

# 6050/6050 FS

Hydraulic Shovel



## Engine\*

Engine Model	2 × Cummins K1500E or 2 × Cummins QSK 38
Gross Power – SAE J1995	1880 kW    2,520 hp
Net Power – SAE J1349	1880 kW    2,520 hp

\*Electric drive option available (1600 kW) on 6050 AC/6050 AC FS

## Bucket

Bucket Capacity – Front Shovel (heaped 2:1)	26.0 m <sup>3</sup>	34.0 yd <sup>3</sup>
Bucket Capacity – Backhoe (heaped 1:1)	28.0 m <sup>3</sup>	36.6 yd <sup>3</sup>

## Operating Specifications

Bucket Payload – Front Shovel	47 tonnes	52 tons
Bucket Payload – Backhoe	50 tonnes	55 tons
Operating Weight – Front Shovel	528 tonnes	582 tons
Operating Weight – Backhoe	537 tonnes	592 tons

## 6050/6050 FS Features

*With over two decades of experience in the field, in nearly every application and climate type across the globe, the 6050/6050 FS has established itself as the industry benchmark for durability, reliability, and productivity. With its superior accessibility to major components, as well as our unique boom-mounted main valve block, maintenance of the 6050/6050 FS can be performed more quickly to reduce downtime.*

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## Every Day Matters, Every Load Counts

We understand the challenges you face, the importance of reliability, and the relationship between uptime and productivity. That's why we continually strive to produce the safest, most reliable and productive hydraulic mining shovels possible. Offering the widest payload range of any manufacturer in the industry, the ability to optimally pair with our popular line of mining trucks, and the support of our world-class Cat dealer network, we are uniquely positioned to partner with you to help achieve your productivity targets. We understand what matters to you. Our hydraulic mining shovels are built with you in mind. Because in mining, every day matters and every load counts.

## Meeting Your Site Specific Needs with a Choice of Robust Drive System Options

Giving you the option to choose the drive system best suited for your operation, the Cat 6050/6050 FS can be equipped with either two diesel engines for greater mobility, or an electric drive for better efficiency.

- **Reliable Diesel Engines**

Delivering durable, reliable power that will keep your 6050/6050 FS producing, the diesel engines currently in use were developed for mining and routinely achieve high uptime in mining applications. Two different engine models are available; one for countries with more regulated emissions, and another for countries with less regulated emissions.

- **Efficient Electric Drive System on 6050 AC/6050 AC FS**

Providing a lower cost-per-ton alternative to diesel powered hydraulic mining shovels, our electric drive option maintains the ruggedness you need and offers superior availability since no refueling and less service is required.

The 6050 AC/6050 AC FS is the ideal solution for operations that do not require a great deal of mobility and value a low cost-per-ton model.

# Drive Systems

## Balanced Combination of Power and Efficiency





## Twin-engine Concept

### Stay Up and Running More Consistently

#### Keep Producing and Ensure the Safety of Your Operators, Even During Single Engine Loss

You will realize enhanced safety, greater uptime, more productivity, and better serviceability as a result of our twin engine concept.

- **Enhanced Safety**

- The ability to move your shovel to a safe area for repair, away from highwalls, blast zones, or other safety hazards, is still possible with the use of a single engine.

- **Greater Uptime and More Productivity**

- 65% of full production can still be achieved with the use of a single engine. This is due to the shovel's continued ability to exert maximum digging forces, to lower the front attachment without requiring engine power (i.e., pressure-free), and to recuperate energy via its closed-loop swing circuit.

- **Better Serviceability**

- Troubleshooting is greatly simplified and expedited with the ability to compare one engine versus the other.



# TriPower System

Superior Digging Capability and Bucket Fill Factors



## **Dig More Effectively with Our Unique TriPower Front Shovel Design**

You will experience safer, easier and faster front shovel operation with TriPower, a system proven on over a thousand Cat hydraulic mining shovels worldwide. Generating superior mechanical leverage and control, our FS configured hydraulic mining shovels utilize a unique boom design that employs rotatable triangular rockers. This design facilitates quicker cycle times, increased effective lifting force, constant boom momentum, automatic constant bucket angle, and automatic roll-back limiter.

- **Quicker Cycle Times**

- Faster lifting speeds are achieved, because the design enables the use of smaller-diameter boom cylinders.

- **Increased Effective Lifting Force**

- Design transfers digging forces into the superstructure, creating supporting boom momentum in addition to momentum that is generated hydraulically.

- **Constant Boom Momentum**

- Allows smaller boom cylinders for higher lifting speed.
- Keeps lifting speed constant.
- Enables the shovel to lift a single load along the entire digging distance.
- No retracting of stick cylinders is required, ensuring that all hydraulic pumps are supplying the boom-up function.

- **Automatic Constant Bucket Angle**

- Material spillage is avoided during boom lifting, because the filled bucket automatically maintains a constant bucket angle.
- On conventional kinematics the operator has to control manually the bucket position during lifting which cut in half the available oil flow for the boom cylinders.

- **Automatic Roll-back Limiter**

- Preventing material spillage back on to the operator's cab and machine superstructure, our system ensures that the bucket is always in a safe position, without operator control/manipulation, when it is at maximum height.
- The boom cylinder continues to receive maximum oil flow, because the operator does not need to activate the bucket cylinder.



# Hydraulic System

Easy Serviceability and Greater Productivity

### **Straightforward, Safe System Maintenance**

Ensuring neat organization for safe operation, easy inspection, and fast service, and reducing the number of hoses needed, the main valve block is located on top of the boom.

### **Faster Cycle Times**

Faster cycle times are realized, because float valves are used to lower the boom instead of engaging pumps. This facilitates faster boom movements and allows other operating functions to occur simultaneously, such as bucket curl and stick in/out.

### **Greater Control**

Your operators will experience greater control with our five circuit hydraulics, allowing for two cylinder motions, two travel motions, and swing to be controlled simultaneously.



## Independent Oil Cooling System

More Effective Oil Cooling for  
Extended Component Life

### **Protect and Extend the Life of Your Hydraulic Components and Seals**

Providing a more efficient means of cooling, particularly in demanding applications, our unique independent oil cooling system will extend the life of your hydraulic mining shovel's components.

### **More Efficient Oil Cooling**

Our system is independent of return oil, achieving efficiency through the utilization of dedicated pumps that provide cooling capacity as needed, whether the engine is idling or under load. That means optimum oil temperature is being maintained, even while your operator waits for the next truck to load. Competitive hydraulic mining shovels only provide cooling when the machine is working and the engine is under load.

Additional efficiency is achieved via our thermostatically controlled radiator fan speed. The fans do not run until oil temperature exceeds a temperature of 50° C (122° F), saving energy.

### **Optimal Oil Temperature Maintained**

The highly efficient oil cooling system ensures that the oil temperature is only 25° C to 30° C (45° F to 54°F) higher than the ambient temperature. Thus the hydraulic oil working temperature remains within the optimal operating viscosity range of 50° C to 70° C (122° F to 158° F).



## Pump Managing System

Enhanced Efficiency, Component Life,  
and Control Response

### **Experience Improved Machine Control and Component Life, while Reducing Fuel Consumption and Noise Emission, with Our Intelligent Pump Managing System**

Delivering optimal performance, our pump managing system continuously evaluates actual engine and hydraulic operating values against set values, and adjusts pump output accordingly. This results in efficient use of the engine for greater productivity.

Pump managing system advantages include:

- Best possible utilization of engine output and engine overload avoidance via electronic load limit regulation
- Less energy consumption and less thermal load on hydraulic oil with zero oil flow regulation for main pumps
- Less fuel consumption and lower noise emission via automatic RPM reduction
- Reduced component wear and lower noise emission with automatic oil flow reduction for closing/opening of bucket clam
- Protection of components with automatic oil flow reduction if hydraulic and/or engine coolant temperature exceed set maximum
- Improved operator control response via on-demand pump flow

## **Load More Material, at Lower Cost, with the Energy Recovery Capability of Our Closed-loop Swing System**

Delivering faster cycle times and improved energy efficiency, while also generating less heat, our closed-loop swing circuit provides distinct advantages over competitive machines utilizing open-circuit swing systems.

