

# THE NEXT GENERATION STARTS NOW

**Cat® Tier 4 Solutions  
for the Oil and Gas Industry**





# CUSTOMER FOCUS

# SUSTAINABLE VALUE

Caterpillar is proud to offer the highest quality power solutions to meet Tier 4 regulations and the specific demands of the petroleum industry. Cat® Tier 4 engines meet the distinct needs of our customers and deliver unsurpassed value.

- **Performance & Reliability** – Groundbreaking emissions reduction without sacrificing engine performance
- **Reduced Emissions** – Up to 90 percent reduction in particulate matter and 50 percent reduction in NOx from previous emissions tier
- **Maximized Uptime** – World-class support from the Cat Dealer network
- **Long Life** – Caterpillar durability and long life to overhaul
- **Minimized Impact** – Simplified aftertreatment optimized for petroleum applications
- **Designed for Tier 4 Final** – Design and modular aftertreatment pave the way for a smooth transition to Tier 4 Final without the need for redesign, with some ratings already Tier 4 Final compliant
- **Fuel Efficiency** – Up to five percent improvement in fuel efficiency





## THE NEXT PHASE IN EMISSIONS REDUCTION

Cat Tier 4 engines meet tough emissions standards and deliver the performance and efficiency that successful oil and gas companies demand.

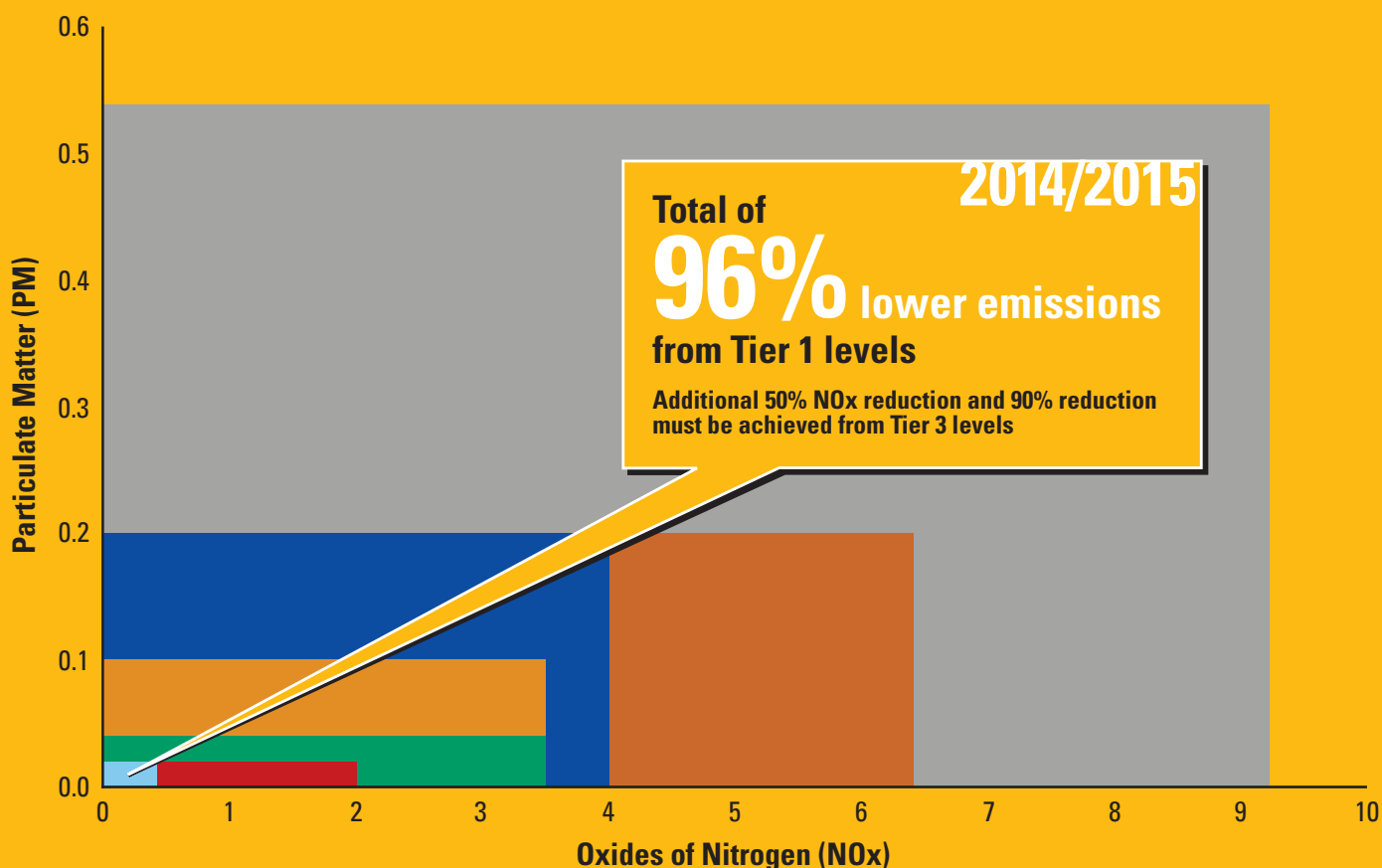
Like all manufacturers of diesel engines, Caterpillar is required to deliver engines that meet government emissions standards that are being phased in throughout the U.S., Canada, and Europe.

