
BUILT FOR THE NEXT GENERATION

CAT® TIER 4 INTERIM / STAGE IIIB INDUSTRIAL ENGINES



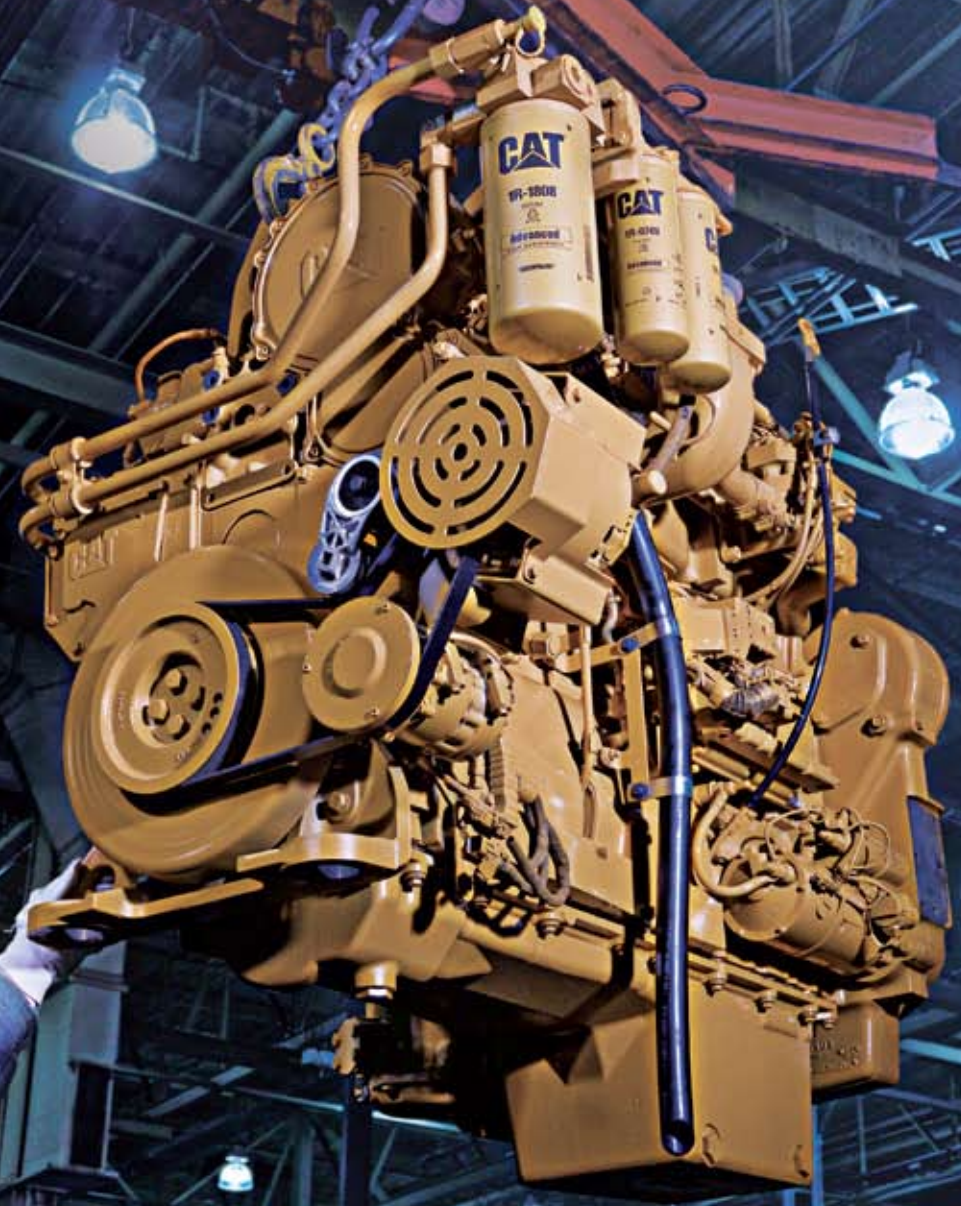
ADVANCING TECHNOLOGY

BUILDING CUSTOMER VALUE

With decades of diesel engine innovation and expertise behind us, Caterpillar takes another critical step into the future with Cat® Tier 4 Interim/Stage IIIB technologies.

You understand the critical balance between meeting customer expectations today as well as working toward the emerging needs of the future. Leaders are integrators—not just of engine systems, but of industry-best practices, service and support and sustainable value.