### **Greater Efficiency Via Energy Recovery**

Kinetic energy captured during the swing motion is fed back into the system during deceleration, providing more power to drive the main and auxiliary pumps. Energy is saved during deceleration, because braking occurs via counteracting controls, as opposed to throttles used in open circuit swing systems.

### **Energy Savings During Acceleration**

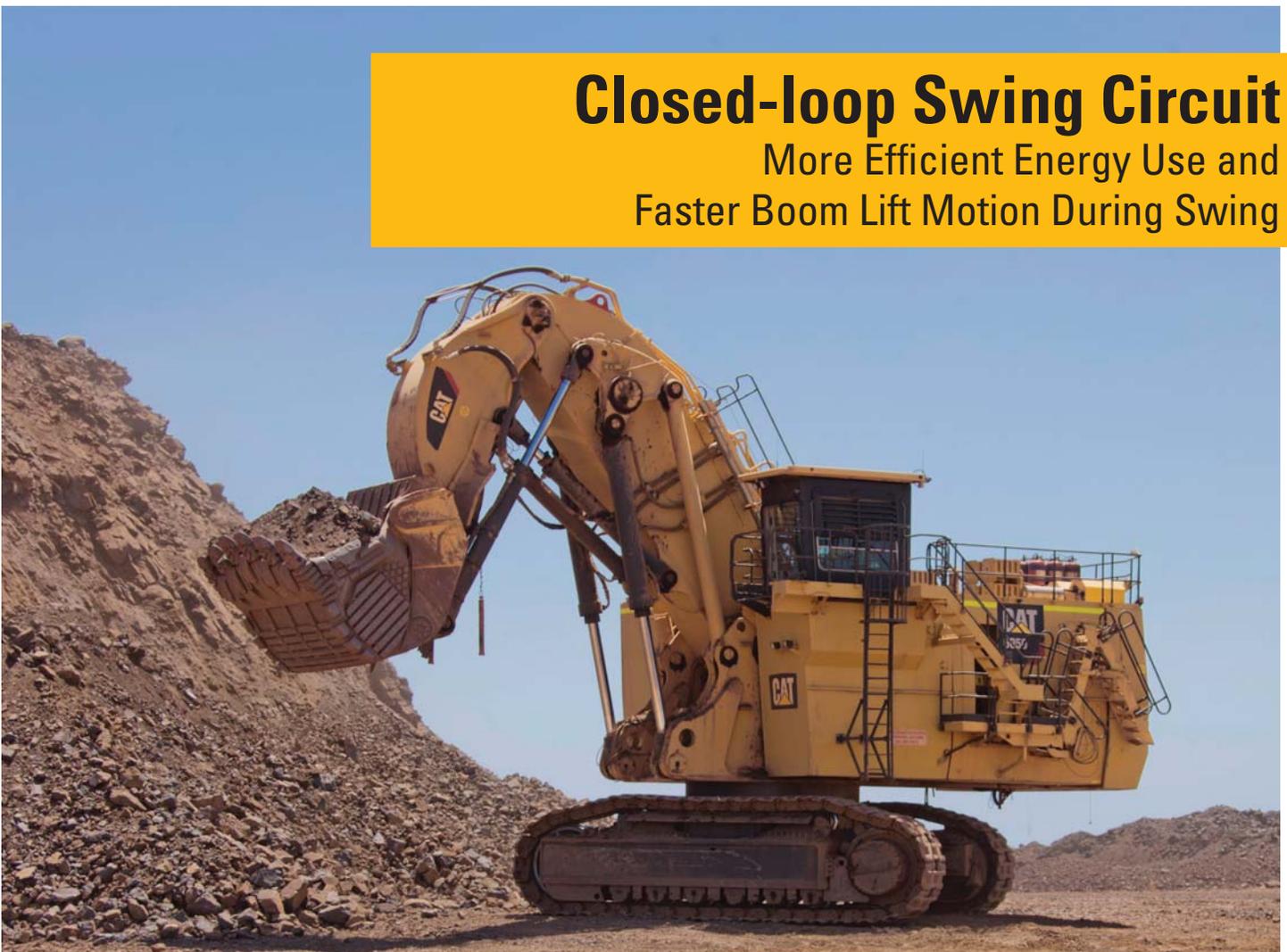
Energy is saved during acceleration via torque control, providing a pressure balance valve that controls the swing pump against pressure in the closed-loop swing circuit, ensuring that only the minimum necessary oil flow is utilized at any given time.

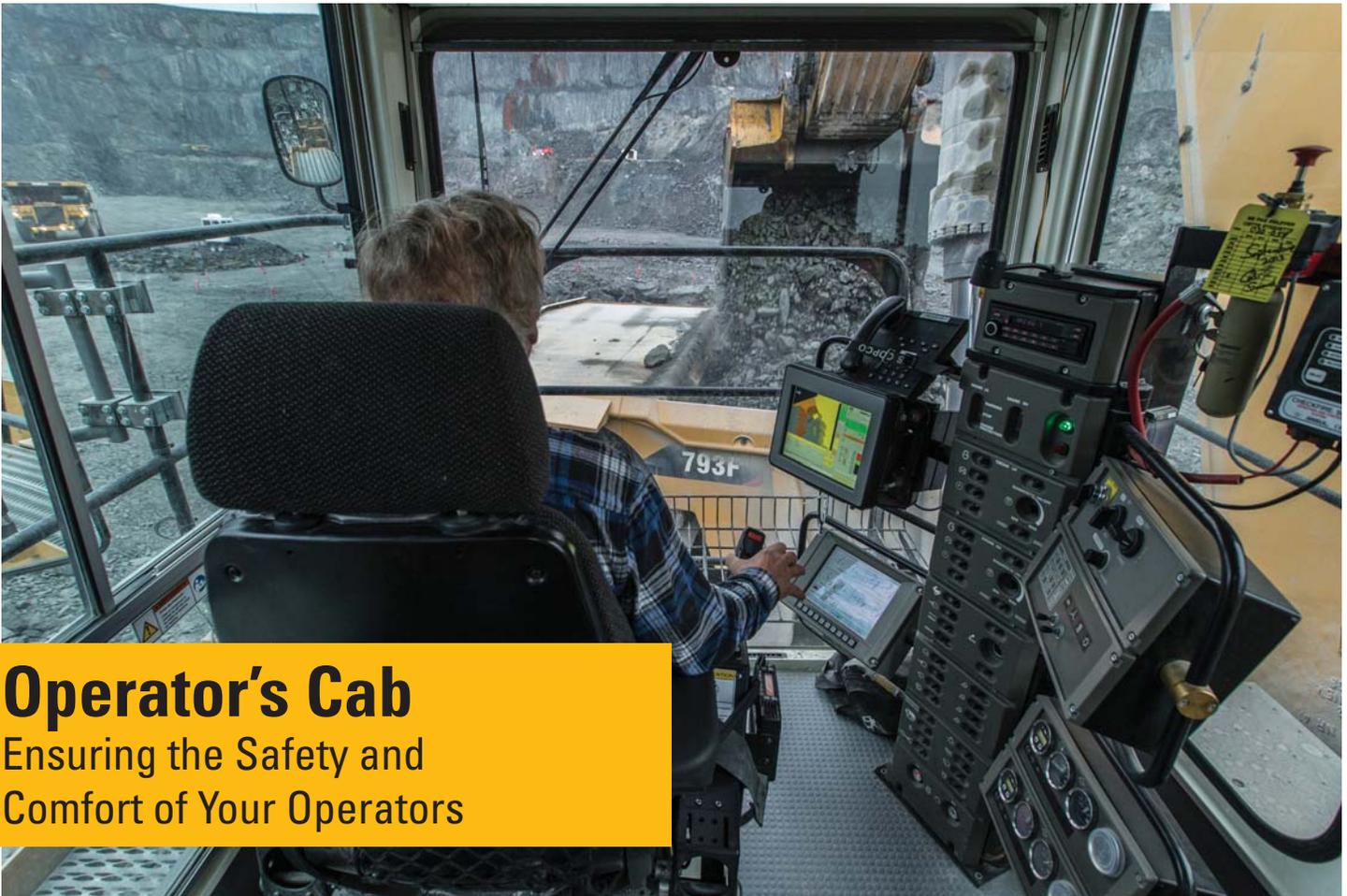
### **Faster Cycle Times**

Faster boom lift motion during swing is achieved with our closed-loop swing system, increasing overall productivity.

