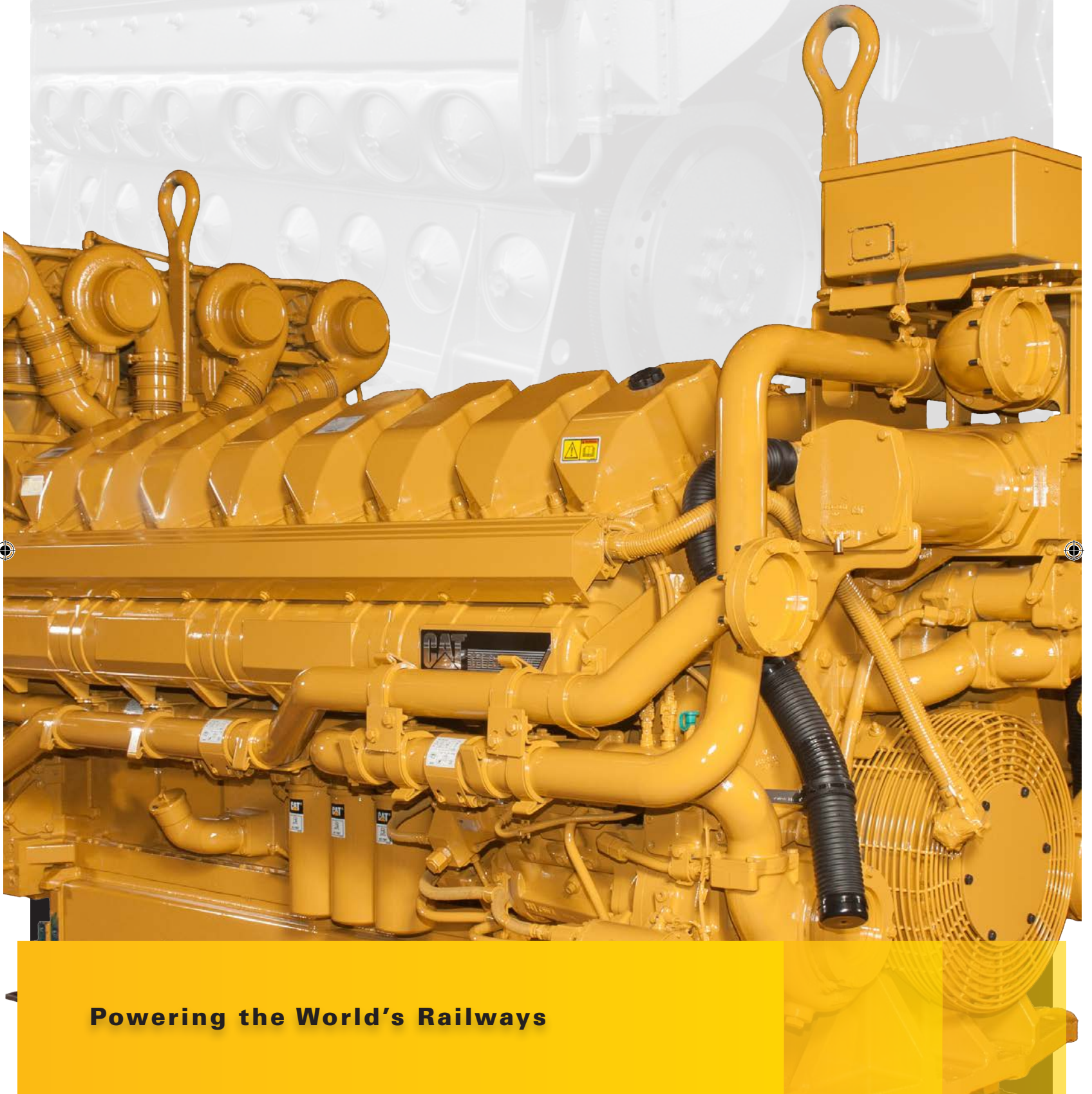


Decades of Service to the Rail Industry



Powering the World's Railways



A reputation for quality, service and innovation

Deep Expertise in the Rail Industry



Through technological advancements and customer-focused solutions, our rail customers in more than 100 countries worldwide have achieved new levels of availability, reliability and asset utilization.

Caterpillar | Many Decades in Rail

- Powering the world's locomotives since the 1930s
- More than 8,000 Cat® engines are powering locomotives across the globe today, with thousands more powering maintenance-of-way equipment
- Cat natural gas engines have been operating in locomotives for more than 20 years
- The world's broadest line of engines for the rail industry
- World's premier supplier of integrated diesel mechanical locomotive drivetrains.
- Thousands of Cat machines supplied to the maintenance-of-way industry
- Many head end power units provided for hotel electrical loads on locomotives all over the world.

Progress Rail | Broad Expertise in Rail

- The largest integrated and diversified supplier of railroad and transit products in North America, and one of the largest in the world.
- Freight and transit industries
- Track - trackwork, fasteners, welding, etc.
- Signaling - controls, engineering, infrastructure, etc.
- Maintenance-of-way equipment
- Locomotive - new, refurbishment, maintenance, etc.
- Freight cars - new, refurbishment, repair, wheels, axles, bearings, leasing, etc.
- Unique understanding of operator needs through owning and operating a short line railroad
- Complete locomotive controls

EMD | World's Premier Locomotive Innovator

- Serving the rail industry for more than 90 years.
- More than 64,000 locomotives delivered to nearly 80 countries
- Largest fleet of locomotives running in the world, with more than 30,000 active today
- Broadest portfolio of locomotives in the industry

This EMD locomotive by Progress Rail, wearing Cat yellow colors, exemplifies the deep integration of these three experienced rail entities blended into one global supplier.



EMD has been building iconic locomotives and defining the locomotive industry for over 90 years.



OUR VALUES IN ACTION

Caterpillar's Code of Conduct

- INTEGRITY
- EXCELLENCE
- TEAMWORK
- COMMITMENT
- SUSTAINABILITY



All parts of the Caterpillar family follow the high ethical standards defined by **Caterpillar's Code of Conduct**. The code puts our values and principles into action every day by providing detailed guidance on behaviors and actions that support our values of Integrity, Excellence, Teamwork, Commitment and Sustainability.

