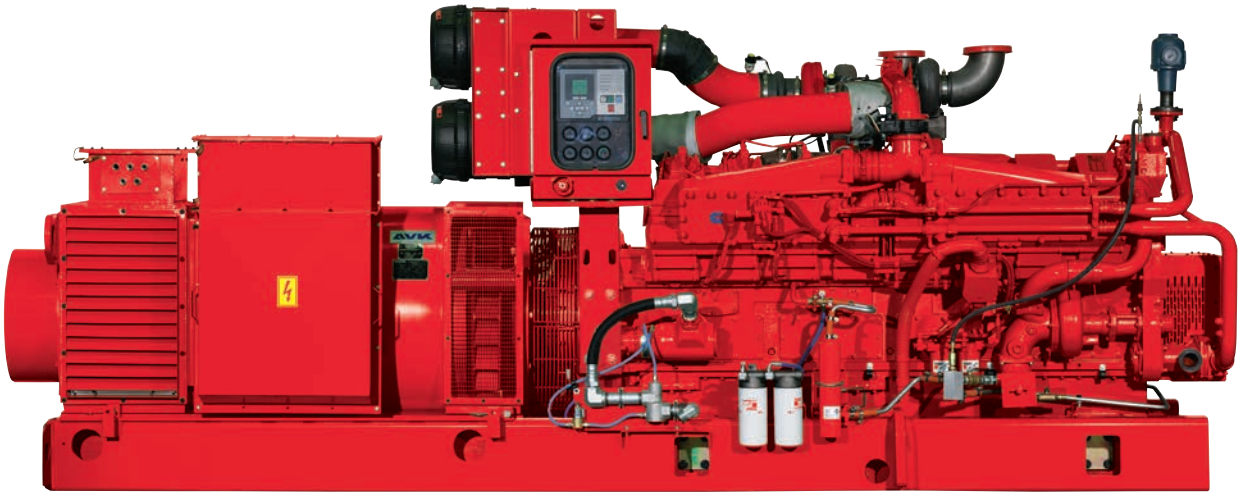
QSK50
U.S. EPA TIER 2

60Hz DRILLING POWER MODULE



CUMMINS LAND-BASED DRILLING POWER MODULES ARE DESIGNED AND TESTED BASED ON OIL-FIELD CUSTOMER REQUIREMENTS TO PROVIDE OPTIMUM PERFORMANCE, RELIABILITY AND VERSATILITY. THESE POWER MODULES DELIVER WORLD-CLASS UPTIME AND A LOW TOTAL COST OF OWNERSHIP THROUGH HIGH FUEL EFFICIENCY AND LONG LIFE-TO-OVERHAUL.

The entire power module is designed, developed, assembled, tested, and delivered with the full force of Cummins behind it. This means that the entire power module is fully supported with parts and service available worldwide. Drilling contractors can expect seamless, consistent support wherever the rig operates.

CUSTOM OPTIONS

Standard specifications and options are shown. Cummins also can provide custom factory packages.

FEATURES

- **Cummins diesel engine —** The legendary QSK50 four-stroke diesel engine provides reliable power, delivers fast response to load changes and is compliant to U.S. Environmental Protection Agency (EPA) Tier 2 emissions standards.
- **Alternator —** Form-wound stator and rotor, designed, tested and sized for drill rig service; low waveform distortion with nonlinear loads; fault-clearing short-circuit capability.
- **Control system —** Full-authority electronic controls that provide complete engine monitoring and automatic adjustment for peak performance and fuel efficiency, plus full diagnostics and prognostics.
- **Warranty and service —** Backed by a global standard Cummins factory warranty and supported by over 600 worldwide Cummins-authorized service locations.

RATINGS

Model	QSK50-DPM	**Alternator rating**	1750 kVa (1225 kWe)*
Frequency	60 Hz	**Power module rating**	1003 kWe*
Voltage	600 V		
Speed	1200 rpm	**Emissions**	EPA Tier 2
Engine power	1480 hp (1104 kWm)		

**Total output of package varies with cooling system and alternator configuration.*

GENERAL SPECIFICATIONS

Engine type	Cummins QSK50 V-16, four-stroke diesel	**Weight w/o radiator**	29,500 lb (13,381 kg)
Bore	6.26 in (159 mm)	**Lube oil capacity**	72 gal (273 liters)
Stroke	6.26 in (159 mm)	**Base design**	Three-point mounting
Displacement	3,082 in^3 (50.3 liters)	**Alternator rotor design**	Two-bearing
Aspiration	Turbocharged and aftercooled		
Governor	Electronic	**Alternator insulation**	Class H
Cooling System	Horizontal or remote vertical discharge		