# **Closed-loop Swing Circuit**

More Efficient Energy Use and  
Faster Boom Lift Motion During Swing





## Operator's Cab

Ensuring the Safety and Comfort of Your Operators

### Get Peak Operator Performance with Our Safe and Comfortable Operator's Cab

We understand that the most important factor in your hydraulic shovel's effectiveness is the performance of its operator. To help make their workday as productive as possible, we've incorporated safety and comfort features into the 6050/6050 FS operator's cab.

#### Protection for Your Operator; Every Day, Every Shift

- Safety glass is used for all cab windows, and armored glass for the windshield.
- Operator's seat is equipped with an integrated safety switch that automatically neutralizes the hydraulic controls when the operator leaves the seat.
- Position of cab module, approximately 7.6 m (24 ft 11 in) high, provides excellent visibility of the digging and loading areas.
- Cab meets Falling Object Protection System (FOPS) and DIN ISO 3449 standards.

#### Supporting Peak Operator Performance with Comfort Features

- Pneumatically cushioned, multi-adjustable operator's seat.
- Large, transfective color display provides vital machine monitoring and diagnostic data for convenient troubleshooting and service assistance.
- Enhanced control response and servo adjustment capability via electro-hydraulic servo control.

# Electronic Control System

## Operate with Confidence



### Enhanced Control Response and Optimized Hydraulic Engine Load Management

Help your team meet productivity and performance standards with our intuitive, informative on-board electronics.

### Electro-hydraulic Servo Control

- **Enhanced Control Response**

- The system relays actuating signals from the joysticks, delivering fast and precise machine reactions that reduce operator fatigue.

- **Increased Up-time**

- Up-time is increased as a result of simplified troubleshooting and advanced diagnostic capabilities.

- **Greater Operator Comfort**

- Easier setting of servo control characteristics allow operators to adjust to their preference.

- **Clean and Quiet Cab Environment**

- No hydraulic lines are present in the cab or the cab module, ensuring a clean arrangement with less noise emission.

# Cat MineStar System and Technology Solutions

Evolving Your Mine for Greater Safety and Productivity



## Helping You Enhance Safety and Productivity Through Technology

Aimed at enhancing the productivity and profitability of your hydraulic mining shovel, we currently offer a combination of Cat MineStar System offerings and Cat hydraulic mining shovel technology solutions.

## Cat MineStar System

Helping you achieve your goals for enhanced mine site safety, improved efficiency, reduced operating costs, and greater profitability, the Cat MineStar System provides the most comprehensive suite of mining technology products in the industry. It consists of a number of configurable capability sets – Fleet, Terrain, Detect, Health, and Command – that allow you to scale the system to your mine site needs. Cat MineStar System helps you manage everything from material tracking to sophisticated real-time fleet management, machine health systems, autonomous equipment, and more.

The Cat 6050/6050 FS is currently able to utilize three of the Cat MineStar System capability sets:

- **Fleet**

- Fleet provides real-time machine tracking, assignment and productivity management, providing a comprehensive overview of all your asset operations from anywhere in the world.

- **Terrain**

- Terrain enables high-precision management of drilling, dragline, grading and loading operations through the use of guidance technology. It increases machine productivity and provides you real-time feedback for improved efficiency.

- **Detect**

- Detect provides equipment operators with enhanced awareness for increased site safety, using a combination of radars, an in-cab display, and multiple cameras.

The remaining Cat MineStar System capability sets are currently under development for the Cat hydraulic mining shovel product line.

## Hydraulic Mining Shovel Technology Solutions

- **Monitoring and Diagnostic System**

- Enhancing diagnostic capabilities and providing detailed troubleshooting functions, our Board Control System uses sensors throughout the machine to monitor operating data, record faults, and notify the operator audibly and visually. This promotes the earliest possible detection of faults and allows for timely maintenance planning and assistance for speedy repair.





# Loading/Hauling Efficiency

Move More Material with Optimal Pass Match Pairings

### Achieve Targeted Loading/Hauling Production with Perfectly Paired Cat Hydraulic Mining Shovels and Mining Trucks

For full truck payloads with minimum loading time, an efficient loading/hauling system begins with an optimized equipment match. Cat hydraulic mining shovels are matched with Cat mining trucks to maximize volume of material moved at the lowest operating cost per ton.

#### 6050/6050 FS Pass Match with Cat Mining Trucks

	785D/785C	789D	MT4400D AC	793D/793F	MT5300D AC
	136 tonne (150 ton)	181 tonne (200 ton)	221 tonne (244 ton)	227 tonne (250 ton)	290 tonne (320 ton)
6050/6050 FS	3	4	5	5	6

# Front Attachment Options and Structures

## Bolstering Your Investment with Robust and Durable Structures



### **Rugged Front Attachment Options Designed and Fabricated to Withstand Your Extreme Mining Conditions**

To extend service life and ensure that your shovel keeps producing, our front shovel attachment structures are designed for durability and dependability. Extended performance in the harsh mining conditions you face daily is accomplished through selection of high-strength steels and rugged castings, joined and thermally stress-relieved, to help you achieve your productivity targets.

### **Front Attachment Structures Include:**

- Heavy castings at all pivot points
- Better flow of forces and less welding seams, as top chords are made of one bend plate
- Entire boom and stick are stress relieved after welding
- Welding procedures allow for internal welding (double prep weld)





## Swing System

Longer Component Life for Better  
Swing System Reliability

### **More Reliable Swing Component Life**

Extending component life and ultimately improving machine uptime, our swing system includes a triple-race swing roller bearing with internal gearing connected to an automatic lubrication system.

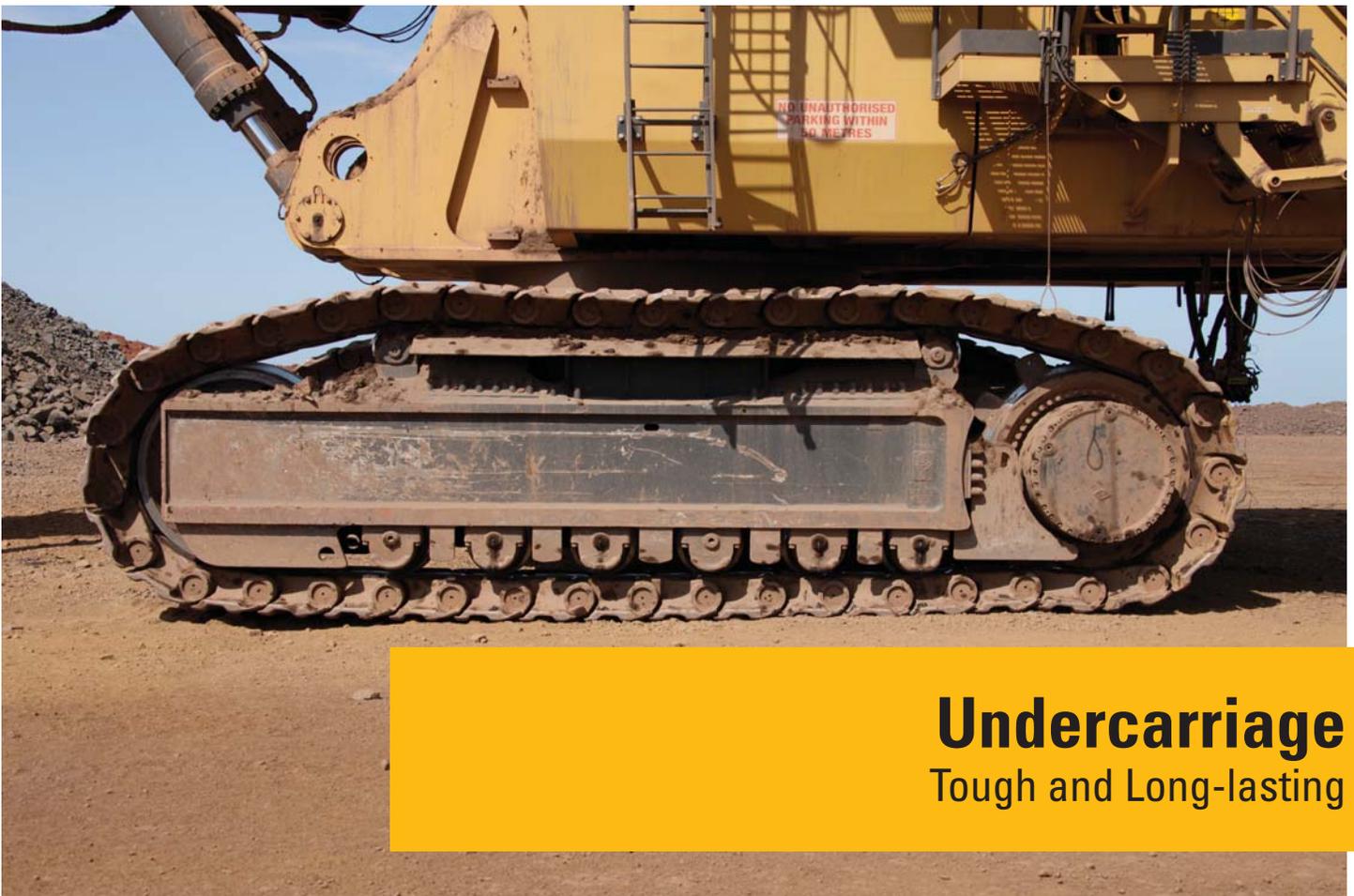
For added reliability, all lube lines are located inside the roller bearing for maximum protection.