Since Cat diesel engines first powered the world's railways in the 1930s – and for thousands of locomotive installations around the world – builders and operators have found very compelling reasons to specify Cat diesel engines. Today, Caterpillar is the single most experienced name in power. Over the decades, Caterpillar engineers have designed diesel engines for the toughest railway operating environments. These power solutions have included engines for all rail applications - driving traction alternators, auxiliary power, head end power, diesel hydraulic, and diesel mechanical. These engines serve our customers well with high reliability, durability, exceptional life, and low operating costs. Caterpillar engines are engineered for life.

From this long and notable history, we now offer the industry the lowest emissions possible. Caterpillar can provide any emissions levels up to U.S. EPA Tier 4 or EU Stage V standards for locomotives and Maintenance of Way machinery.

Each year, Caterpillar supplies hundreds of thousands of engines to more than a thousand of the world's best manufacturers of equipment in all industries.



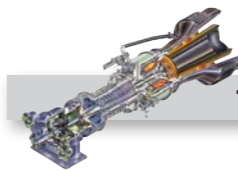
Caterpillar has been providing engines for locomotives since the 1930s. This one still runs daily!
Photo courtesy of Walkersville Southern Railroad.

Caterpillar: Where the World Turns for Big Power

- Broadest line of engines in the industry
- World's largest heavy-duty, high-power engine manufacturer
- More than \$1 billion USD invested in engine research and development each year

Solar Turbines

A Caterpillar Company



1120-22,400 kW



1020-16,000 kW



1500-3700 kW



400-4300 kW



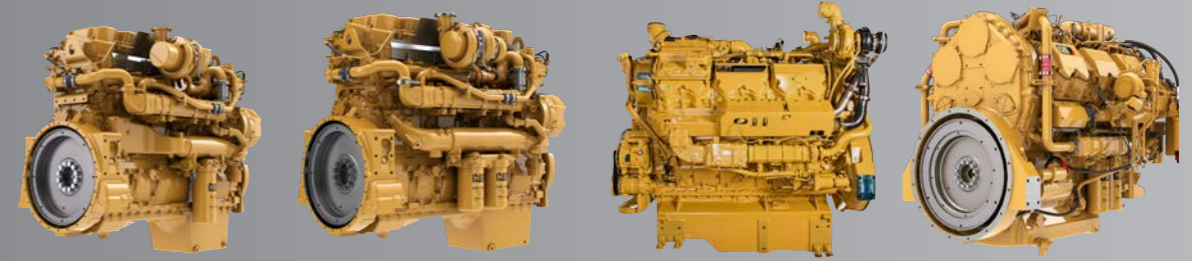
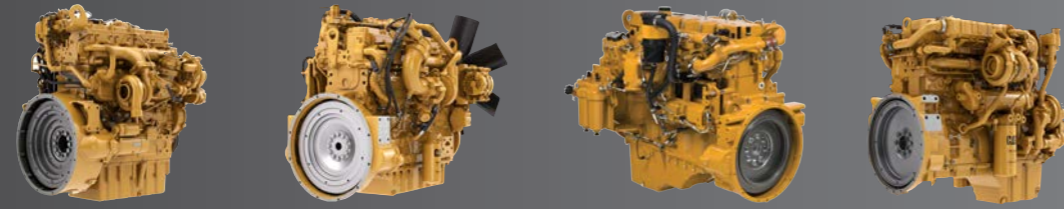
10-5000 kW



4-2000 kW



Engine Specifications



| Engine | C4.4 | C7.1 | C9.3 | C13 |
|-----------------|--------------|------------|--------------------|----------------|
| Power (kW) | 61.5-129.4 | 116-175 | 205-280 | 287-388 |
| Power (HP) | 82.5-173.5 | 156-235 | 275-395 | 385-520 |
| Speed (RPM) | 2,200 | 2,200 | 1,800-2,200 | 1,800-2,100 |
| Emissions* | T4, IIIB, IV | T4, IIIB | T4, IIIA, IIIB, IV | T4, IIIA, IIIB |
| Length (mm) | 845.1 mm | 1,063.7 mm | 1,119 mm | 1,272 mm |
| Length (Inches) | 33.3 in | 41.9 in | 44 in | 50.1 in |
| Height (mm) | 867.6 mm | 907 mm | 1,066 mm | 1,132 mm |
| Height (Inches) | 34.1 in | 35.7 in | 41.9 in | 44.6 in |
| Width (mm) | 772.5 mm | 753 mm | 1,025 mm | 996 mm |
| Width (Inches) | 30.4 in | 29.6 in | 40.4 in | 39.2 in |
| Weight (Kg) | 420 | 715 | 885 | 1,143 |
| Weight (Lbs) | 926 | 1,576 | 1,950 | 2,520 |

| Engine | C15 | C18 | C27 | C32 |
|-----------------|--------------------|--------------------|-------------|-------------|
| Power (kW) | 328-444 | 429-597 | 597-858 | 708-1,007 |
| Power (HP) | 440-595 | 575-800 | 800-1120 | 950-1,350 |
| Speed (RPM) | 1,800-2,100 | 1,800-2,100 | 1,800-2,100 | 1,800-2,100 |
| Emissions* | T4, IIIA, IIIB, IV | T4, IIIA, IIIB, IV | IIIA, IIIB | IIIA, IIIB |
| Length (mm) | 1,438 mm | 1,462 mm | 1,896 mm | 1,819 mm |
| Length (Inches) | 56.6 in | 57.5 in | 75 in | 71.6 in |
| Height (mm) | 1,248 mm | 1,296 mm | 1,557 mm | 1,442 mm |
| Height (Inches) | 49.1 in | 51 in | 61 in | 56.7 in |
| Width (mm) | 969 mm | 1,194 mm | 1,264 mm | 1,527 mm |
| Width (Inches) | 38.1 in | 47 in | 50 in | 60 in |
| Weight (Kg) | 1,542 | 1,542 | 2,790 | 2,946 |
| Weight (Lbs) | 3,395.5 | 3,399 | 6,151 | 6,495 |

*Emissions regulations around the world are complicated, please contact us for specifics in your situation.

Caterpillar follows a policy of continuous product improvement. For this reason, some material and specifications in this guide could change without notice. Please contact us for the most recent specifications and dimensions.