Cat Tier 4 Interim/Stage IIIB engines meet tough emissions standards and deliver the performance and efficiency you expect from Caterpillar.



The Next Phase in Emissions Reduction

Cat Tier 4 Interim/Stage IIIB engines meet tough emissions standards and deliver the performance and efficiency that successful businesses demand.

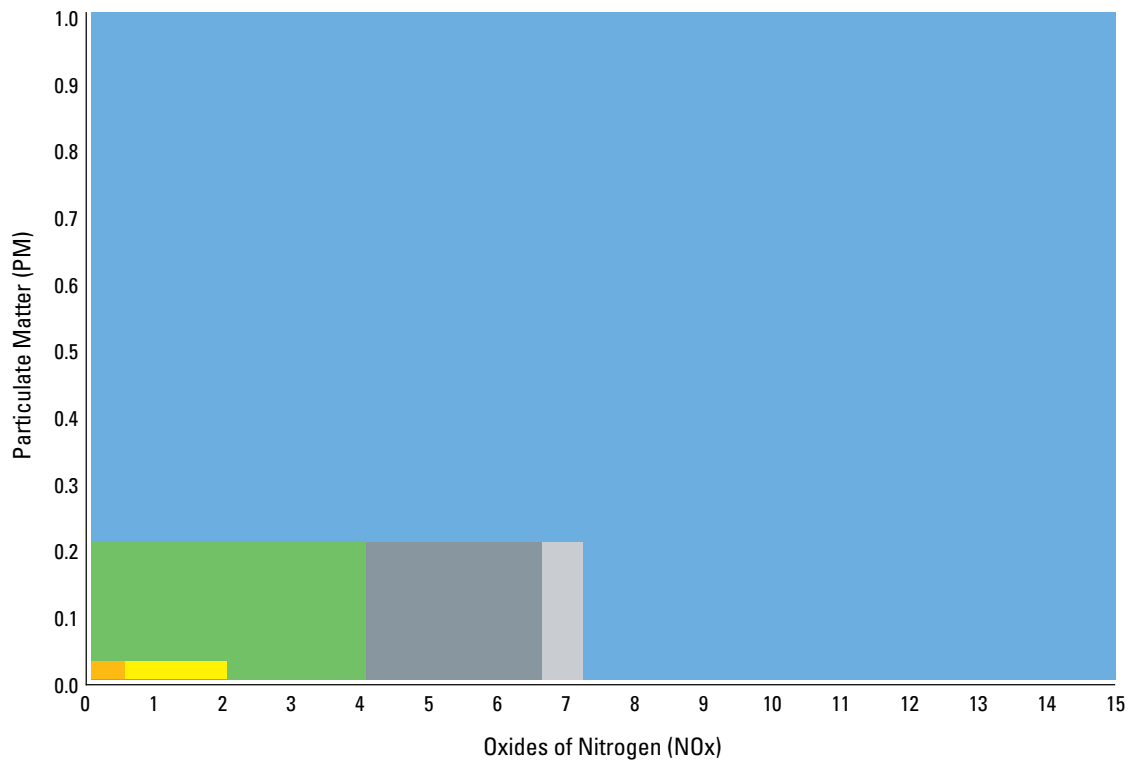
Like all manufacturers of diesel engines, Caterpillar is required to deliver engines that meet government emissions standards that are being phased in throughout the U.S., Canada, Europe and Japan.

Cleaner Fuel & Oils

Also part of the upcoming emissions standards, industry technology requires Ultra Low Sulfur Diesel Fuel (ULSD, 15 ppm sulfur) for use in Tier 4 Interim/Stage IIIB engines. In Cat engines, not only will ULSD need to be used, but also ultra low sulfur diesel oils. These cleaner fuels and oils will help reduce ash and maintain service intervals, contributing to low emissions and reduced operating costs. The new Cat engines will also have B20 biodiesel capability, adding even greater sustainability where desired or required.