### **Service Friendly**

Easier maintenance is afforded by the free accessibility of swing gears and rotary distributor.

## Less Wear and Tear on Crawler Components

Extending track life and improving overall machine reliability, our undercarriages are engineered with extensive use of finite element analysis, steel structures are optimized, travel motors are well-protected by strong cover plates and hinged door covers, and a unique robust track chain incorporates a combined pad/link design. Further extending track life, a state-of-the-art track tensioning system with membrane accumulator automatically adapts the tensioning of the tracks, depending upon operating conditions.



**Undercarriage**  
Tough and Long-lasting

# Safety

## Designed with Your Safety as Our Top Priority

Sharing your commitment to safety, and driven by our commitment to Zero Harm, we work tirelessly to design the safest machines possible to protect your most important asset; your employees.

Some examples of the safety-enhancing features of the Cat 6050/6050 FS hydraulic mining shovel include the following:

### Machine Access

- Hydraulically operated boarding ladder with emergency lowering via nitrogen accumulator ensures that ladder remains operational even when engines shut off.
- Machine swing and propel capability is switched-off when ladder is in down position.

### Precise Bucket Control

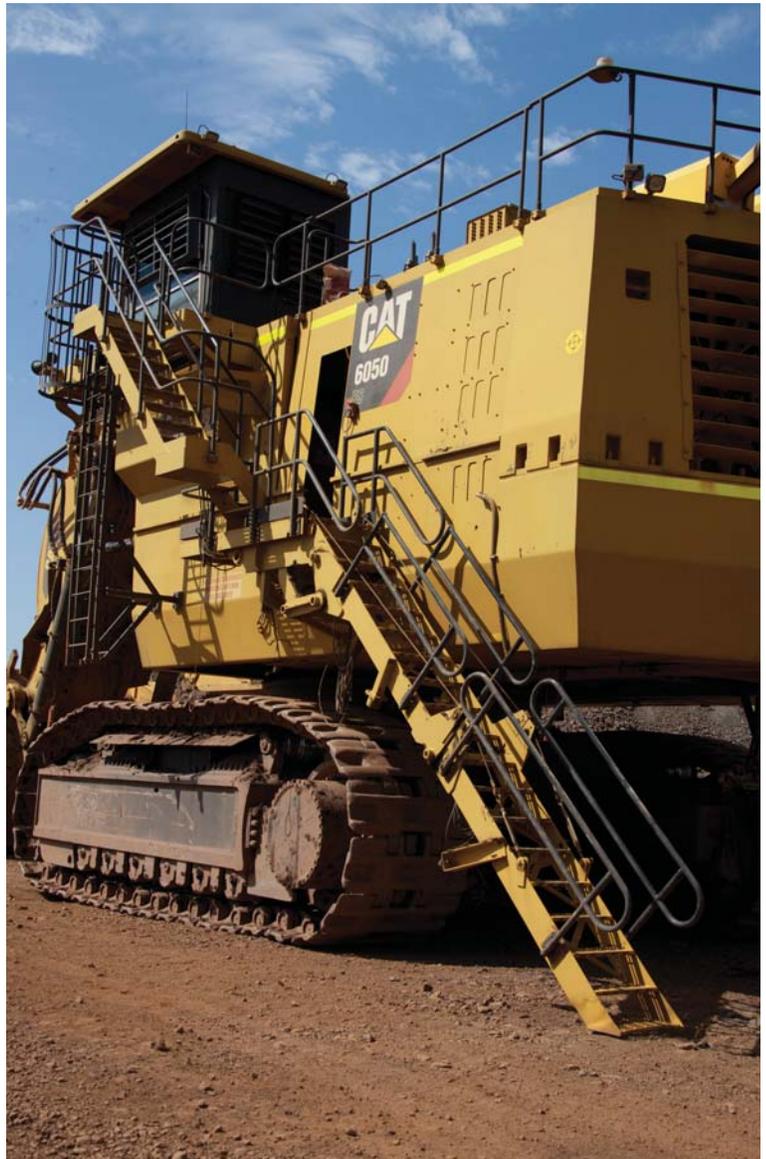
- Minimizing the potential for material spill on to the attachment or cab, the TriPower automatic roll-back limiter prevents the bucket from being curled back too far.

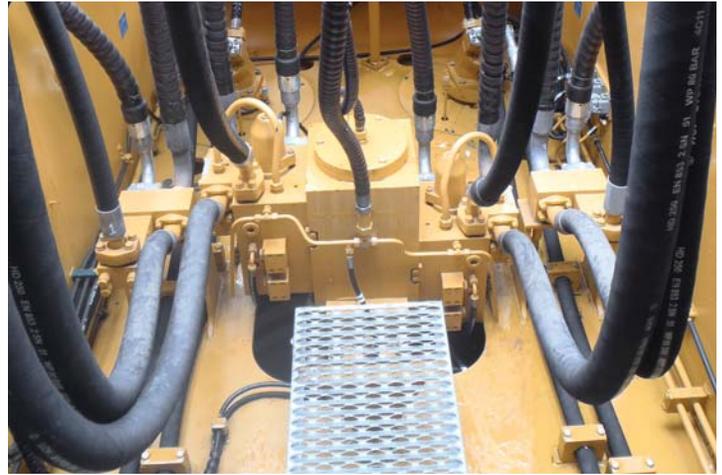
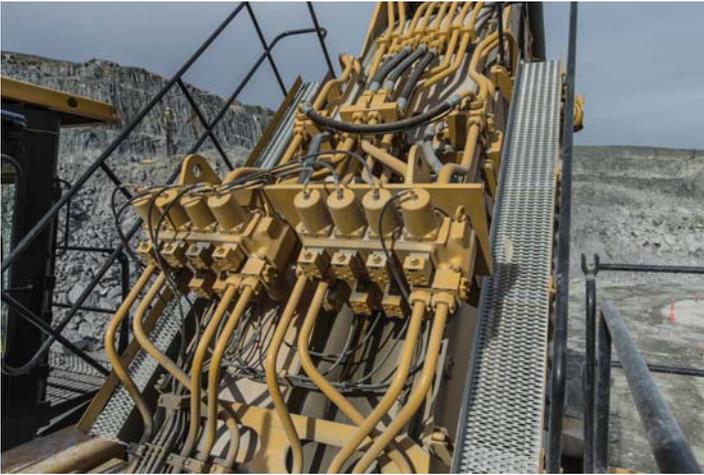
### Operator Environment

- Switch in seat cushion to automatically neutralize the hydraulic controls when operator leaves the seat.
- FOPS and DIN ISO 3449 safety standards integrated into cab structure.
- Safety glass windows, armored windshield and sliding side window.