Engine Specifications



| Engine | 3508B | 3508C | 3512B | 3512B HD | 3512C HD |
|-----------------|---------------|---------------|---------------|---------------|------------------|
| Power (kW) | 820 / 970 | 920 / 1,000 | 1,455 / 1,500 | 1,570 / 1,700 | 1,380 / 1,700 |
| Power (HP) | 1,100 / 1,300 | 1,234 / 1,340 | 1,950 / 2,000 | 2,100 / 2,280 | 1,850 / 2,280 |
| Speed (RPM) | 1,800 | 1,800 | 1,800 | 1,800 | 1,800 |
| Emissions* | LRC | LRC | LRC | LRC | T2, T3, T4, IIIA |
| Length (mm) | 2,016.7 mm | 2,016.7 mm | 3,031.6 mm | 3,031.6 mm | 3,031.6 mm |
| Length (Inches) | 79.4 in | 79.4 in | 119.36 in | 119.36 in | 119.36 in |
| Height (mm) | 1,959.9 mm | 1,959.9 mm | 1,960.1 mm | 1,960.1 mm | 1,960.1 mm |
| Height (Inches) | 77.16 in | 77.16 in | 77.17 in | 77.17 in | 77.17 in |
| Width (mm) | 1,562.9 mm | 1,562.9 mm | 1,726.4 mm | 1,726.4 mm | 1,726.4 mm |
| Width (Inches) | 61.53 in | 61.53 in | 67.96 in | 67.96 in | 67.96 in |
| Weight (Kg) | 4,582 | 4,582 | 6,863 | 6,863 | 6,863 |
| Weight (Lbs) | 10,100 | 10,100 | 15,130 | 15,130 | 15,130 |

| Engine | 3512E HD | 3516B | 3516B HD | 3516C HD | C175-16 | C175-20 |
|-----------------|---------------|---------------|-----------------------|------------|------------------|----------|
| Power (kW) | 1,600 / 1,800 | 1,618 / 2,060 | 2,060/2,100/ 2,240 | 2,240 | 2,800 / 3,000 | 3,750 |
| Power (HP) | 2,146 / 2,400 | 2,250 / 2,760 | 2,762/2,816/ 3,004 | 3,000 | 3,753 / 4,023 | 5,026 |
| Speed (RPM) | 1,800 | 1,800 | 1500/1800 | 1,800 | 1,800 | 1,800 |
| Emissions* | T4, IIIB | LRC | UIC2 | T2, IIIA | IIIA, IIIB | T4 |
| Length (mm) | 3,031.6 mm | 2,996 mm | 2,966 mm | 2,996 mm | 4,325 mm | 4,825 mm |
| Length (Inches) | 119.36 in | 117.95 in | 117.95 in | 117.95 in | 170.27 in | 190 in |
| Height (mm) | 1,960.1 mm | 2,106.8 mm | 1,943 mm | 2,106.8 mm | 2,360 mm | 2,357 mm |
| Height (Inches) | 77.17 in | 82.94 in | 76.50 in | 82.94 in | 92.91 in | 92.79 in |
| Width (mm) | 1,726.4 mm | 1,561.6 mm | 1,521 mm | 1,561.6 mm | 1,800 mm | 1,815 mm |
| Width (Inches) | 67.96 in | 61.48 in | 59.88 in | 61.48 in | 70.86 in | 71.45 in |
| Weight (Kg) | 7144 | 8956 | 7720 | 8956 | 12,500 | 17,050 |
| Weight (Lbs) | 15,750 | 19,745 | 17,020 | 19,745 | 27,558 | 37,589 |

*Emissions regulations around the world are complicated, please contact us for specifics in your situation.

Caterpillar follows a policy of continuous product improvement. For this reason, some material and specifications in this guide could change without notice. Please contact us for the most recent specifications and dimensions.

Legacy Engines



| Engine | 3406C | 3508A |
|-----------------|---------------|-------------|
| Power (kW) | 298 / 343 | 507-746 |
| Power (HP) | 400 / 460 | 680-1,000 |
| Speed (RPM) | 1,800 / 2,100 | 1,200-1,800 |
| Emissions* | LRC | LRC |
| Length (mm) | 1,066 mm | 2,136 mm |
| Length (Inches) | 65.35 in | 184 in |
| Height (mm) | 1,335 mm | 1,720 mm |
| Height (Inches) | 52.56 in | 68 in |
| Width (mm) | 906 mm | 1,703 mm |
| Width (Inches) | 35.67 in | 67 in |
| Weight (Kg) | 1,300 | 4,309 |
| Weight (Lbs) | 2,866 | 9,500 |

*Emissions regulations around the world are complicated, please contact us for specifics in your situation.

