

# CAT<sup>®</sup> GRADE

FOR MOTOR GRADERS



# CAT GRADE FOR MOTOR GRADERS

When profit margins and budget targets are on the line, Cat® Grade for Motor Graders delivers the speed, efficiency and spot-on accuracy you need to stay ahead of the game.

Cat Grade technologies automate blade control and key machine functions. This provides accurate guidance to help operators achieve precise grade targets in less time, with fewer passes and reduced operator input.

FAST, EFFICIENT AND RIGHT ON THE MONEY



## GRADE TECHNOLOGY BENEFITS:

- + Faster, easier, safer and more accurate — every time
- + Factory integrated and optimized for maximum precision
- + Digital dash technology simplifies operation
- + Requires fewer people on the ground for greater safety



# FACTORY INTEGRATED FOR PRECISION AND PERFORMANCE

Cat Grade technologies are built-in — not added on — and calibrated at the factory. They're optimized for specific Cat motor grader models and the applications in which they work, so you can count on unmatched performance and super-accurate grading precision. You can take advantage of 2D or 3D technologies, plus a range of other options to match site and application needs.

## GET TO WORK FASTER

- + Minimal set-up time means you can get right down to business at the start of every shift
- + Mastless receiver system eliminates cumbersome exterior hardware, providing better moldboard visibility and more precise control
- + GNSS (Global Navigation Satellite System) receivers are integrated into the cab roof and front frame for better protection, reducing chances for damage and improving system uptime
- + A range of options means you optimize your Cat Grade system to your needs

# SIMPLE OPERATION, PRECISE ACCURACY



An in-cab display offers tablet-like touchscreen operation, putting the design plan literally at the operator's fingertips. It enables the operator to instantly see the work ahead and to monitor progress across the jobsite.

## LESS CONTROL INPUT

Grade control buttons are integrated into the joystick controls for seamless operation. Control movements are intuitive and precise, with less operator input than traditional motor grader operation. As a result, Cat Grade helps to maximize operator efficiency throughout a long shift, minimizing fatigue, errors and rework.

## FOCUS ON THE JOB

Because the 3D Grade system uses machine-integrated sensors, ground-based grade checking is not required. The blade moves automatically and uses an auto side shift to accurately maintain the planned grade. You get the results you want in fewer passes, using less fuel and with less material waste.



With no masts and fully machine-integrated cabling, the potential for machine component damage is virtually eliminated. Operators can focus on the work, with less worry about snagging machine systems and structures.

### E-FENCE PROTECTION

Cat Grade with 3D includes factory-installed E-fence capabilities. When activated, the E-fence system sets automatic boundaries to prevent the moldboard from contacting the tires and ladder. Plus, it stops the circle from potentially damaging the link bar. The machine protects itself, freeing the operator to devote full attention to the tasks at hand.

# CROSS SLOPE: ACHIEVE COMPLEX GRADES FASTER

Cat Grade with Cross Slope automatically maintains the blade at a preset cross slope. This fully integrated system lets operators achieve grade faster and more accurately. They can do more work in the same amount of time, which saves fuel and improves material efficiency.

- + **Up to 40% better material efficiency** reduces sub-base preparation time and cost
- + **Keeps operators on target** by automatically controlling one side of the blade
- + **Saves time and money** by reaching target grade quickly and with high accuracy
- + **Maintains a smooth, consistent slope** when the blade is lowered raised — no lag between automatic and manually controlled sides of the moldboard
- + **Factory-integrated software** makes controlling cross slope easy — single in-cab display gives operators all the information they need at a glance





# GRADE WITH 3D: BOOST ACCURACY AND EFFICIENCY

Cat Grade with 3D for motor graders is a fully machine-integrated system that helps you get to grade faster with more accuracy, efficiency and productivity. It automatically adjusts blade movements to follow the design plan using machine-integrated sensors and GNSS guidance technology.

- + **Get to grade faster** with more accuracy, efficiency and productivity
- + **Automatic blade control** reduces operator inputs and the number of passes to get the job done to save you time and money
- + **Maintains grade** at the required level, maximizing accuracy
- + **Save time and reduce costs** for rework, labor and materials
- + **Helps operators focus on the job** at hand, without worrying about constant grade checking

# GRADE WITH 3D: TOTAL INTEGRATION. MAXIMUM PROTECTION.

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Grade with 3D is a fully machine-integrated system. Everything is built-in and calibrated at the factory for optimal performance and efficient operation.

- + **Dual GNSS receivers** are integrated into the cab roof and front frame for better protection — there is nothing to remove at the end of the day
- + **Grade control buttons** are integrated into the joystick controls for seamless operation
- + **Mastless system** offers better moldboard visibility and movement
  - Requires minimal machine prep
  - Reduces the potential for damage to machine components
- + **Factory E-fence capabilities** protect the machine and ease operation



# APPLICATION AND SITE CONFIGURATION OPTIONS

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Cat Grade can be configured with a variety of other technologies to match site limitations and specific job needs.