Standard Equipment

AIR INTAKE SYSTEM
- Factory-installed heavy-duty air cleaners
- Factory-installed air inlet shutoff valves

CONTROL SYSTEM
- Package-mounted control-and-monitoring system provides warning and shutdown protection for the power module
- Simple Control Panel:
  - Provides warning and engine shutdown protection
  - Monitors and protects all critical engine functions

FUEL SYSTEM
- Dual stage filtration system with integrated water separation
- Modular Common Rail Fuel System (MCRS) generates clean, quiet and efficient power
- MCRS technology helps reduce noise emissions and engine vibration, resulting in a safer and more comfortable work environment

LUBE OIL SYSTEM
- High-capacity structural oil pan
- Service-free open crankcase ventilation system
- Centrifuge oil filtration option available

COOLING SYSTEM
- Dual-core base-mounted radiator
- Electric or mechanical fan drive system
- Horizontal and remote vertical discharge systems available
- Standard radiator options available for up to 50°C
- Thermostat-controlled outlets

STARTING SYSTEM
- Air starter

MOUNTING ARRANGEMENT
- Three-point-mounted to sub-base
- Isolation pads at mounting points
- Vertical lift provisions on base

ALTERNATOR
- Two-bearing, 600 V, 60 Hz, three-phase, 0.7 pf, six-wire, WYE-connected
- Brushless type
- Standard anti-condensation heater
- Standard winding and bearing RTDs
- Custom alternator specifications available on request

Standard specifications and options are shown. Cummins can provide custom factory packages.

ALTERNATOR SPECIFICATIONS			
Design	Brushless, six-pole, revolving field	**Alternator cooling**	Direct-drive Centrifugal Blower Fan
Rotor	Two-bearing	**Efficiency @ 0.7 pf**	95.36
Insulation system	Class H	**Subtransient reactance**	(X"d, unsaturated = 0.126 p.u.)
Temperature rise	80ºC/50ºC	**Subtransient reactance**	(X"d, saturated = 0.123 p.u.)

TECHNICAL DATA

Rating	1428 kVA (1000 kWe @ 0.7 pf)	**Poles**	6
Power factor	0.70	**Speed**	1200 rpm
Voltage (line-neutral/line-line)	347/600 V	**Overspeed limit (60 seconds)**	125%
Current	1683 A	**Enclosure**	IP23 with Air Inlet Filter
Frequency	60 Hz		

DIMENSIONS AND WEIGHTS (WITHOUT COOLING SYSTEM)

Model	Length	Width	Height	Set dry weight kg (lb)
QSK50-DPM	5,159 (203.1)	2,040 (80.3)	1,756 (69.1)	14,120 (31,260)

Note: Weights represent a set of standard features. See outline drawings for weights of other configurations.

ENGINE SPECIFICATIONS

Engine manufacturer	Cummins Inc.	**Gross engine power output**	1480 hp (1104 kWm)
Model	QSK50	**Displacement**	3,069 in^3 (50.3 liters)
Design	4-stroke, V-block, turbocharged and aftercooled	**Cylinder block configuration**	Cast iron, 60° V, 16-cylinder
Injection system	MCRS	**Engine speed**	1200 rpm
Aspiration	Turbocharged and low temperature aftercooled		

COOLING

Ambient design	Standard 50°C

Cummins is a pioneer in product improvement. Thus, specifications may change without notice. Illustrations may include optional equipment.

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cummins.com

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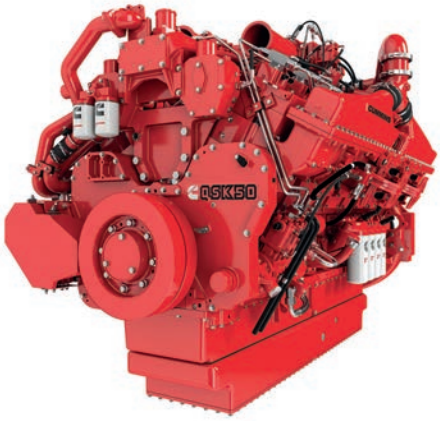
SERIOUS POWER FOR SERIOUS OPERATIONS

QSK50 TIER 4 ENGINE FOR MINING APPLICATIONS



FOR A WORLD THAT'S ALWAYS ON™

Cummins®

WE'RE ALWAYS EVOLVING THE QSK50, AND IT SHOWS

The QSK50 Tier 4 builds upon its legendary robustness with enhanced engine power and improved reliability while in compliance with EPA Tier 4 and EU Stage V emissions regulations.