Medium-Speed EMD Engines

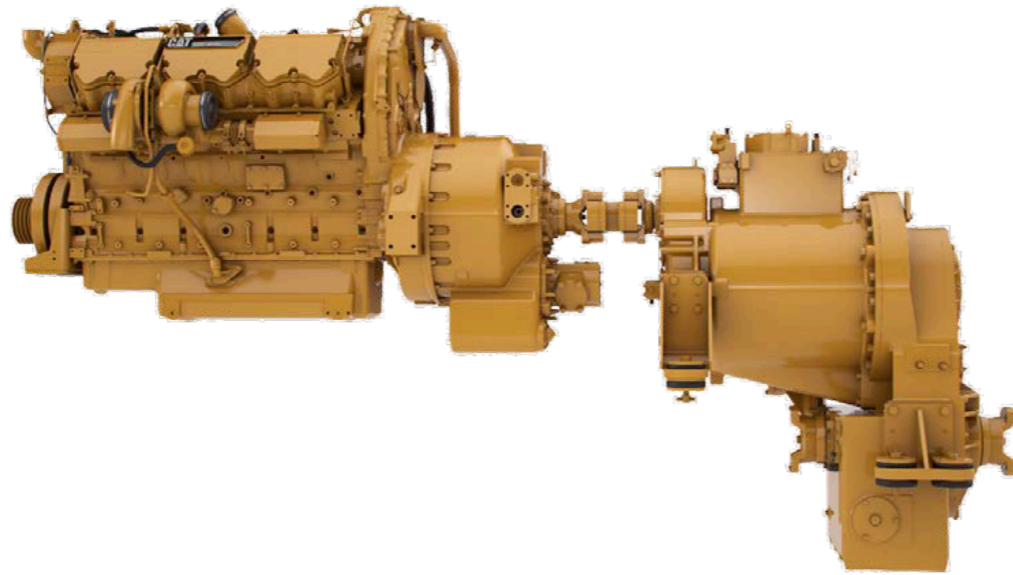


| Engine | 8-710 | 12-710 |
|-----------------|------------------|------------------|
| Power (kW) | 1,640 | 2,460 |
| Power (HP) | 2,200 | 3,300 |
| Speed (RPM) | 900 | 900 |
| Emissions* | IIIA, T2, T3, T4 | IIIA, T2, T3, T4 |
| Length (mm) | 3,632 mm | 4,597 mm |
| Length (Inches) | 143 in | 181 in |
| Height (mm) | 2,743 mm | 2,743 mm |
| Height (Inches) | 108 in | 108 in |
| Width (mm) | 1,727 mm | 1,727 mm |
| Width (Inches) | 68 in | 68 in |
| Weight (Kg) | 11,300 | 14,600 |
| Weight (Lbs) | 24,912 | 32,187 |

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Diesel-Mechanical Power Trains

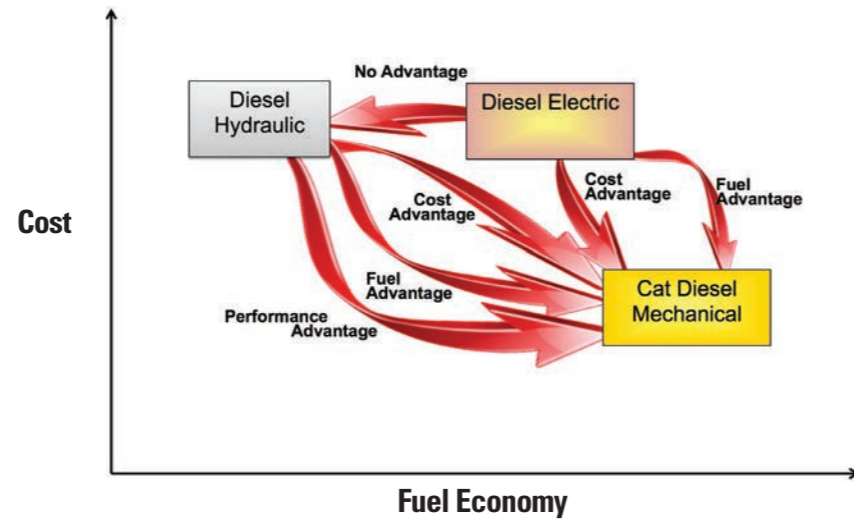


Caterpillar offers a complete line of Cat diesel engines coupled to modern, highly efficient, Cat transmissions.

This modern alternative to traditional locomotive propulsion offers lower initial cost and higher efficiency than either diesel-electric or diesel-hydraulic power – a significant advantage in life cycle costs.

If your project is 1200 kW (or 1500 HP) or below, ask us about this unique solution to power a rail vehicle for less initial cost and less operating cost.

- Locomotive
- Shunter
- Switcher
- Maintenance-of-way
- Utility
- etc.



Cat diesel-mechanical systems are significantly lower cost than either diesel-hydraulic or diesel-electric and gives significantly better fuel economy.