EMISSIONS REDUCTION

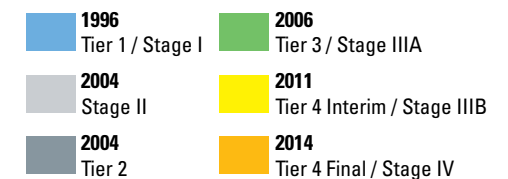
Tier 1/Stage I (1996) – Tier 4 Final/Stage IV (2014)
Engines rated 130–560 kW (175–750 hp)*



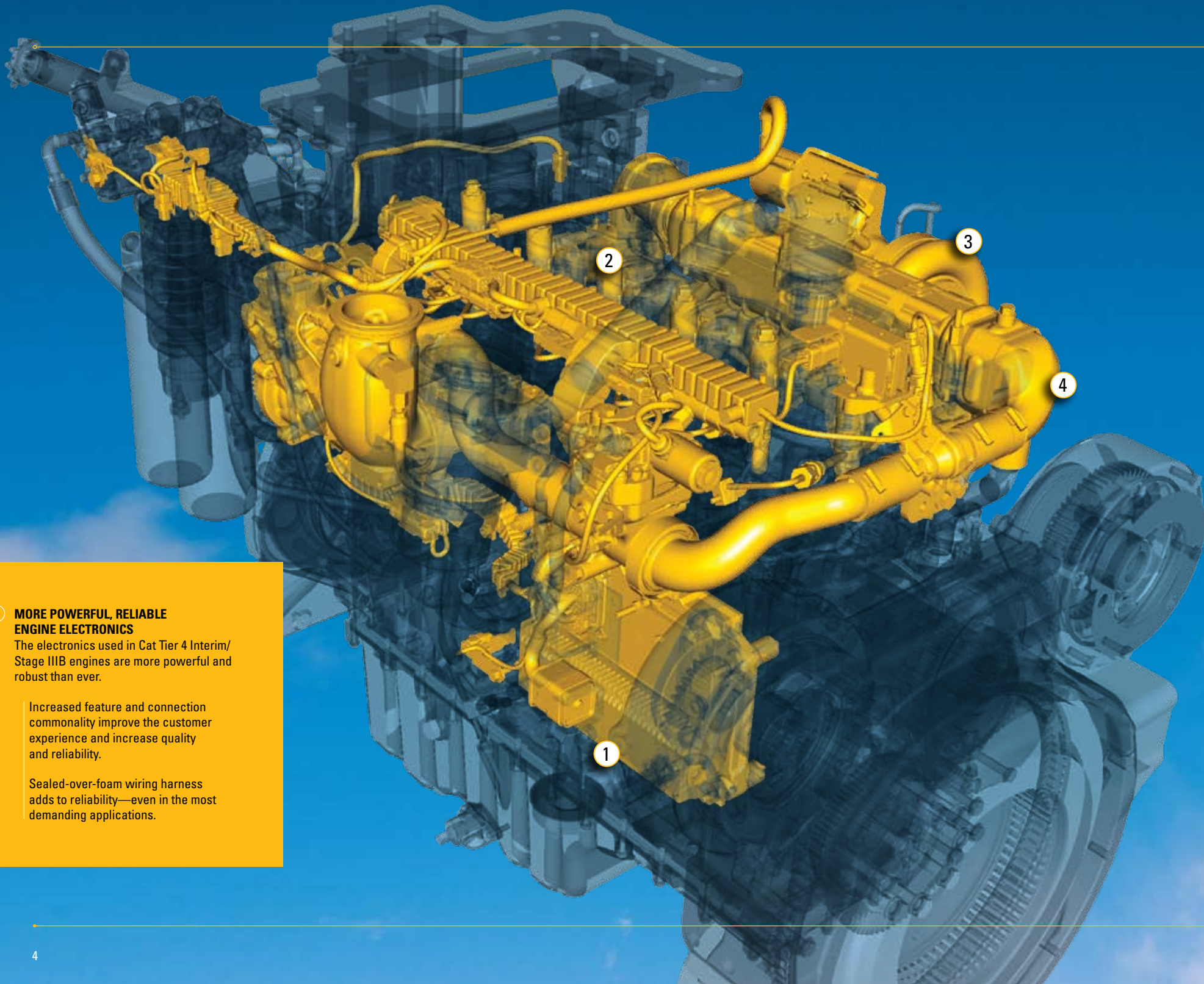
Emissions standards have been systematically reducing levels of Particulate Matter (PM) and Oxides of Nitrogen (NOx) since 1996 when the first standards went into effect.

From Tier 1/Stage I (1996) levels to Tier 3/Stage IIIA (2006), emissions standards required an approximate 65 percent reduction in PM and a 60 percent reduction in NOx.