## 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 engines. Cat engines will also use ultra low sulfur diesel oils for optimal performance. 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

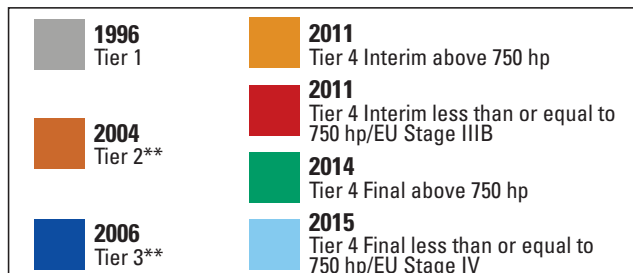
**Tier 1/Stage I (1996) – Tier 4 Final/EU Stage IV**  
Engines rated  $\geq 130$  kW (175 bhp)\*



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 bhp) are required to meet Tier 4 Interim/Stage IIIB standards in 2011 and Tier 4 Final regulations in 2014. Engines rated >560 kW (750 bhp) will meet Tier 4 Interim standards in 2011 and Tier 4 Final regulations in 2015 (EPA only). Standards differ by power category.

\*\*For Tier 2 and Tier 3, NOx numbers reflect NOx and HC combined.

NOx and PM are measured in g/kW-hr.

# THE FUTURE IS NOW

## PETROLEUM TIER 4 LINEUP

### U.S. EPA TIER 4 INTERIM/EU STAGE IIIB

#### FEATURES:

- World-class reliability and durability
- NOx Reduction System (NRS)
- Clean Emissions Module (CEM)
  - Diesel Oxidation Catalyst (DOC)
  - Diesel Particulate Filter (DPF)
- Cat Regeneration System

#### APPLICATIONS:

- Mud Pumping
- Workover
- Cementing
- Blending
- Coil Wire Tube



*C13 ACERT™ Tier 4 Interim/Stage IIIB,  
image may include optional attachments*

### U.S. EPA TIER 4 FINAL

#### FEATURES:

- World-class reliability and durability
- NOx Reduction System (NRS)
- Diesel Oxidation Catalyst (DOC)

