 366 kg	27,263 lb	12 062 kg	26,592 lb
*	Operating Weight	13 994 kg	30,852 lb	14 226 kg	31,363 lb

*Vary with bucket.

**Vary with tire.

Dimensions listed are for a machine configured with 2.1 m³ (2.7 yd³) general purpose Fusion™ bucket, bolt-on cutting edge, heavy counterweights, additional guarding, 80 kg (176 lb) operator and Michelin 20.5 R25 (L-3) XHA2 tires.

930M Wheel Loader

STANDARD EQUIPMENT

POWER TRAIN

- Auto idle shut down feature
- Cat C7.1 ACERT engine
  - Power modes (Standard and Performance)
  - Power by range (High Power in Range 4)
  - Turbocharged and aftercooled
  - Filtered crankcase breather
  - Diesel particulate filter
  - Selective Catalyst Reduction
- Coded start (requires secondary display)
- Coolant protection to –34° C (–29° F)
- Enclosed wet disc full hydraulic brakes
- Fuel priming pump, automatic
- Hydraulically driven demand cooling fan
- Hydrostatic transmission with electronic control
  - Operator modes (Default, TC, Hystat, and Ice)
  - Directional Shift Aggressiveness (fast, medium, slow)
  - Rimpull control, adjust wheel torque
  - Creeper control, adjust ground speed
- Parking brake, electric
- Single plane cooling package wide six fins per inch density
- Throttle lock and max speed limiter

HYDRAULICS

- Automatic lift and bucket kickouts, adjustable in-cab
- Bucket and fork modes, adjustable in-cab
- Cylinder damping at kickout and mechanical end stops
- Fine mode control (fast, medium, slow) in fork mode
- Hydraulic response setting (fast, medium, slow)
- Hydraulic diagnostic connectors and S·O·S℠ ports
- Load sensing hydraulics and steering

ELECTRICAL

- Alternator, 115 amp, heavy duty
- 12V power supply in cab (2)
- Batteries, 1,000 CCA (2) 24V system, disconnect switch
- Back-up alarm
- Emergency shutdown switch
- Halogen work and roading lights, LED rear tail lights
- Product Link™ PRO with three year subscription
- Remote jump start post
- Resettable main and critical function breakers

OPERATOR ENVIRONMENT

- 75 mm (3 in) retractable seat belt, with audible alarm and indicator
- Automatic temperature control
- External heated mirrors with lower parabolic
- Hydraulic control lockout
- Interior cab lighting, door and dome
- Interior rearview mirrors (2)
- Lunch box storage
- Radio ready speakers
- Rear window defrost, electric
- Seat-mounted electronic implement controls, adjustable
- Column mounted multi function control – lights, wipers, turn signal
- Tilt and telescopic steering wheel
- Tinted front glass
- Wet arm wiper/washer, 2-speed and intermittent, front

OTHER STANDARD EQUIPMENT

- Large-access enclosure doors with adjustable close/open force
- Parallel lift loader linkage

EU STANDARD EQUIPMENT

- Deluxe cab
- Secondary display
- Rearview camera

OPTIONAL EQUIPMENT

- Auto lube, integrated in secondary display
- Auxiliary flow, third and fourth function, adjustable through secondary display
- Beacon light, strobe
- Cab, deluxe (standard in Europe, optional in North America)
  - Electrically adjustable external heated mirrors (2)
  - Secondary display to enable features and adjust parameters
  - Sunscreen, front and rear
- Camera, rearview (standard in Europe)
- Cold start package
- Counterweight, (heavy and logger)
- Coupler, (Fusion and ISO 23727)
- Debris packages (low, medium, high)
- Fenders (extended cover and full coverage)
- Guarding (machine and operator)
- Linkage, high lift
- Lights, auxiliary, halogen or LED with engine compartment lights
- Object Detection
- Product Link ELITE with capabilities for software push, data logging, histogram and trend mapping
- Radio packages
- Ride Control System, adjustable through secondary display
- Seats
  - Deluxe seat – fully adjustable fabric air suspension seat with mid backrest and mechanical lumbar support
  - Premium seat – fully adjustable leather and fabric air suspension with high backrest and air lumbar support. Seat is heated and ventilated on bottom cushion and backrest.
- Steering
  - Dual mode and secondary
- NOTE: Not all features are available in all regions.

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