The next phase of emissions standards, called Tier 4 Interim in the U.S. and Canada and Stage IIIB in the European Union, take effect for engines above 130 kW in 2011. Compared to Tier 3/Stage IIIA levels, Tier 4 Interim/Stage IIIB standards require a 90 percent reduction in PM and a 50 percent decrease in NOx. Tier 4 Final/Stage IV standards, which will become effective in 2014, reduce NOx by an additional 40 percent, taking PM and NOx emissions to near-zero levels.



* Engines rated 56–130 kW (75–175 hp) are required to meet Tier 4 Interim/Stage IIIB standards in 2012 and Tier 4 Final regulations in 2015. Engines rated >560 kW (750 hp) will meet Tier 4 Interim standards in 2011 and Tier 4 Final regulations in 2015 (EPA only). Standards differ by power category.

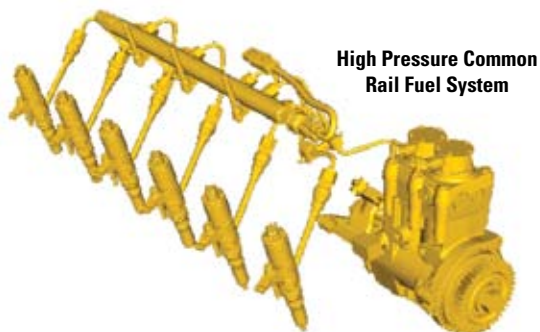


**1 MORE POWERFUL, RELIABLE
ENGINE ELECTRONICS**

The electronics used in Cat Tier 4 Interim/ Stage IIIB engines are more powerful and robust than ever.

Increased feature and connection commonality improve the customer experience and increase quality and reliability.

Sealed-over-foam wiring harness adds to reliability—even in the most demanding applications.



High Pressure Common Rail Fuel System

② NEXT GENERATION FUEL SYSTEM

As a key component of Cat Tier 4 Interim/Stage IIIB Technology, injection timing precisely controls the fuel-injection process through a series of carefully timed microbursts. This injection timing provides more control of combustion for the cleanest, most efficient fuel burn. To maximize customer value, Cat engineers specified fuel systems based on the power and performance demands for each engine.

High Pressure Common Rail Fuel Systems with full electronic injection improve precision and control that boosts performance and reduces soot for the C4.4 ACERT, C6.6 ACERT, C7.1 ACERT and C9.3 ACERT.

Advanced MEUI-C injectors handle increased injection pressures and more precise fuel rates. These durable injectors enhance responsiveness while controlling soot in the C13 ACERT, C15 ACERT, C18 ACERT, C27 ACERT and C32 ACERT.

③ INNOVATIVE AIR MANAGEMENT

Cat Tier 4 Interim/Stage IIIB air management is accomplished through simplified turbocharging solutions. A range of turbocharging solutions optimizes performance for each model:

C9.3 ACERT–C32 ACERT

A simple, efficient turbocharger delivers variable turbo boost, reliable performance and long service life in the most demanding applications.

C4.4 ACERT–C18 ACERT

Smart Wastegate and Series turbocharger performance is matched to rated power output for higher productivity and better fuel efficiency.

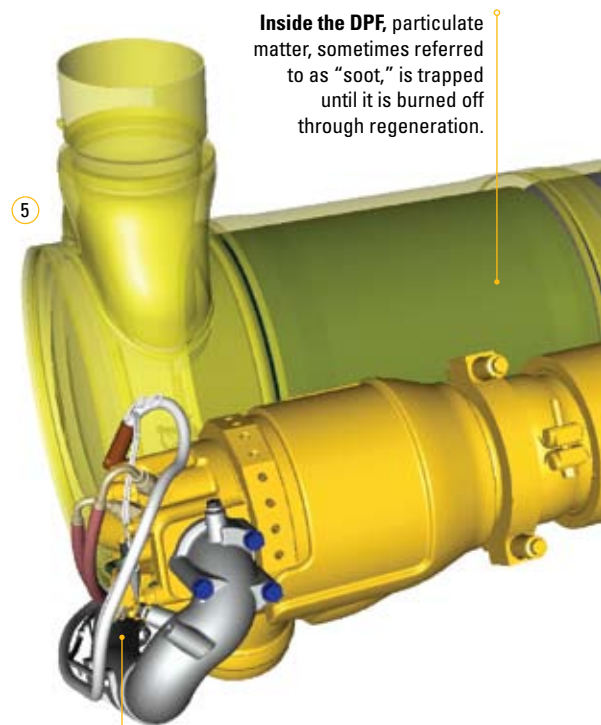
④ CAT NO_x REDUCTION SYSTEM

The Cat NO_x Reduction System captures and cools a small quantity of exhaust gas and sends it back into the combustion chamber where it drives down combustion temperatures and reduces NO_x emissions. The result of more than a decade of Caterpillar engineering research into this technology, the Cat NO_x Reduction System is designed to be the most reliable system of its type.