#### APPLICATIONS:

- Fracturing
- Cementing
- Drilling
- Blending
- Nitrogen Units



*C27 ACERT Tier 4 Final, image  
may include optional attachments*



#### U.S. EPA TIER 4 INTERIM/EU STAGE IIIB ENGINE RATINGS

### C7.1 ACERT™

140-205 bkW  
188-275 bhp  
1800-2200 rpm

### C9.3 ACERT

224-261 bkW  
300-350 bhp  
1800-2200 rpm

### C13 ACERT

287-388 bkW  
385-520 bhp  
1800-2100 rpm

### C15 ACERT

354-433 bkW  
475-580 bhp  
1800-2100 rpm

### C18 ACERT A, B, C Rating

447-522 bkW  
600-700 bhp  
1800-1900 rpm



#### U.S. EPA TIER 4 FINAL ENGINE RATINGS

### C18 ACERT C, D Rating

563-597 bkW  
755-800 bhp  
1800 rpm

### C27 ACERT

597-652 bkW  
800-875 bhp  
1800 rpm

### C32 ACERT

708-839 bkW  
950-1125 bhp  
1800 rpm

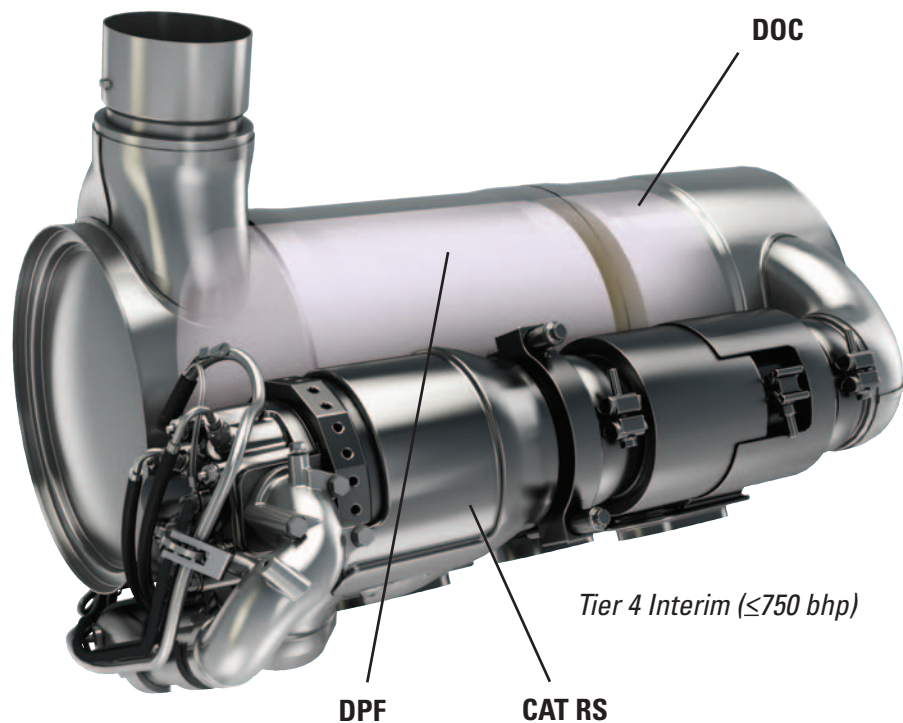


# SUSTAINABILITY THROUGH ADVANCED TECHNOLOGY

## U.S. EPA TIER 4 INTERIM/ EU STAGE IIIB

(≤560 bkW/750 bhp)

	C7.1 ACERT	C9.3 ACERT	C13 ACERT	C15 ACERT	C18 ACERT ≤750 bhp
NRS	•	•	•	•	•
DOC	•	•	•	•	•
DPF	•	•	•	•	•
Cat RS	•	•	•	•	•



## NRS NO<sub>x</sub> REDUCTION SYSTEM

**All Tier 4 Cat engines feature a NO<sub>x</sub> reduction system.** The Cat on-engine NO<sub>x</sub> Reduction System (NRS) 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<sub>x</sub> emissions. The result of more than a decade of Caterpillar engineering research, the NRS is designed to be the most reliable system of its type.

## DOC DIESEL OXIDATION CATALYST

- Reduces regulated constituents, primarily CO, to less harmful compounds through a catalyst washcoat
- Proven technology with experience in the oil and gas industry
- Flow-through, maintenance-free component

Tougher EPA emissions requirements haven't stopped Caterpillar from delivering the same proven high-quality, durable engines that our valued customers have come to expect, with no sacrifice to their proven outstanding performance.

Cat Tier 4 solutions consist of a suite of next generation on-engine and aftertreatment technologies.