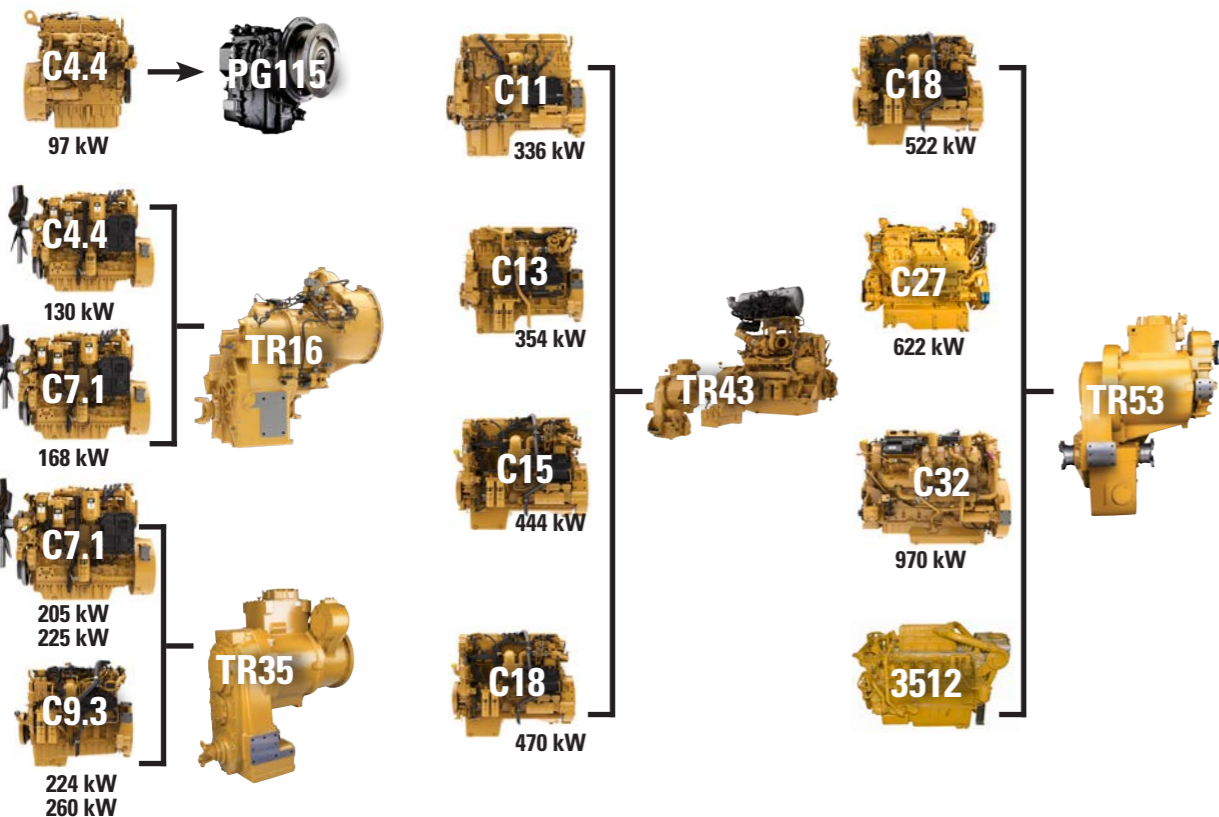
Diesel-Mechanical Transmissions



| | PG115 | TR16 | TR35 | TR43 | TR43 | TR43 HT | TR53 | TR53-2Sp Dropbox |
|----------------------|---------------|-------------------|-----------|-----------|-----------|-----------|-------------------------|-----------------------------|
| Power (kW) | 60 - 97 | 138 - 172 | 164 - 261 | 298 - 354 | 373 - 470 | 500 - 571 | 597 - 1,120 | 597 - 1,120 |
| Power (HP) | 80-130 | 185-231 | 220-350 | 400-475 | 500-630 | 670-765 | 800-1,500 | 800-1,500 |
| Configuration | Integral | Integral & Remote | Integral | Integral | Remote | Remote | Remote | Remote |
| Drop Length (mm) | 180 302.5 | 495 | 542 | 609.6 | 759.5 | 759.5 | 800 898.7 1,001.5 | 1,001.5 |
| Drop Length (Inches) | 7.09 11.91 | 19.49 | 21.34 | 24 | 29.9 | 29.9 | 32.49 35.38 39.43 | 39.43 |
| Gears | 3F / 3R | 3F / 3R | 4F / 4R | 4F / 4R | 4F / 4R | 4F / 4R | 3F / 3R | 3F / 3R High 3F / 3R Low |
| Weight (Kg) | 303 | 625 | 1,497 | 1,817 | 1,350 | 1,350 | 3,980 | 4,545 |
| Weight (Lbs) | 668 | 1,378 | 3,300 | 4,006 | 2,976 | 2,976 | 8,774 | 10,020 |

“Diesel-mechanical shunters or switchers can be built for 25% less cost than diesel-electric shunters or switchers.”

- Caterpillar customer



Complete Propulsion Packages

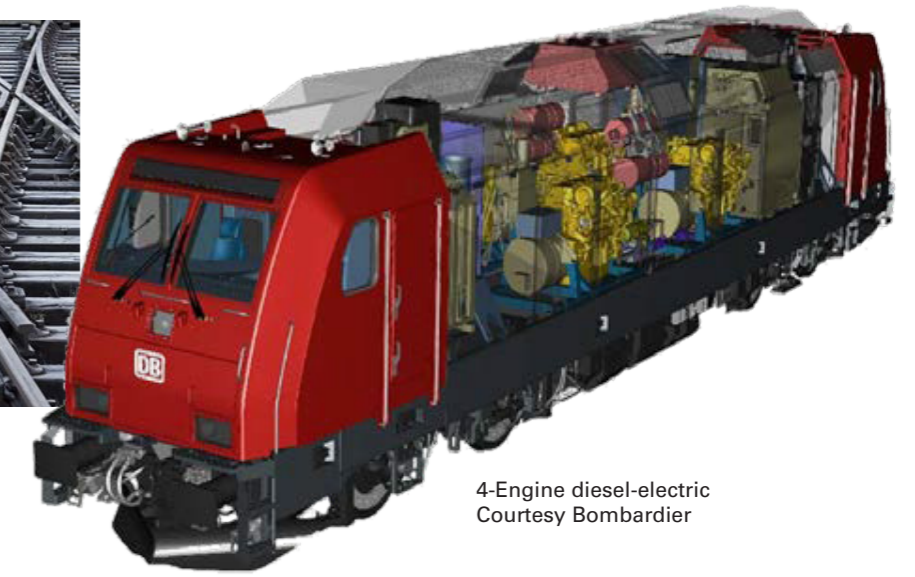


Tasrail loco with 3512C HD and traction alternator package



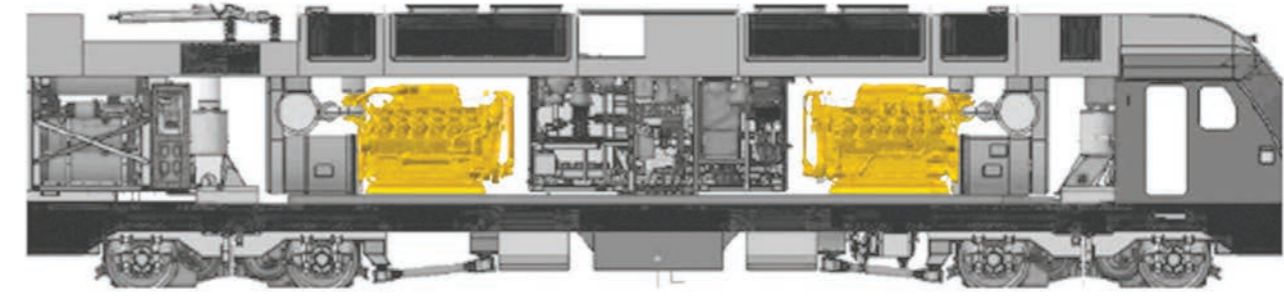
Indonesia loco with 3512B and C15 Head-End Power Package

Multi-Engine Experience

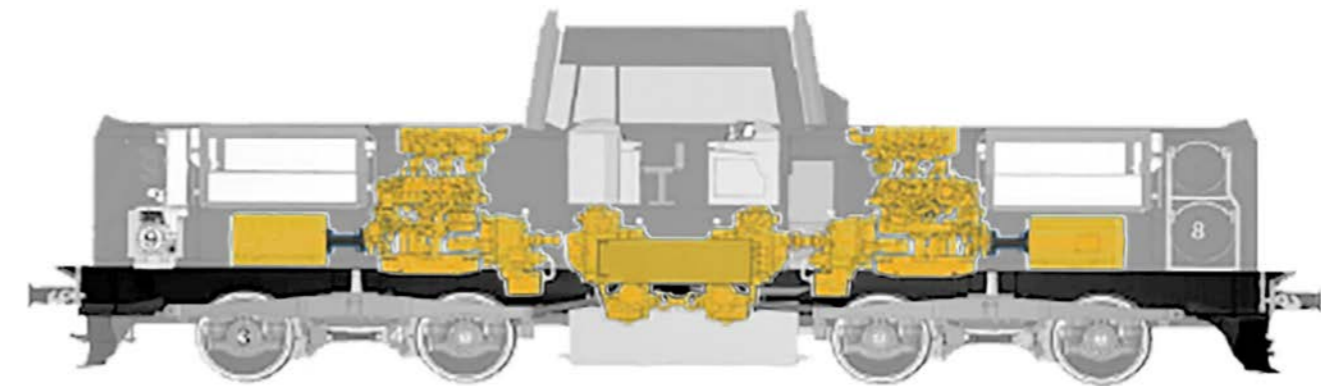


4-Engine diesel-electric
Courtesy Bombardier

We've partnered on numerous successful multiple-engine locomotive projects globally.