### Emergency Shut-offs

- An easily accessible, standard shut-off switch located in the cab shuts down the electrical system in case of emergencies.
- Additional shut-off switches are located on the machine, in the machine house or accessible from the ground with pull ropes.





## Serviceability

### Designed to Get You Back to Work Fast

Lowering your operating costs and maximizing your hydraulic mining shovel's uptime and productivity is of supreme importance to us. To that end, we've made vital components more accessible and designed simpler systems to make maintenance activities quicker and easier.

#### **Open, Spacious Access to Components**

- Facilitating easier maintenance, exceptional accessibility is provided to systems like the swing motor, swing gearbox and rotary distributor in the well organized superstructure. The engine is accessible from three sides.
- Easily accessed by walkways on both sides, the boom-mounted main valve block, a feature unique to Cat hydraulic mining shovels, provides a clean layout and reduces the number of hoses leading from the superstructure to the attachment.

#### **Simple Hydraulic System with Main Valve Block Positioned on Boom**

- Ensuring neat organization for safe operation, easy inspection and fast service, the design of our hydraulic system significantly reduces the total number of frequently moving hoses from the superstructure to the attachment.
- Longer hose life via improved routing in accordance with MDG design standards.

#### **Easy Ground-level Fuel and Fluid Replenishment**

- Quick fuel and fluid replenishment is made easy with a retractable service station underneath the engine module, accessible at ground-level.

#### **Improved Drive Train Troubleshooting**

- Twin-engine design facilitates trouble shooting of drive trains, as one engine can be compared to the other.



# Customer Support

Stay Up and Running with Service and Support from Our Unmatched Global Network

### Commitment Makes the Difference

Cat dealers offer a wide range of solutions, services and products that help you lower costs, enhance productivity and manage your operation more efficiently. From the time you select a piece of Cat equipment until the day you trade or sell it, the support you get from your Cat dealer makes the difference.

### Dealer Capability

Cat dealers provide the level of support you need, on a global scale. Dealer expert technicians have the knowledge, experience, training and tooling necessary to handle your repair and maintenance needs, when and where you need them.

### Product Support

When Cat products reach the field, they are supported by a worldwide network of parts distribution facilities, dealer service centers and technical training facilities to keep your equipment up and running.

Cat customers rely on prompt, dependable parts availability through our global dealer network, ready to meet your needs 24/7.

### Service Support

Every piece of Cat equipment is designed and built to provide maximum productivity and operating economy throughout its working life. Cat dealers offer a wide range of service plans that will maximize uptime and return on your investment, including:

- Preventive Maintenance Programs
- Diagnostic Programs, such as Scheduled Oil Sampling and Technical Analysis
- Rebuild and Reman Option
- Customer Support Agreements

### Application Awareness

Operating and maintenance costs are influenced by many application and site-specific factors, such as: material density and fragmentation, payload, bench height, truck positioning, ground conditions, amount of travelling and maintenance. Your Cat dealer can provide you with an understanding of the effects application characteristics and operating techniques have on maintenance and operating costs.

### Operation

Your Cat dealer can arrange training programs to help operators improve productivity, decrease downtime, reduce operating costs and enhance safety.



# Sustainability

## Higher Standards for a Better Tomorrow

Meeting the needs of today without compromising the needs of tomorrow is the goal for all Cat machinery. The commitment to helping you operate safely and sustainably is affirmed in the production of the 6050/6050 FS hydraulic mining shovel.

### **Cat Hydraulic Mining Shovel Sustainability:**

- **Electric Power Option**
  - Produces less emissions, heat, and sound, and avoids disposal/replenishment of engine oil and oil filters.
- **Energy Recovery**
  - Emit less heat and improve energy efficiency via the energy recovery capability of the closed-loop swing circuit.
- **Rebuilds**
  - Decrease your energy use and material consumption with a machine that's designed to be rebuilt.

# 6050/6050 FS Hydraulic Shovel Specifications

## General Data

Operating weight		
Face Shovel	528 tonnes	582 tons
Backhoe	537 tonnes	592 tons
Engine output SAE J1995		
Cummins K1500E	1880 kW	2,520 hp
Cummins QSK38	1880 kW	2,520 hp
Standard bucket capacity		
Face Shovel (heaped 2:1)	26.0 m <sup>3</sup>	34.0 yd <sup>3</sup>
Backhoe (heaped 1:1)	28.0 m <sup>3</sup>	36.6 yd <sup>3</sup>

## Features

- TriPower shovel attachment
- Independent oil cooling system
- Spacious walk-through machine house
- 5-circuit hydraulic system
- Electronic-hydraulic servo control
- Board Control System (BCS)
- Torque control in closed-loop swing circuit
- Automatic central lubrication system
- LED working lights

## Operating Weight

6050 FS		
Standard track pads	1400 mm	4 ft 7 in
Operating weight	527 600 kg	1,163,150 lb
Ground pressure	25.9 N/cm <sup>2</sup>	37.5 psi
• Other track pads available on request		
6050		
Standard track pads	1400 mm	4 ft 7 in
Operating weight	537 000 kg	1,183,870 lb
Ground pressure	26.3 N/cm <sup>2</sup>	38.1 psi
• Other track pads available on request		

## Diesel Engines

Version 1 – Cummins K1500E Tier 1		
Make and model	2 × Cummins K1500E	
Total rated net power ISO 3046/1	1880 kW 1,800 min <sup>-1</sup>	2,520 hp 1,800 min <sup>-1</sup>
Total rated net power SAE J1349	1880 kW 1,800 min <sup>-1</sup>	2,520 hp 1,800 min <sup>-1</sup>
Total rated gross power SAE J1995	1880 kW 1,800 min <sup>-1</sup>	2,520 hp 1,800 min <sup>-1</sup>
Number of cylinders (each engine)	12	
Bore	159 mm	6.25 in
Stroke	159 mm	6.25 in
Displacement	37.8 L	2,300 in <sup>3</sup>
Aspiration	Turbocharged and aftercooled	
Maximum altitude without deration – above sea level	2438 m	8,000 ft
Version 2 – Cummins QSK38 Tier 2		
Make and model	2 × Cummins QSK38	
Total rated net power ISO 3046/1	1880 kW 1,800 min <sup>-1</sup>	2,520 hp 1,800 min <sup>-1</sup>
Total rated net power SAE J1349	1880 kW 1,800 min <sup>-1</sup>	2,520 hp 1,800 min <sup>-1</sup>
Total rated gross power SAE J1995	1880 kW 1,800 min <sup>-1</sup>	2,520 hp 1,800 min <sup>-1</sup>
Number of cylinders (each engine)	12	
Bore	159 mm	6.25 in
Stroke	159 mm	6.25 in
Displacement	37.8 L	2,300 in <sup>3</sup>
Aspiration	Turbocharged and aftercooled	
Maximum altitude without deration – above sea level	3200 m	10,500 ft
Emissions	U.S. EPA Flex	
Fuel tank capacity	10 700 L	2,820 gal
<ul style="list-style-type: none"> <li>• Hydraulically driven radiator fan with electronically controlled fan speed</li> <li>• Microprocessed engine control</li> <li>• Heavy-duty air filters with automatic dust evacuation</li> <li>• Two-stage fuel filter including water separator</li> <li>• Additional high-capacity water separator</li> <li>• Pre-lube starting system</li> <li>• Eliminator with centrifuge for engine oil filtration</li> </ul>		