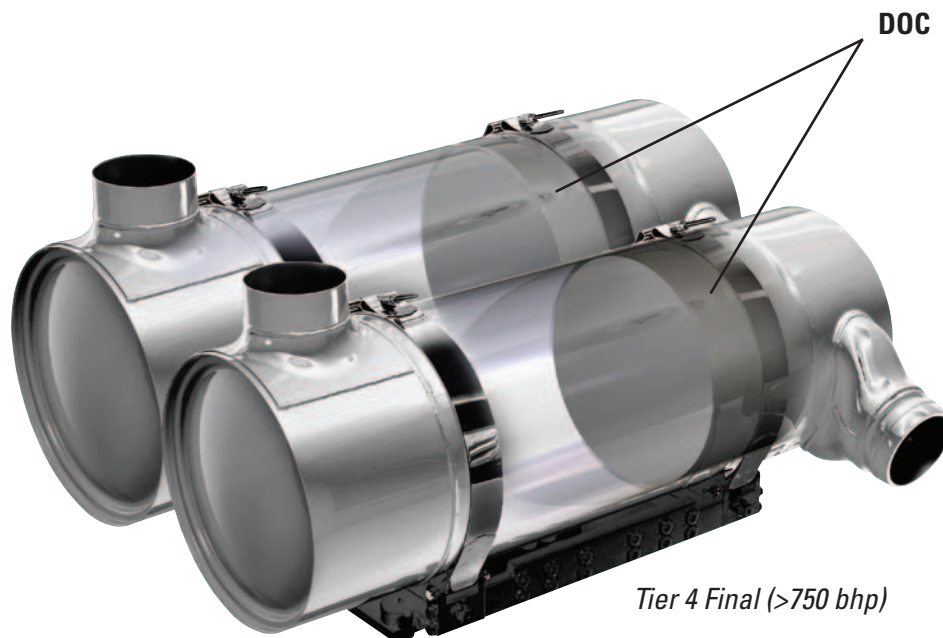


## U.S. EPA TIER 4 FINAL (>560 bkW/750 bhp)

	C18 ACERT >750 bhp	C27 ACERT	C32 ACERT
NRS	•	•	•
DOC	•	•	•



**AIR MANAGEMENT  
AND NRS**



*Tier 4 Final (>750 bhp)*

## DPF DIESEL PARTICULATE FILTER

- Uses a filter to trap particulate matter ("soot") as it passes through
- Filter is cleaned through passive and active regeneration

## CAT RS CAT REGENERATION SYSTEM

- For active regeneration, system elevates exhaust gases to a temperature where soot is removed within the DPF
- Petroleum tailored for efficiency and uptime
- Passive and active regeneration strategies developed to maximize operation time



# TIER 4 INTERIM/STAGE IIIB

## Committed to Sustainable Development

- Achieves U.S. EPA Tier 4 Interim and EU Stage IIIB, cutting emissions in half from Tier 3

## Driving Down Total Cost of Ownership

- Legendary reliability & durability of engine and aftertreatment
- Improved fuel consumption
- Designed to reduce engineering cost
  - Future Tier 4 Final aftertreatment solution designed with approximately same space claim as Tier 4 Interim

## Making Your Investment Work Harder

- Single-source engine, transmission, and aftertreatment designed to maximize performance of the package
- Simplified controls and customer connection points decrease time to get up and running
- Optimized regeneration strategy maximizes uptime

## Improving Workforce Efficiency

- Optimized systems minimize operator interface with the aftertreatment
- Easy-to-use, single, state-of-the-art ADEM™ A4 control system for engine and aftertreatment
- Extensive factory-trained dealer network

## Fully Integrated Petroleum Solutions

- Petroleum power units offer factory installed engine, aftertreatment, transmission, and base — eliminating the need for a delegated final assembly contract (DFA)

## CLEAN EMISSIONS MODULE (CEM) FOR TIER 4 INTERIM/EU STAGE IIIB

The CEM is a completely modular, configurable aftertreatment solution. It features a single DPF and DOC, with an optimized Cat regeneration system. It can be packaged with a muffler, air cleaner, and supporting structure.

With the optional muffler, the CEM is designed to claim the same space as future Tier 4 Final technology. Therefore, only one design will be required to install Tier 4 Interim and Tier 4 Final technology.

The Cat CEM is an option on C9.3 ACERT, C13 ACERT, and C15 ACERT.



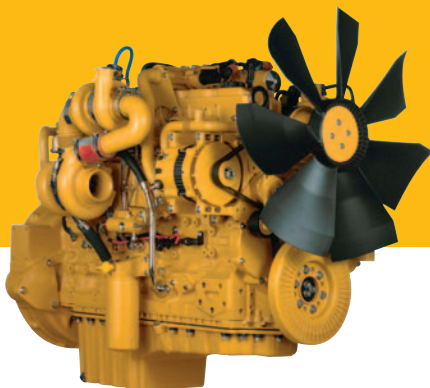
*Cat clean emissions module shown with optional muffler, air cleaner, and supporting structure*



Because it drives your application, your engine drives your bottom line. Caterpillar is looking ahead to ensure next generation emissions reductions will be met at all stages. The Tier 4 Interim/Stage IIIB engines are built to be easy to integrate, durable, and reliable, to power through the rough petroleum environment.