Air Management and Cat NO_x Reduction System

BUILDING BLOCK DELIVER FUEL EFFICIENCY



Inside the DPF, particulate matter, sometimes referred to as “soot,” is trapped until it is burned off through regeneration.

Cat Regeneration System meets specific engine requirements. It allows for fast, accurate control of regeneration independent of engine exhaust temperatures. The Cat Regeneration System provides an ideal solution in all operating conditions, including low load, cold ambient temperatures and extended idle time.

K TECHNOLOGIES

NCY, RELIABILITY AND DURABILITY

The DOC does not require maintenance since it is a “flow-through” device, and the pollutants do not get trapped in the component.



5 AFTERTREATMENT TECHNOLOGIES

To meet Tier 4 Interim/Stage IIIB emissions standards and beyond, Cat aftertreatment components have been designed to match application needs.

For small to medium applications:

- Service-free compact systems
- Low-temperature (passive) regeneration
- No supplemental fuel needed

For medium to large applications:

- Durable packaged systems designed to withstand even the most demanding applications
- Fuel-efficient, reliable regeneration
- Operates automatically

Cat aftertreatment components include:

Diesel Oxidation Catalyst (DOC)

The DOC uses a chemical process to transform pollutants in the exhaust stream into unregulated components.

Diesel Particulate Filter (DPF)

A DPF traps additional particulate matter that’s carried in the exhaust stream, preventing it from being released into the atmosphere.

Low-Temperature Regeneration System (C3.4B, C4.4 ACERT, C6.6 ACERT)

All Cat Tier 4 Interim/Stage IIIB engines use a low-temperature, passive regeneration system that continually regenerates at a slow rate, during normal machine operation, using the heat from the engine’s exhaust gas.

Cat Regeneration System (C7.1 ACERT–C18 ACERT)

The Cat Regeneration System is an active regeneration system used in engines rated bkW 130–560 (175–750 bhp) when optimal passive regeneration conditions cannot be achieved. The Cat Regeneration System safely elevates exhaust gas temperatures to promote oxidation and burn off soot in the DPF.



CAT CLEAN EMISSIONS MODULE (CEM)

The CEM is a flexible, Caterpillar designed modular system that can include the following components: DOC, DPF, Cat Regeneration System, muffler and air cleaner. Designed to withstand the most severe applications and conditions, the CEM is available on C7.1 ACERT–C18 ACERT engine models. (For C4.4 ACERT and C6.6 ACERT engines, the configuration is nonmodular and includes a DOC and DPF with a simple low-temperature regeneration system.) The CEM protects the components, minimizes the aftertreatment footprint and simplifies maintenance.

COMMITTED TO CUSTOMER SUCCESS

Cat Tier 4 Interim/Stage IIIB ACERT™ Technology capitalizes on the expertise of Caterpillar in four proven core engine systems: electronics, fuel, air and aftertreatment. Cat engineers have studied the specific demands of each size class and determined which technologies deliver the greatest value—resulting in the development of application-specific products to better meet the unique needs of your customers with:

- FUEL EFFICIENCY** Up to five percent improvement in fuel efficiency
- POWER AND PERFORMANCE** Integrated design boosts power and performance across applications
- RELIABILITY** through commonality and simplicity of design
- MAXIMIZED UPTIME** with world-class support from the Cat Dealer Network
- LONG LIFE** Caterpillar durability and long life to overhaul
- MINIMIZED IMPACT** of service and maintenance on operating costs
- SMOOTH TRANSITION** Design and modular aftertreatment pave the way for a smooth transition to Tier 4 Final/Stage IV solution, requiring no additional space
- REDUCED EMISSIONS** Up to 90 percent reduction in particulate matter (PM) and 50 percent reduction in Oxides of Nitrogen (NOx)

The entire line of Cat Tier 4 Interim/Stage IIIB engines is precisely engineered, rigorously tested and validated and built for the reliability and durability you count on from Caterpillar.