## CROSS SLOPE

An integrated system that enables motor grader operators to achieve grade faster and more accurately by automating the cross slope of the blade. Other cost-saving benefits of the system include lower fuel consumption and up to 40% less material usage.



## LASER TECHNOLOGY

Provides elevation control using manually configured, laser guidance where GNSS systems are impractical or unavailable. This option can be combined with Cross Slope to control both elevation and slope of the blade for full automation blade control.



## DOUBLE MAST GPS

A dual GPS receiver configuration is also available where GPS technology makes more sense. As with the GNSS and laser technologies, this system automatically controls blade adjustments for automatic control of elevation at both ends of the moldboard.



## **SONIC TECHNOLOGY**

Another manually configured alternative to satellite navigation, sonic technology tracks sound waves to provide elevation control. As with laser technology, it can be combined with Cross Slope for automatic blade control.



## **SINGLE MAST GPS**

This system uses a 3D position from a single GPS receiver in combination with information from the Cross Slope sensors to automatically control elevation and cross slope.



## **UNIVERSAL TOTAL STATION (UTS)**

The UTS receiver gets a signal from a stationary transmitter on the jobsite, which provides location and elevation. This receiver is used in conjunction with the Cross Slope sensors to provide 3D control of the moldboard with very high accuracy.

# CAT GRADE SYSTEMS AT A GLANCE

SYSTEM	APPLICATIONS	ACCURACY	CONSIDERATIONS
<b>Cross Slope</b>	<ul style="list-style-type: none"> <li>• Road maintenance</li> <li>• Road shaping</li> <li>• Road ditching</li> <li>• Sports fields</li> <li>• Embankments</li> <li>• Parking lots</li> </ul>	± 0.2 - 0.4% slope	<ul style="list-style-type: none"> <li>• Operator manually controls elevation</li> <li>• Does not require a design file</li> </ul>
<b>Sonic with Cross Slope</b>	Any construction work with a finished surface or string line to follow	± 3 - 5 mm elevation ± 0.2 - 0.4% slope	<ul style="list-style-type: none"> <li>• Does not require a design file</li> <li>• Requires a curb and gutter, string line or previous pass for elevation reference</li> <li>• Operator steers the machine to maintain the sonic sensor within the external elevation reference</li> </ul>
<b>Laser with Cross Slope</b>	<ul style="list-style-type: none"> <li>• Indoor work</li> <li>• Pad construction</li> <li>• Sports fields</li> </ul>	± 3 - 5 mm elevation ± 0.2 - 0.4% slope	<ul style="list-style-type: none"> <li>• Does not require a design file</li> <li>• Works in flat and single- or dual-sloped applications</li> <li>• Requires off-board laser transmitter</li> <li>• Requires transmitter line-of-sight to the machine within 750 ft/228 m</li> <li>• Range and accuracy affected by dust, fog, wind and other machines on the jobsite</li> </ul>
<b>Single Mast GNSS with Cross Slope</b>	<ul style="list-style-type: none"> <li>• Large earthmoving projects</li> <li>• Landfills</li> <li>• Rough grading roads and highways</li> </ul>	± 20 - 30 mm elevation ± 0.2 - 0.4% slope	<ul style="list-style-type: none"> <li>• Requires management of 3D design data, GNSS base station setup and site calibration</li> <li>• Requires off-board RTK correction signal infrastructure</li> <li>• Requires a clear view of the sky — trees and tall buildings can interfere with satellite signals</li> </ul>
<b>Dual Mast GNSS with Cross Slope</b>	<ul style="list-style-type: none"> <li>• Large earthmoving projects</li> <li>• Complex designs</li> <li>• Steep slopes</li> </ul>	± 20 - 30 mm elevation	<ul style="list-style-type: none"> <li>• Requires management of 3D design data, GNSS base station setup and site calibration</li> <li>• Requires off-board RTK correction signal infrastructure</li> <li>• Requires a clear view of the sky — trees and tall buildings can interfere with satellite signals</li> </ul>
<b>Universal Total Station (UTS) with Cross Slope</b>	<ul style="list-style-type: none"> <li>• Finish grading roads and highways</li> <li>• Airport construction</li> <li>• Complex commercial and residential site preparation</li> </ul>	± 2 mm elevation ± 0.2 - 0.4% slope	<ul style="list-style-type: none"> <li>• Requires management of 3D design data, UTS setup and site calibration</li> <li>• Requires off-board UTS and 2400 MHz radio network correction signal infrastructure</li> <li>• Requires UTS line-of-sight to the machine within 750 ft/228 m</li> <li>• Each machine requires its own UTS</li> </ul>

**\*Contact your Cat dealer to discuss the best feature sets for your fleet, operators and applications.**

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)

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