# 6050/6050 FS Hydraulic Shovel Specifications

## Electric Motor – 6050 AC/6050 AC FS

Type	Squirrel cage induction motor
Output	1600 kW
Voltage	6.6 kV ± 10% (other on request)
Rated current $I_N$	174 A (at 6.6 kV)
Frequency	50 Hz (60 Hz on request)
Revolutions	1,500 min <sup>-1</sup> (1,800 min <sup>-1</sup> at 60 Hz)
Starting current	350% of $I_N$ (197% of $I_N$ optional)

- Custom-made electric motor with increased gap between rotor and stator to withstand severe mining conditions
- Power limit control by Pump Management System

## Electrical System (diesel drive)

System voltage	24V
Batteries in series/ parallel installation	6 × 210 Ah – 12V each 630 Ah – 24V in total
Alternators	2 × 175A each

- Battery isolation relays
- Emergency stop switches accessible from ground level, in engine module and in operator's cab
- Ten (10) LED high-brightness working flood lights
  - Eight (8) for working area
  - Two (2) for rear end
- Two (2) LED high-brightness access flood lights
- Thirteen (13) LED service lights

## Hydraulic System with Pump Managing System

Main pumps	4 × variable flow axial piston pumps	
Maximum oil flow		
Diesel version	4 × 912 L/min	4 × 241 gal/min
AC version	4 × 933 L/min	4 × 246 gal/min
Maximum pressure, attachment	300 bar	4,350 psi
Maximum pressure, travel	340 bar	4,930 psi
Swing pumps		
Diesel version	4 × reversible swash plate pumps	
AC version	3 × reversible swash plate pumps	
Maximum oil flow		
Diesel version	4 × 351 L/min	4 × 93 gal/min
AC version	3 × 491 L/min	3 × 131 gal/min
Maximum pressure, swing pumps	350 bar	5,080 psi
Total volume of hydraulic oil		
Diesel version – approximately	7800 L	2,060 gal
AC version – approximately	7300 L	1,930 gal
Hydraulic tank capacity		
Diesel version – approximately	5500 L	1,450 gal
AC version – approximately	5000 L	1,320 gal

- Pump Managing System contains:
  - Electronic load limit control
  - Flow on demand from main pumps depending on joystick position
  - Automatic regulation of main pumps to zero flow without demand
  - Automatic rpm reduction of engine speed during working breaks
  - Reduced oil flow of main pumps at high hydraulic oil temperature or high engine temperature
- Pressure cut-off for main pumps
- Cooling of pump transmission gear oil
- Filters:
  - Full-flow high-pressure filters (100 μm) for the main pumps, installed directly behind each pump
  - High pressure filters (100 μm) for the closed swing circuit
  - Full-flow filters (10 μm) for the complete return circuit
  - Pressure filters (40 μm and 6 μm) for servo circuit
  - Pressure filters (40 μm) for the feed pumps of the closed swing circuit
  - Transmission oil filters (40 μm)

# 6050/6050 FS Hydraulic Shovel Specifications

## Hydraulic Oil Cooling

### Oil flow of cooling pumps

Diesel version	4 × 488 L/min	4 × 129 gal/min
AC version	4 × 491 L/min	4 × 130 gal/min
Diameter of fans	4 × 1170 mm 4 × 46 in	

- Cooling system is fully independent of all main circuits, i.e. controlled cooling capacity is available whenever engine is running
- Gear-type cooling pumps supplying high-volume, low-pressure oil to fans and aluminum coolers
- Fan speed and flow of oil to the coolers are thermostatically controlled
- Extremely high cooling efficiency to ensure optimum oil temperature

## Swing System

Swing drives	4 compact planetary transmissions with axial piston motors
Parking brakes	Wet multiple disc brake, spring-loaded/hydraulically released
Maximum swing speed	
Diesel version	3.8 rpm
AC version	4.0 rpm
Swing ring	Triple-race roller bearing with sealed internal gearing

- Closed-loop swing circuit with torque control
- Hydraulic braking of the swing motion by counteracting control
- All raceways and the internal gearing of swing ring supplied by automatic central lubrication system
- Dirt wipers at swing ring to prevent build-up of debris between swing ring and carbody

## Retractable Service Station

Retractable service station installed underneath the engine module and easily accessible from ground. Equipped with:

- Quick couplings for:
  - Diesel fuel
  - Engine coolant – left/right
  - Pump transmission gear oil – left/right
  - Engine oil (oil pan) – left/right
  - Engine oil (additional tank – optional) – left/right
  - Hydraulic oil tank
  - Grease container
- Cat® jump-start socket
- Indicator lights for fuel tanks left/right full and grease container full

## Operator's Cab

Operator's eye level – approximately	7.6 m	24 ft 11 in
Internal dimensions		
Length	2200 mm	7 ft 3 in
Width	1600 mm	5 ft 3 in
Height	2150 mm	7 ft 1 in

- Under roof mounted heating ventilating and air conditioning system
- Pneumatically cushioned and multi-adjustable comfort seat with lumbar support, seat heating, safety belt, head and armrests
- Switch in seat cushion to automatically neutralize the hydraulic controls when operator leaves the seat
- Joystick controls integrated in independently adjustable seat consoles
- Fold-away auxiliary seat with safety belt
- FOPS (rock guard; approved according to DIN ISO 3449) integrated into cab structure
- All-round safety glass, armored windshield and sliding side window
- Windshield with parallel intermittent wiper/washer
- Roller blinds at all windows
- External sun shields at side and rear windows
- Robust instrument panel including large colored BCS screen with transfective technology
- Board Control System (BCS) electronic monitoring and data logging system for vital signs and service data of engines, hydraulic systems and lubrication systems
- Machine access via retractable boarding ladder, hydraulically operated
- Emergency ladder mounted to the A-frame
- Emergency rescue seat

# 6050/6050 FS Hydraulic Shovel Specifications

## Undercarriage

Travel speeds (2 stages)		
1st stage – maximum	1.6 km/h	0.99 mph
2nd stage – maximum	2.3 km/h	1.44 mph
Maximum tractive force	2576 kN	578,900 lbf
Gradeability of travel drives – maximum	50%	
Track pads (each side)	39	
Bottom rollers (each side)	6	
Support rollers (each side)	2 plus a skid plate in between	
Travel drives (each side)	1 planetary transmission with 2 two-stage axial piston motors	
Parking brakes	Wet multiple disc brake, spring-applied/hydraulically released	

- Cast double-grouser combined pad links with bushings connected by hardened full floating pins
- All running surfaces of sprockets, idlers, rollers and pad links, as well as teeth contact areas of sprocket and pad links, are hardened
- Bottom rollers are connected to the automatic lubrication system
- Fully hydraulic, self-adjusting track tensioning system with membrane accumulator
- Automatic hydraulic retarder valve to prevent over-speed on downhill travel
- Acoustic travel alarm

## Automatic Lubrication System

Capacity of grease container	1000 L	264 gal
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- Dual-circuit system with hydraulically driven heavy-duty pumps and electronic time relay control to adjust the pause/lube times
- Connected to the lubrication system are:
  - raceways of the swing roller bearing
  - two greasing pinions for the internal gearing of the swing ring
  - pivot points of attachment, bucket and cylinders
  - bottom rollers of undercarriage
- System failures displayed by Board Control System
- Grease filters (200 µm) between service station and container, as well as directly behind grease pump