2-Engine diesel-electric
Courtesy Bombardier



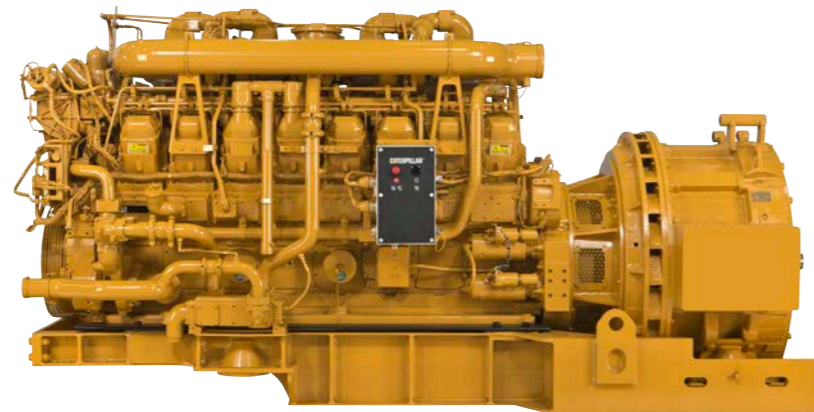
2-Engine diesel-mechanical
Courtesy Reloc SA

3516BHD with alternator



Our vast scope of supply allows us to offer partial or complete, turnkey propulsion packages for your new or refurbished locomotive project.

- Engine
- Alternator
- Auxilliary alternator, exciter, battery charger
- Mounting Skid
- Cooling System
- Locomotive Controls
- Traction Motors
- Axles, Wheels
- Compressors
- Displays
- Relays
- Electrical locker etc.
- Etc.



3516B HD with alternator package for Thailand



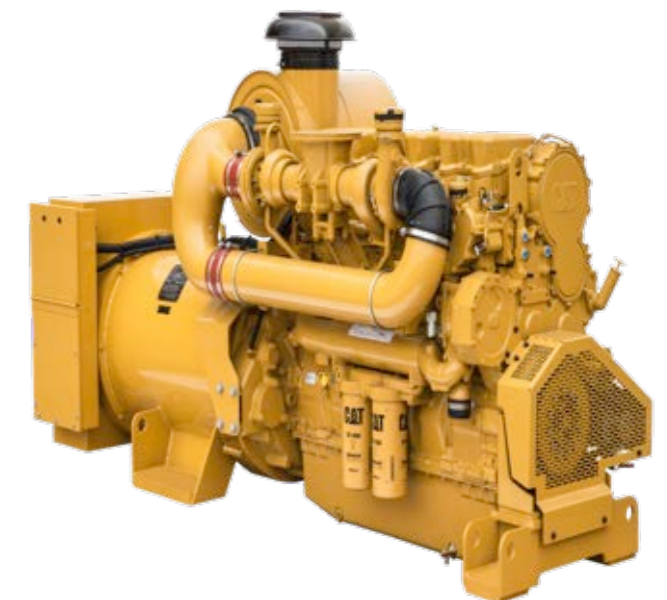
C15 engine package with alternator and custom control panel

And, our team of experienced engineers can custom design propulsion packages to your locomotive's specifications, no matter where you are in the world.

HEP Packages

(Head End Power / Hotel Power)

We've supplied numerous HEP units to the industry, and with our broad selection of engine power ranges to choose from, we're certain to have the precise power you need for your electrical demands.



Controls for Diesel-Electric Locomotives



Controls for Diesel-Mechanical Locomotives



Caterpillar offers a full range of control systems developed exclusively for rail industry demand in Diesel-Electric locomotives.

NANO Automation System – SAL NANO FULL Automation System – SAL-05

Both Systems have the same concepts and same benefits... Excitation control, Auxiliary generation control, adhesion control, Mechanical and Electronic engine communication capability, event recorder, Human-Machine Interface, maintenance and diagnostics tools, ZSS ready, full documentation for installation, new electric schematic, wire running list, pre-assembled panels.

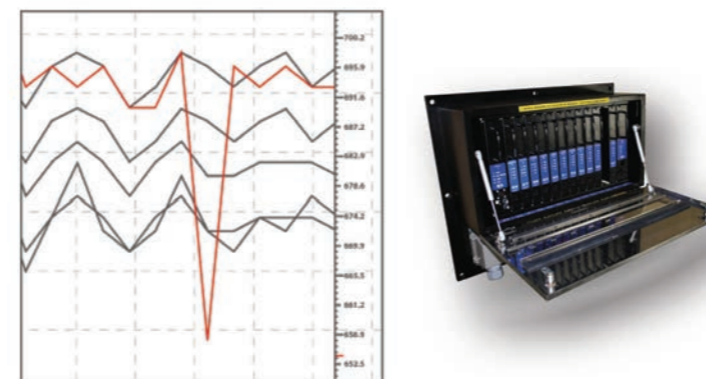
But different approaches...

NANO:

Perfect match for small locomotives (switcher), simpler automation required, essential functionalities supported, lean installation, full protection for vital equipment (Traction Motors, Generators, Diesel Engine)

SAL-05:

Full system, perfect match for complex automation, wide range of functionalities supported, ready for genset operation (2+ simultaneously engines), individual axle control (choppers for DC or Inverters for AC), load shedding, battery saver, Tri-State Charging.