- ① More Powerful Engine Electronics** Common features and connections increase quality, reliability and ease of use.
- ② Next Generation Fuel Systems Options** Precise injection systems deliver maximum fuel efficiency and soot control.
- ③ Innovative Air Management** Simplified turbocharging optimizes productivity, fuel efficiency and reliability.
- ④ Cat NOx Reduction System** Rugged, reliable system lowers combustion temperatures and reduces NOx emissions.
- ⑤ Aftertreatment Technologies** Designed to specific application demands, components reduce pollutants and particulate matter.

MOVING FORWARD

ON A PROVEN PATH

Caterpillar is the largest vertically integrated manufacturer in the world. And, just as each new family of engines moves us forward, it also sustains the advantages learned from decades of manufacturing, testing and product support.

Rigorous Testing and Validation Drive On-the-job Reliability

Caterpillar's engine validation program, the largest in Caterpillar history, will ensure that all new Cat engines deliver reliable performance from the first day on the job.

Multi-segment, multi-phase validation of **prototype and pilot engines and machines** conducted in a wide variety of the most demanding applications.

Reliability validated with **over a million accumulated operating hours** by the end of 2010.

Advanced power system simulators provide **extensive modeling, analysis and testing**.

Next generation simulation techniques enhance shake table testing, cooling design and engine integration optimization.

World-class Service and Support Increases Uptime, Reduces Operating Costs

The worldwide Cat Dealer network supports Cat engines anywhere in the world. The parts commonality built into the Tier 4 Interim/Stage IIIB line of engines enables common service tooling and parts stock coverage, further enhancing the value that product support can deliver.

With industry-leading parts availability, cost-saving Cat Reman options, Cat Certified Rebuild programs as well as Customer Support Agreements, your end-user customers can keep engine performance high and operating costs lower.

Caterpillar has taken every possible step to effectively manage service and maintenance issues.

Basic oil and filter change intervals have not changed.

Engines require the use of **Ultra Low Sulfur Diesel (ULSD)** fuel and also accommodate **ULSD B20 biofuel**.

New emissions standards drive new **service intervals and maintenance activity**:

- 5,000 hours for DPF ash removal. Removal options:
 - Mobile ash removal tool
 - Stationary ash removal tool
 - Cat Reman exchange
 - Dealer inventory/swap
- 2,000 hours for Open Crankcase Ventilation filter

CEM aftertreatment is designed with a removable center section to allow easy access to the DPF for **ash service**.

HELPING YOUR BUSINESS REACH THE NEXT LEVEL

We know that engine maintenance, service and support are critical not just to power and performance but to achieving the lowest total cost of ownership. Value is cumulative, and the Cat Dealers are dedicated to building value for the life of every engine.





DURABLE. RELIABLE. FUEL EFFICIENT.

CAT POWER KEEPS THE WORLD WORKING

From the heat of the equator to the freezing temperatures of the poles and every environment in between, Cat engines and power systems are built for the toughest job requirements in every application.

Cat building block technologies proved their value at Tier 3/Stage IIIA. And the continued evolution of these same technologies has led to a line of engines that not only meet emissions standards around the world, but also meet customer expectations for performance and value.

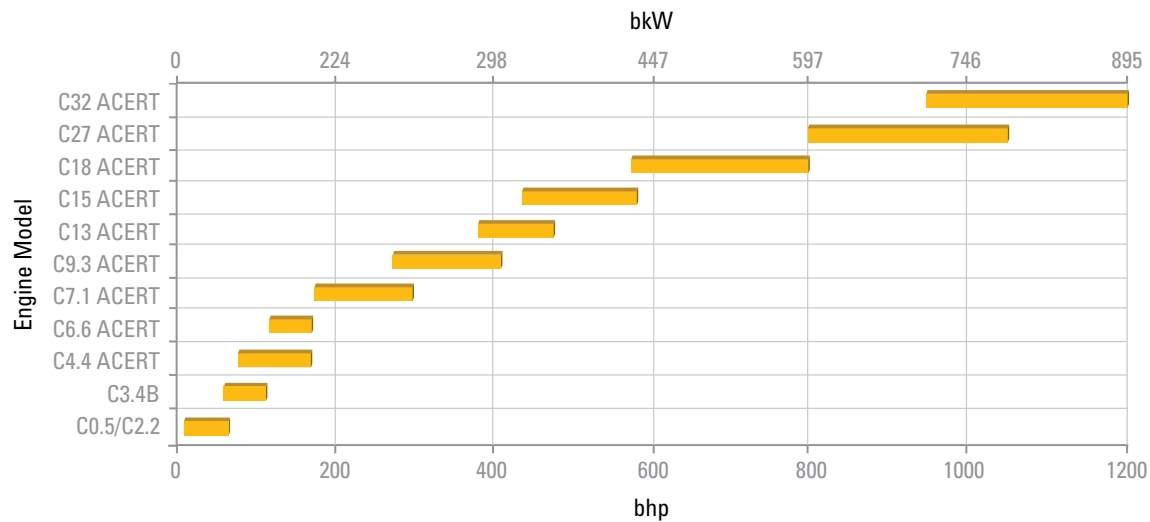
Available in every horsepower range, the complete line of Tier 4 Interim/Stage IIIB engines ensures that you get fuel-efficient and reliable power for every product from one industry-leading supplier.