## C7.1 ACERT

Power	140-205 kW / 188-275 bhp
Length	1052 mm / 41.4 in
Width	759 mm / 29.9 in
Height	1031 mm / 40.6 in
Weight	629 kg / 1386.7 lb



## C9.3 ACERT

Power	224-261 kW / 300-350 bhp
Length	1150 mm / 45.3 in
Width	827 mm / 32.6 in
Height	1123 mm / 44.2 in
Weight	885 kg / 1950 lb



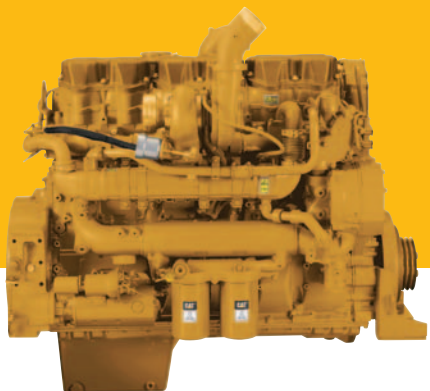
## C13 ACERT

Power	287-388 kW / 385-520 bhp
Length	1203 mm / 47.4 in
Width	933 mm / 36.7 in
Height	1186 mm / 46.7 in
Weight	1350 kg / 2976.2 lb



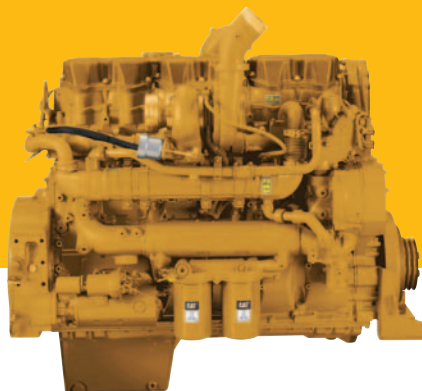
## C15 ACERT

Power	354-433 kW / 475-580 bhp
Length	1530 mm / 60.2 in
Width	961 mm / 37.8 in
Height	1282 mm / 50.5 in
Weight	1666 kg / 3672.9 lb



## C18 ACERT

Power	447-522 kW / 600-700 bhp
Length	1530 mm / 60.2 in
Width	961 mm / 37.8 in
Height	1282 mm / 50.5 in
Weight	1580 kg / 3483.3 lb



### AFTERTREATMENT DIMENSIONS\*

#### C7.1 ACERT

Length	919 mm / 36.2 in
Width	714 mm / 28.1 in
Height	619 mm / 24.4 in

#### C9.3 ACERT

Length	925 mm / 36.4 in
Width	714 mm / 28.1 in
Height	392 mm / 15.4 in

#### C13 ACERT, C15 ACERT, C18 ACERT

Length	1053 mm / 41.5 in
Width	779 mm / 30.7 in
Height	451 mm / 17.8 in

\*Dimensions are for base configuration without muffler.

Images may include optional attachments.





# TIER 4 FINAL

## **Commitment to Sustainable Growth**

- Meets U.S. EPA Tier 4 Final, achieving environmental benefits four years earlier than required

## **Driving Down Total Cost of Ownership**

- Legendary reliability and durability of engine and aftertreatment
- Designed to reduce engineering cost
  - Fully compliant through 2015, eliminating need for equipment redesign

## **Making Your Investment Work Harder**

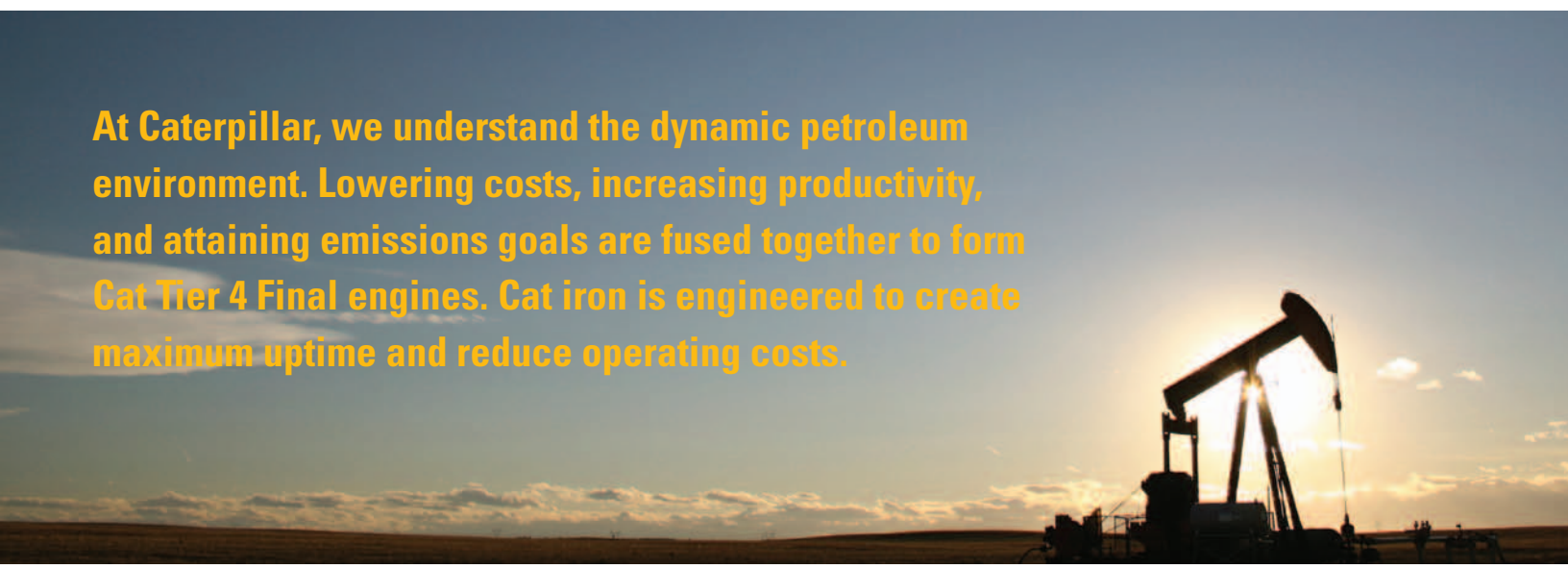
- Single-source engine, transmission, and aftertreatment designed to maximize performance of the package
- Simplified controls and customer connection points decrease time to get up and running
- Ultra low emissions allow for operation in the most highly regulated areas