Caterpillar Select Controls (CSC)

- CSC is a configurable control system for Cat locomotive powertrains
- CSC can be a standalone locomotive controller, or can interface with a customer controller/PLC
 - Input options are J1939 messages and hardwire switch to ground inputs
- Multiple Control Station Configurations
 - Single or Multiple Stations
 - Single or Multiple Locomotives through one Operator Station

Shift Features

- Automatic Shifting
- Manual Shifting
- Neutralizer
- Gear Hold
- Min/Max Gear Configurable
- Alternate Shift Schedule

Locomotive Features

- Vigilance/Alerter
- Park Brake Control
- Traction Control
- Auxiliary Outputs
- Emergency Stop
- Powertrain Monitor
- Fuel Level Monitor
- Odometer
- Operation Hour Counter

Engine Features

- Engine Start Control
- Engine Speed Control
- Locomotive Speed Limit
- Constant Speed Control

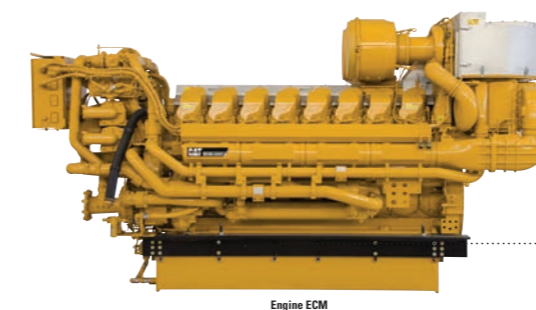
Cat Connect

Caterpillar offers a broad range of electronic systems developed exclusively for rail industry demand.

- DC/DC converters for Traction (Chopper);
- DC/AC converters for traction and for auxiliaries (Inverters);
- Man Machine Interface with dedicated embedded application;
 - Remotely Telemetry Monitoring / Data Logger
 - Server analysis – backlog and data exchange;
- Wide range on Current and Voltage transducers;
- Speedometers with redundancy monitoring (GPS, Radar, Axle generator);
- Ultrasonic Fuel Level Sensor;
 - Ditch-Light Controllers;
 - Start Stop System for Stand Alone Application;

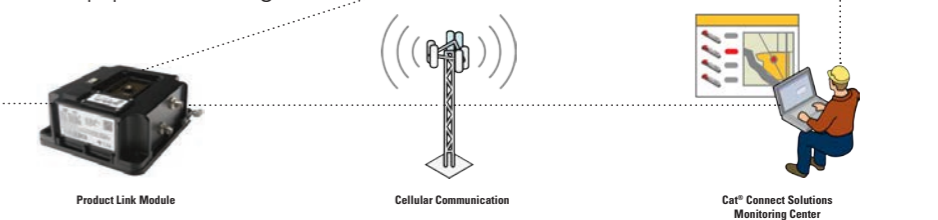


CAT CONNECT



Increase Uptime and Reduce Operating Costs

- Know the location, health, and efficiency of your equipment
- Advanced Proactive Diagnostics
- Receive expert recommendations
- Reduce costs through preventive maintenance, fleet optimization, and equipment lifecycle management
- Equipment Management



Natural Gas

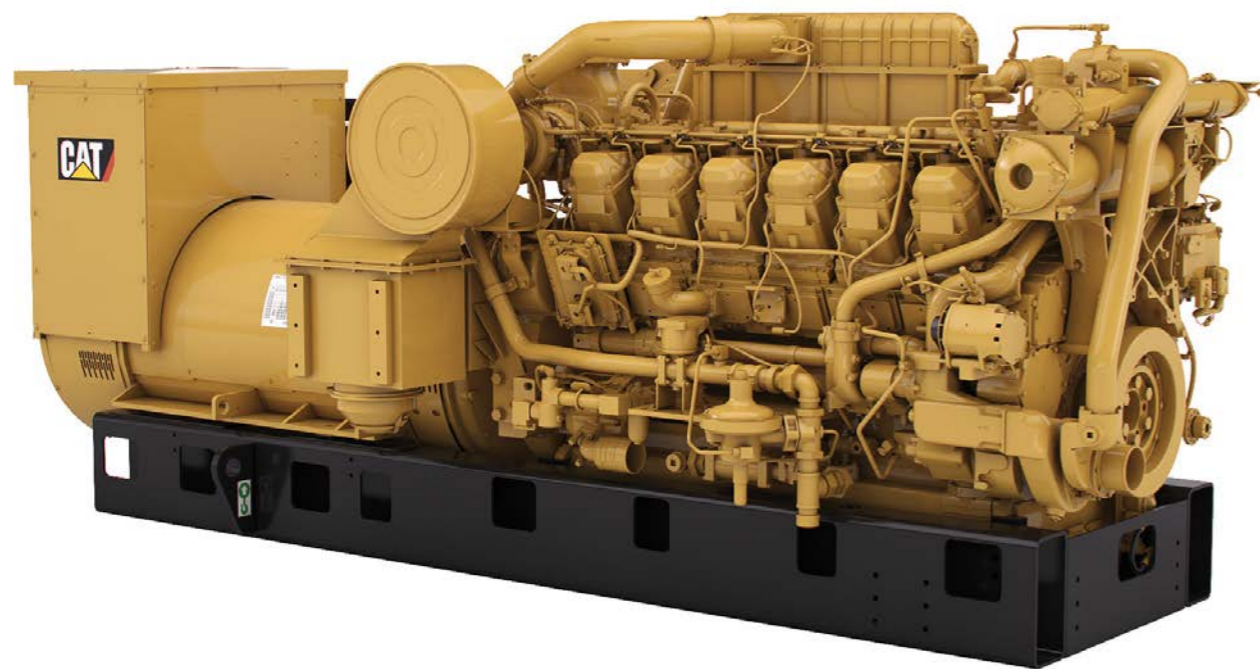


- Caterpillar offers vast expertise to help the rail industry adopt natural gas.
- We've been using and selling gas engines for more than 65 years.
- We've shipped more than 20,000 gas engines (40 million horsepower).
- We incorporated natural gas engines into locomotives more than 20 years ago.

Dynamic Gas Blending

- Dynamic-gas blending (DGB) is proving to be the most practical route to using gas and its associated advantages.
- We have the extensive experience with DGB to assist you with your project.
- We have over 2000 DGB engines running in the field today.
- High substitution rates
 - Unique diesel injection timing map for Gas Blending Mode
 - Improved substitution
 - Maintains engine safety, reliability, and durability
 - Continuously maximized substitution as loads and gas changes
 - Maintains diesel power and transient capability
 - Keeps engine out of detonation
 - No manual setup, extra commissioning, or tuning
 - No need to retune or swap controls as sites, gas quality change
 - Intuitive controls for operator input/output

If you're considering a switch to natural gas, call us. We've been there and can help.