## Attachments

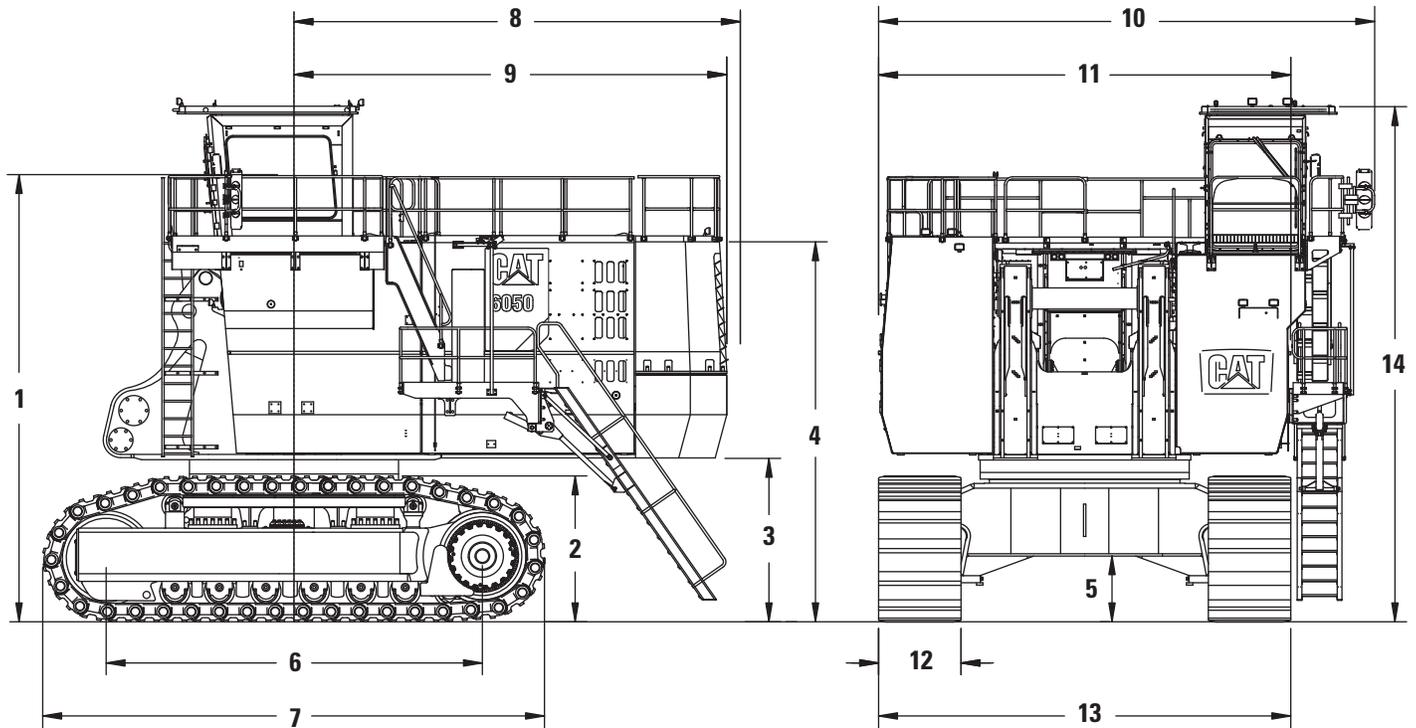
- Booms and sticks are torsion-resistant, welded box design of high tensile steel with massive steel castings at pivot areas
- Welding procedures allow for internal counter-welding (double prep weld) wherever possible
- Booms and sticks are stress-relieved after welding
- Inspection hole in booms
- Guards for shovel cylinders (FS)
- Catwalks with rails at booms
- Pressure-free lowering of boom (FS and BH) and stick (FS) by means of a float valve
- Shovel attachment with unique TriPower kinematics ensuring the following main features:
  - Horizontal automatic constant-angle bucket guidance
  - Vertical automatic constant-angle bucket guidance
  - Automatic roll-back limiter to prevent material spillage
  - Kinematic assistance to hydraulic forces
  - Constant boom momentum throughout the entire lift arc
  - Crowd force assistance
- All buckets (FS and BH) are equipped with a wear package consisting of:
  - Special liner material covering main wear areas inside and outside of bucket
  - Lip shrouds between teeth
  - Wing shrouds on side walls
  - Heel shrouds at bottom edges
- Special wear packages for highly abrasive materials on request

# 6050/6050 FS Hydraulic Shovel Specifications

## Dimensions

All dimensions are approximate.

Dimensions and weights of AC machine differ slightly. Separate drawings, dimensions and weights can be provided upon request.



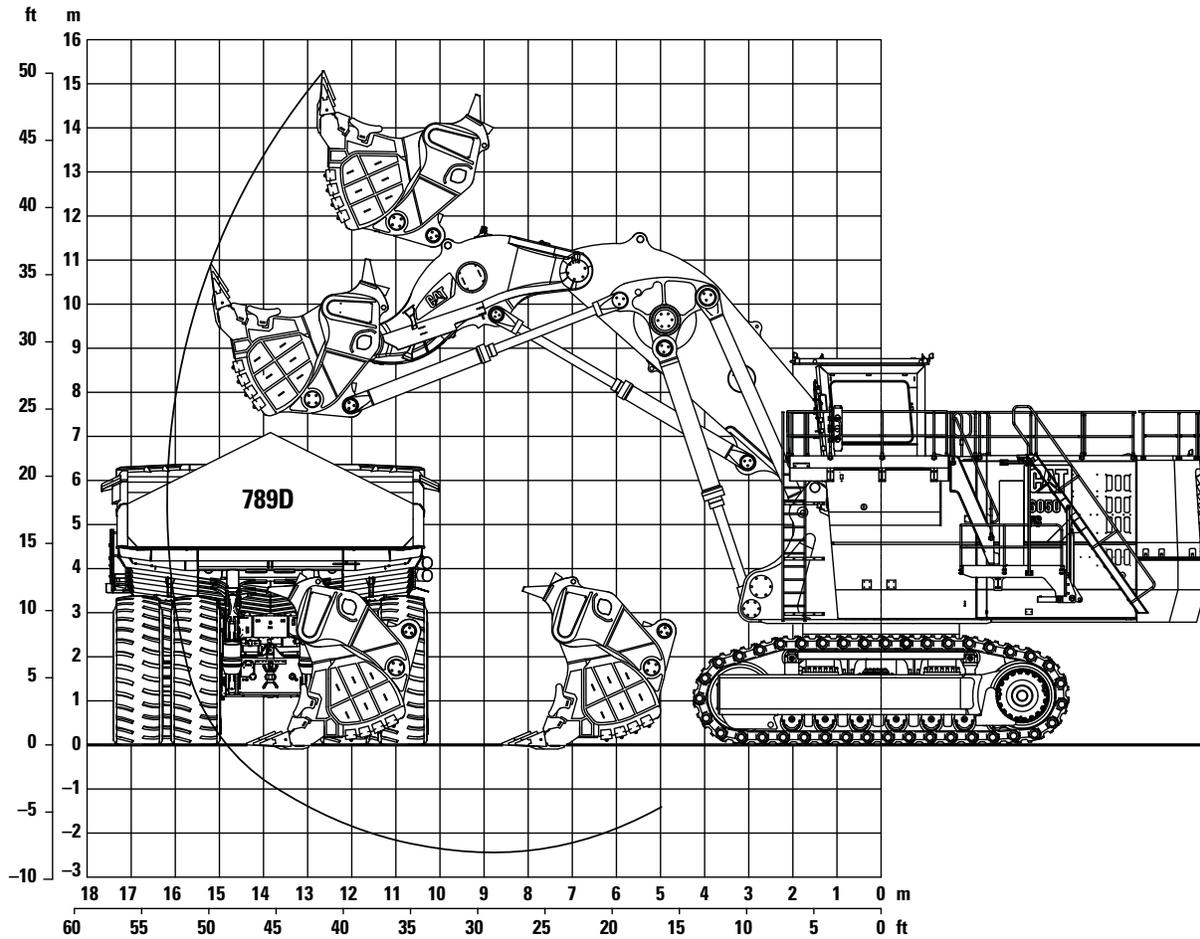
1	7600 mm	24 ft 11 in
2	2480 mm	8 ft 2 in
3	2780 mm	9 ft 1 in
4	6460 mm	21 ft 3 in
5	1120 mm	3 ft 8 in
6	6400 mm	21 ft 0 in
7	8540 mm	28 ft 0 in

8	7580 mm	24 ft 10 in
9	7350 mm	24 ft 1 in
10	8430 mm	27 ft 8 in
11	7000 mm	23 ft 0 in
12	1400 mm	4 ft 7 in
13	7000 mm	23 ft 0 in
14	8760 mm	28 ft 9 in

# 6050/6050 FS Hydraulic Shovel Specifications

## Working Range – TriPower Face Shovel Attachment (FS)

All dimensions are approximate.