## **Improving Workforce Efficiency**

- Service-free aftertreatment solution reduces costs while increasing productivity
- Optimized system minimizes operator interface with the aftertreatment
- Easy-to-use, single, state-of-the-art ADEM A4 control system for engine and aftertreatment
- Extensive factory-trained dealer network

## **Fully Integrated Petroleum Solutions**

- Optimized for the oilfield to work with Cat transmissions
- Extensive testing and validation of engine and aftertreatment in the petroleum work environment

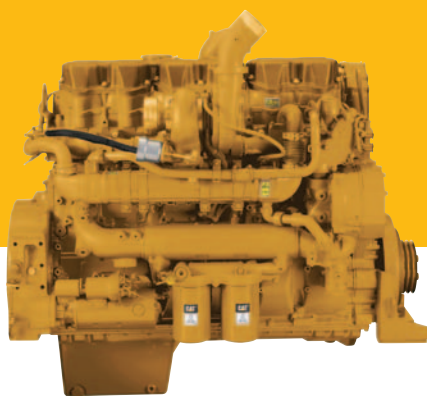


**At Caterpillar, we understand the dynamic petroleum environment. Lowering costs, increasing productivity, and attaining emissions goals are fused together to form Cat Tier 4 Final engines. Cat iron is engineered to create maximum uptime and reduce operating costs.**



## C18 ACERT

Power **563-597 bkW / 755-800 bhp**  
 Length **1530 mm / 60.2 in**  
 Width **961 mm / 37.8 in**  
 Height **1282 mm / 50.5 in**  
 Weight **1580 kg / 3483.3 lb**



## C27 ACERT

Power **597-652 bkW / 800-875 bhp**  
 Length **2160 mm / 85.0 in**  
 Width **1270 mm / 50.0 in**  
 Height **1650 mm / 65.0 in**  
 Weight **2790 kg / 6150.9 lb**



## C32 ACERT

Power **708-839 bkW / 950-1125 bhp**  
 Length **1905 mm / 75.0 in**  
 Width **1600 mm / 63.0 in**  
 Height **1549 mm / 61.0 in**  
 Weight **2770 kg / 6106.8 lb**



### AFTERTREATMENT DIMENSIONS\*

#### C18 ACERT

Length **1162 mm / 45.7 in**  
 Width **871 mm / 34.3 in**  
 Height **439 mm / 17.3 in**

#### C27 ACERT, C32 ACERT

Length **1120 mm / 44.1 in**  
 Width **400 mm / 15.7 in**  
 Height **440 mm / 17.3 in**

*\*C18 ACERT dimensions are for side-by-side configuration.  
 C27 ACERT/C32 ACERT dimensions are for single canister.  
 Two diesel oxidation catalysts are required for compliance.  
 Images may include optional attachments.*



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**To learn more about Tier 4 solutions from Caterpillar Global Petroleum,  
call your local Cat dealer or visit [www.catoilandgas.cat.com](http://www.catoilandgas.cat.com).**