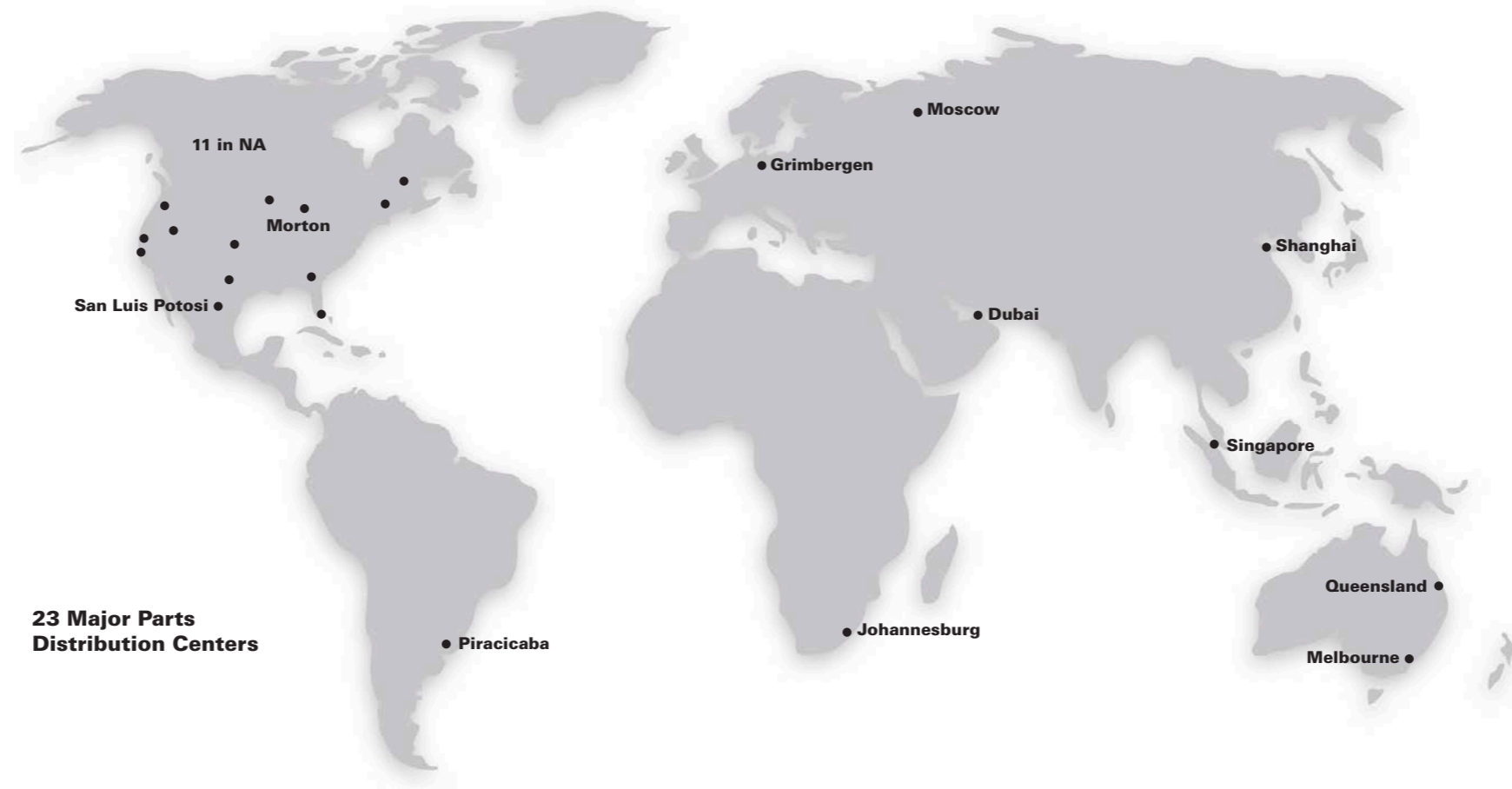
Service and Support



“Best in World” Product Support

- The strongest customer support network in the world
- Customer access to a total support team and solutions
- Personnel that understand their customer, and their customers’ businesses
- Maximum customer uptime and productivity
- Support wherever and whenever needed
- Global presence with local support by 189 Cat Dealers and more than 117,000 trained Dealer personnel
- Over 2100 dealer locations
- Cat Dealers are trained, experienced, equipped and ready to support Cat drivetrains with consistent standards and processes – anywhere in the world

Best in the World, Anywhere in the World



Customer Support Agreement

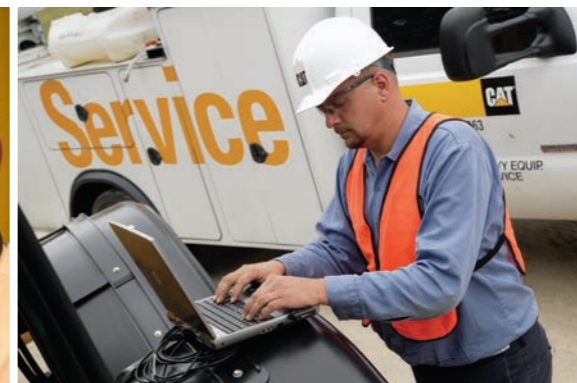
Ensure that your Cat equipment provides the maximum productivity and operating economy throughout its working life with a Customer Support Agreement (CSA).

The CSA with your Cat dealer is tailored to fit your business needs. It can range from Preventive Maintenance (PM), including parts, labor, inspection, SOS, and electronic data monitoring to sophisticated Total Cost Performance and Repair (TM&R) that includes PM as well as all repairs and planned overhauls.

An **Extended Service Contract (ESC)** extends standard warranty coverage that covers replacement parts, repair time labor and travel time and other expenses for the repair.

“Best in World” Parts Network

- 23 facilities operating on six continents (24 / 365)
- 10 million ft² combined storage
- 700,000+ part numbers serviced
- 435,000 part numbers stocked
- 135,000 line orders per day
- Parts Counter
- PartStore™
- 189 Dealers to search for parts
- Parts priority from assembly line
- Recommended parts stock lists



Notes



Email us at:
Rail-Power@cat.com

Get the Power
of Caterpillar
Behind Your
Locomotive

Powering the World's Railways

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