Most comprehensive engine lineup with power ratings from 11 bhp to 6500 bhp (8.2–4847 kW).

Commonality of design across engine platforms streamlines the integration of Cat engines into industrial applications.

Emissions solutions optimized for engine size and application.

World-class product support maximizes uptime, reduces total cost of ownership.



OUR POWERFUL LINE OF ENGINES GETS EVERY JOB DONE

Only Caterpillar has the experience and expertise to bring all the elements together in a brand new, full line of engines optimized for every application.



TIER 4 INTERIM/STAGE IIIB INDUSTRIAL ENGINES



C0.5–C2.2

POWER 8–86 kW (11–115 bhp)

FUEL SYSTEM Cassette

AIR SYSTEM Smart Wastegate Turbocharger

NOx REDUCTION TECHNOLOGY NOx Reduction System

PM REDUCTION TECHNOLOGY In-Cylinder Combustion

REGENERATION TECHNOLOGY Low Temperature



C3.4B–C6.6 ACERT

POWER 60–130 kW (80–174 bhp)

FUEL SYSTEM Common Rail

AIR SYSTEM Smart Wastegate Turbocharger

NOx REDUCTION TECHNOLOGY Cat NOx Reduction System

PM REDUCTION TECHNOLOGY DOC/DPF

REGENERATION TECHNOLOGY Low Temperature



C7.1 ACERT–C18 ACERT

POWER 130–597 kW (175–800 bhp)*

FUEL SYSTEM Common Rail (C7.1 ACERT, C9.3 ACERT); MEUI-C (C13 ACERT–C18 ACERT)

AIR SYSTEM Smart Wastegate, Series Turbocharger**

NOx REDUCTION TECHNOLOGY Cat NOx Reduction System

PM REDUCTION TECHNOLOGY Cat CEM with DOC/DPF

REGENERATION TECHNOLOGY Cat Regeneration System

* C18 ACERT at 597 kW/800 bhp is Tier 4 Final

** C7.1 ACERT Smart Wastegate, Series Turbocharger; C13 ACERT–C18 ACERT Single or Series Turbocharger, depending on horsepower



C27 ACERT—C32 ACERT

POWER 597–950 bkW (800–1200 bhp)