<b>Boom</b>	<b>8.0 m</b>	<b>26 ft 2 in</b>	<b>Working Range</b>	
<b>Stick</b>	<b>5.1 m</b>	<b>16 ft 9 in</b>	Maximum digging height	15.3 m 50 ft 2 in
<b>Digging Forces</b>			Maximum digging reach	16.2 m 53 ft 2 in
Maximum crowd force	1930 kN	433,730 lbf	Maximum digging depth	2.4 m 7 ft 10 in
Maximum crowd force at ground level	1650 kN	370,800 lbf	Maximum dumping height	11.8 m 38 ft 9 in
Maximum breakout force	1530 kN	343,840 lbf	Crowd distance on level	5.8 m 19 ft

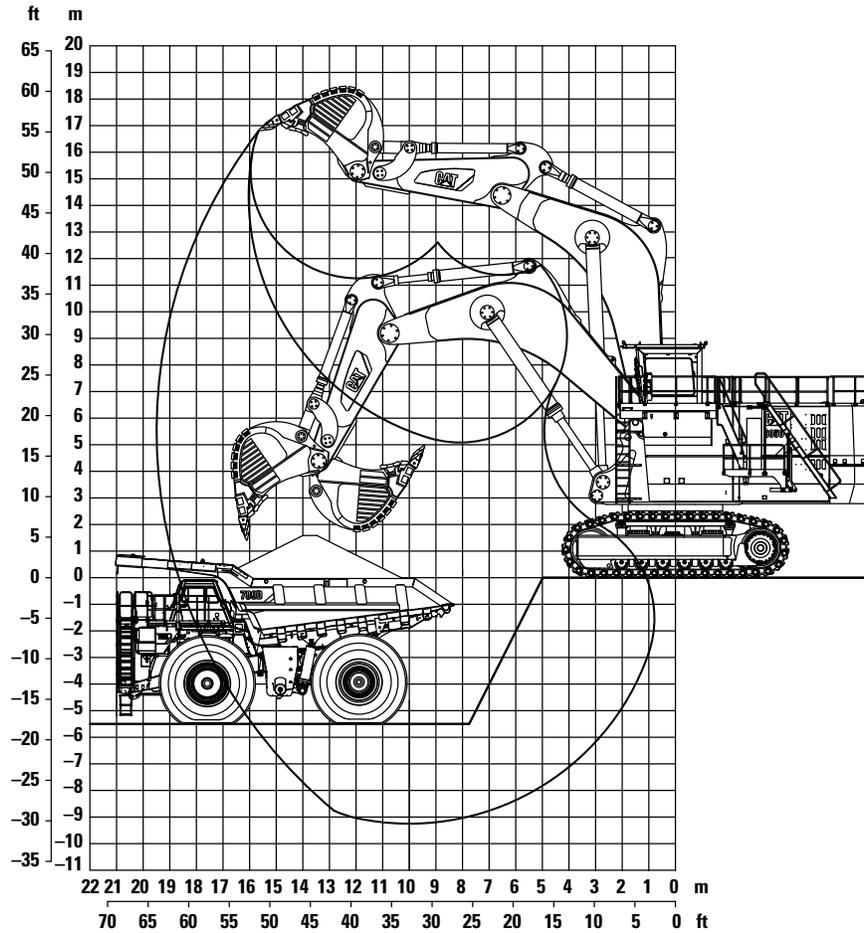
### Face Shovels

Type	Iron Ore Shovel		Heavy Rock Shovel		Heavy Rock Shovel		Standard Rock Shovel		Light Rock Shovel	
Capacity heaped 1:1	21.0 m <sup>3</sup>	27.5 yd <sup>3</sup>	24.5 m <sup>3</sup>	32.0 yd <sup>3</sup>	26.5 m <sup>3</sup>	34.7 yd <sup>3</sup>	30.1 m <sup>3</sup>	39.4 yd <sup>3</sup>	32.3 m <sup>3</sup>	42.2 yd <sup>3</sup>
<b>Capacity heaped 2:1</b>	<b>18.0 m<sup>3</sup></b>	<b>23.5 yd<sup>3</sup></b>	<b>21.0 m<sup>3</sup></b>	<b>27.5 yd<sup>3</sup></b>	<b>23.0 m<sup>3</sup></b>	<b>30.1 yd<sup>3</sup></b>	<b>26.0 m<sup>3</sup></b>	<b>34.0 yd<sup>3</sup></b>	<b>28.0 m<sup>3</sup></b>	<b>36.6 yd<sup>3</sup></b>
Total width	4800 mm	15 ft 9 in								
Inner width	4300 mm	14 ft 1 in								
Opening width	2250 mm	8 ft 2 in	2500 mm	8 ft 2 in						
Number of teeth	6		6		6		6		6	
Weight including wear package	40 400 kg	89,070 lb	42 400 kg	93,480 lb	41 800 kg	92,150 lb	42 900 kg	94,580 lb	43 100 kg	95,020 lb
Maximum material density (loose)	2.6 t/m <sup>3</sup>	4,380 lb/yd <sup>3</sup>	2.2 t/m <sup>3</sup>	3,710 lb/yd <sup>3</sup>	2.0 t/m <sup>3</sup>	3,370 lb/yd <sup>3</sup>	1.8 t/m <sup>3</sup>	3,030 lb/yd <sup>3</sup>	1.65 t/m <sup>3</sup>	2,780 lb/yd <sup>3</sup>

# 6050/6050 FS Hydraulic Shovel Specifications

## Working Range – Backhoe Attachment (BH)

All dimensions are approximate.



<b>Boom</b>	<b>10.5 m</b>	<b>34 ft 5 in</b>
<b>Stick</b>	<b>5.5 m</b>	<b>18 ft 1 in</b>
<b>Digging Forces</b>		
Maximum tearout force	1100 kN	247,200 lbf
Maximum breakout force	1210 kN	271,920 lbf

<b>Working Range</b>			
Maximum digging depth	9.2 m	30 ft 2 in	
Maximum digging reach	19.5 m	64 ft 0 in	
Maximum digging height	16.8 m	55 ft 1 in	

### Backhoes

Type	Heavy Rock Bucket		Standard Rock Bucket	
<b>Capacity heaped 1:1</b>	<b>25.0 m<sup>3</sup></b>	<b>32.7 yd<sup>3</sup></b>	<b>28.0 m<sup>3</sup></b>	<b>36.6 yd<sup>3</sup></b>
Capacity heaped 2:1	22.2 m <sup>3</sup>	29.0 yd <sup>3</sup>	25.0 m <sup>3</sup>	32.7 yd <sup>3</sup>
Capacity struck	19.5 m <sup>3</sup>	25.5 yd <sup>3</sup>	21.7 m <sup>3</sup>	28.4 yd <sup>3</sup>
Total width	4580 mm	15 ft 0 in	4440 mm	14 ft 7 in
Inner width	4035 mm	13 ft 3 in	4040 mm	13 ft 3 in
Number of teeth	6		6	
Weight including wear package	30 100 kg	66,360 lb	32 300 kg	72,210 lb
Maximum material density (loose)	2.0 t/m <sup>3</sup>	3,370 lb/yd <sup>3</sup>	1.8 t/m <sup>3</sup>	3,030 lb/yd <sup>3</sup>

## Optional Equipment

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

### GENERAL

- Custom paint

### SUPERSTRUCTURE

- Hydraulic service crane on superstructure with auxiliary engine
- Mesabi radiators instead of standard radiators
- Oil change interval extension for engine oil up to 1,000 hours
- Oil change interval extension for engine oil with oil burn system

- Folding access stairway, stairway angle approximately 45°
- Two round containers for two standard 200 L (53 gal) barrels (instead of 1000 L (264 gal) grease container)
- Filling of round containers via service station
- Various cold-weather options

### CAB

- Dual (redundancy) heating ventilating and air conditioning system
- Cab heating
- Additional instrumentation
- Camera monitoring system

### UNDERCARRIAGE

- Track pad width 1600 mm (5 ft 3 in) or 1800 mm (5 ft 11 in)
- Cover plate under carbody (belly plate)

Additional optional equipment available on request.

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