FUEL SYSTEM MEUI-C

AIR SYSTEM Simple, Efficient Turbocharger

NO_x REDUCTION TECHNOLOGY Cat NO_x Reduction System

PM REDUCTION TECHNOLOGY No Aftertreatment Required

REGENERATION TECHNOLOGY Not Required

DELIVERING VALUE TODAY

AND FOR FUTURE GENERATIONS

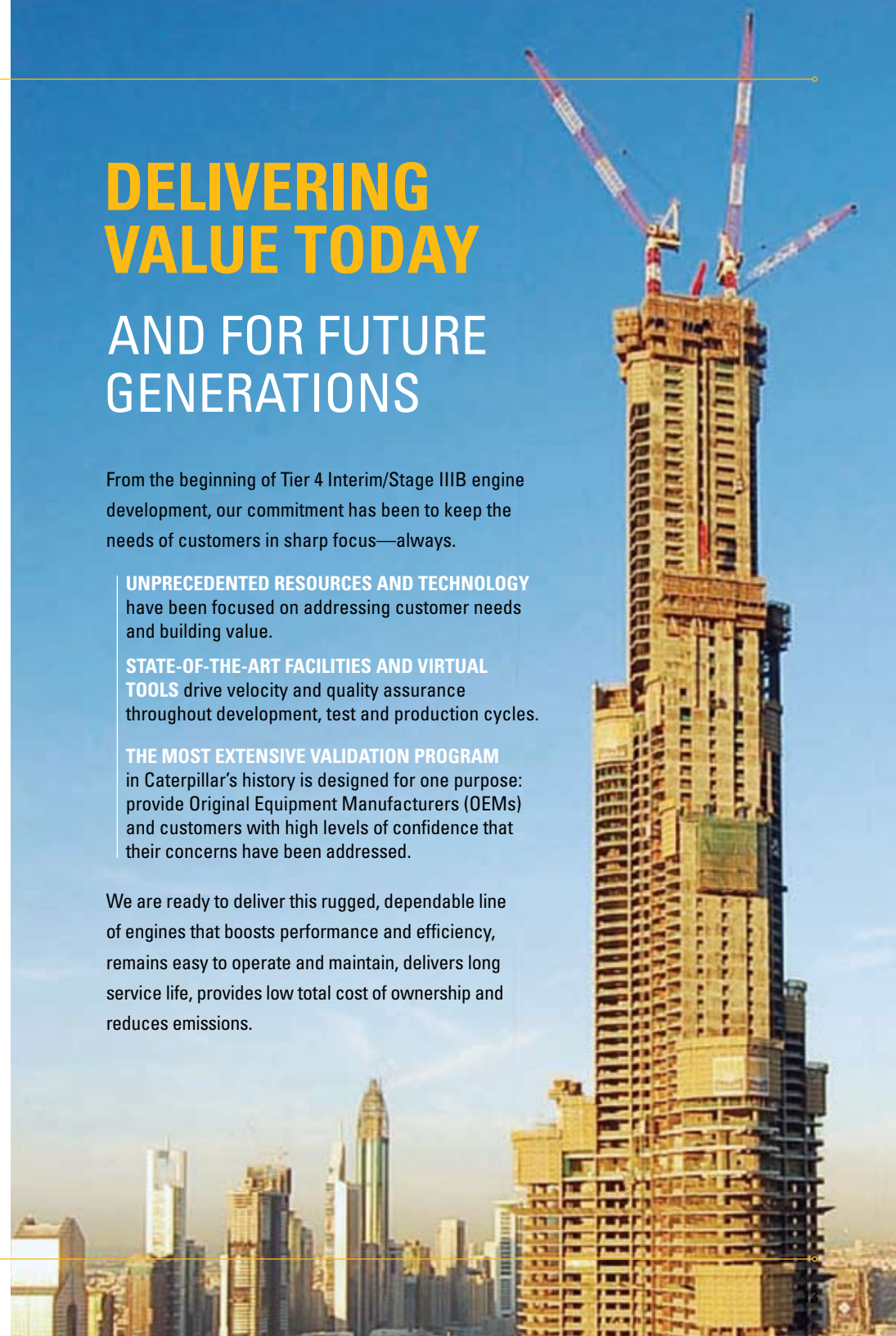
From the beginning of Tier 4 Interim/Stage IIIB engine development, our commitment has been to keep the needs of customers in sharp focus—always.

UNPRECEDENTED RESOURCES AND TECHNOLOGY have been focused on addressing customer needs and building value.

STATE-OF-THE-ART FACILITIES AND VIRTUAL TOOLS drive velocity and quality assurance throughout development, test and production cycles.

THE MOST EXTENSIVE VALIDATION PROGRAM in Caterpillar's history is designed for one purpose: provide Original Equipment Manufacturers (OEMs) and customers with high levels of confidence that their concerns have been addressed.

We are ready to deliver this rugged, dependable line of engines that boosts performance and efficiency, remains easy to operate and maintain, delivers long service life, provides low total cost of ownership and reduces emissions.



GENERATIONS AHEAD

PERFORMANCE. RELIABILITY. VALUE.

As we considered each advancement in our building block technologies, we never lost sight of our commitment to performance, reliability, fuel efficiency and value for our customers.

Caterpillar offers a full line of Tier 4 Interim/Stage IIIB engines for every application—with optimized emissions solutions tailored for each application. With Cat Tier 4 Interim/Stage IIIB engines, you can have even more confidence in your business's economic and environmental performance.

So no matter where you do business and no matter where your customers do business, Caterpillar will deliver solid, bottom-line results...today and in the generations to come.