The QSK50 brings together two powerful technologies: the Cummins high pressure Modular Common Rail Fuel System (MCRS) and Selective Catalytic Reduction (SCR) System. The MCRS fuel system provides precise control of the fuel ejection event that results in lower noise, vibration and smoke, and optimized fuel economy. By using SCR technology, we're able to protect engine performance and power density, while improving fuel economy over previous engine models, without increasing heat rejection or the engine footprint, equating to best in class cost of production (COP).

These capabilities are available in a wide range of heavy-duty front-end loaders, excavators, and haul trucks, with engine power outputs from 1500 hp to 2000 hp (1119-1491 kW). Whatever you need, the QSK50 delivers.

BUILT TO LAST, AND THEN SOME

- **A SMARTER FUEL SYSTEM**
  Means optimal fuel economy, but more than that, it also creates a quieter and smoother environment for your equipment operators. The system provides constant high injection pressure regardless of engine speed or load condition, which results in smooth engine operation throughout the rpm range and increased low-end torque.
- **PERFORMANCE FILTER TECHNOLOGY**
  NanoNet® Advanced Media Technology filters out the smallest impurities that impede optimal engine performance. This technology extends the service intervals of your fuel filters while maintaining high efficiency and reducing downtime and maintenance costs.
- **DOUBLE THE FILTER LIFE**
  NanoForce® Air Filters can more than double your filter life, extend maintenance intervals, keep your engine running longer and improve COP.

DATA IS POWERFUL TOO

Through Cummins PrevenTech® Mining, we can empower you with innovative digital solutions for remote engine monitoring, prognostics, and customer alert creation and notifications, which improve productivity, reduce costs, and optimize maintenance and servicing.

SERVICE AND SUPPORT WE'VE GOT YOUR BACK

- **GLOBAL SUPPORT NETWORK**
  Distributor branches in over 190 countries to support your parts and service needs, no matter where your equipment is located.
- **CUMMINS CARE**
  Our unique solutions center with experts who have specialized skill sets, experience, and in-depth knowledge, to help you problem-solve fast and assist you with your service and support needs.
- **BEST WARRANTY IN THE INDUSTRY**
  QSK50 engines are backed by the best warranty in the industry, with full coverage for unlimited hours during the first year, extending through two years or 2,000 hours, whichever occurs first. Major-components coverage continues through the third year or 10,000 hours, whichever occurs first. Extended protection plans are available.
- **QUICKSERVE™ ONLINE MOBILE**
  With Cummins, one of the most comprehensive and powerful parts and service tools in the industry is all yours.

BREAKING NEW GROUND WITH PLANET 2050

In 2014, Cummins adopted its first comprehensive sustainability plan. Planet 2050 builds on this with 2050 aims and incremental 2030 goals. One of those goals is to partner with customers to reduce greenhouse gas (GHG) emissions from products in the field by 55 MILLION METRIC TONS. This is accomplished by improving the efficiency of our products. For more information on Planet 2050, visit cummins.com.

RATINGS		
ENGINE MODEL*	**ADVERTISED HP (KW) @ RPM**	**PEAK TORQUE LB-FT (N•M) @ RPM**
QSK50 2000**	2000 (1491) @ 1900	5805 (7871) @ 1500
QSK50 1675**	1675 (1249) @ 1800	5375 (7288) @ 1500
QSK50 1600	1600 (1193) @ 1800	5044 (6839) @ 1500
QSK50 1600	1600 (1193) @ 1800	5041 (6834) @ 1500
QSK50 1575	1575 (1175) @ 1900	5450 (7369) @ 1300
QSK50 1500	1500 (1119) @ 1900	5044 (6839) @ 1400

SPECIFICATIONS		
Aspiration	Single-Stage, Turbocharged, Aftercooled	Two-Stage, Turbocharged, Aftercooled and Intercooled
Displacement in (l)	50.3 (3069.5)	50.3 (3069.5)
Bore in (mm)	6.3 (159)	6.3 (159)
Stroke in (mm)	6.3 (159)	6.3 (159)
Length in (mm)	112.3 (2853)	104.6 (2656)
Width in (mm)	60.5 (1537)	72.9 (1852)
Height in (mm)	45.6 (1157)	73.9 (1878)
Engine Type	V-16	V-16

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PERFORMANCE
THAT'S
GROUND
BREAKING
Cummins
ALWAYS ON

WHY CHOOSE CUMMINS

WHO WE ARE

Cummins Inc. is a global power leader designing, manufacturing, distributing and servicing engines and related technologies including fuel systems, controls, air handling, filtration, emission solutions and electrical power generation systems. With over 100 years of diesel experience, the company is now developing a range of complementary power solutions including electric, hybrid, natural gas and fuel-cell technologies to meet or exceed environmental sustainability requirements. We partner with our customers to find the best power solution for their needs.

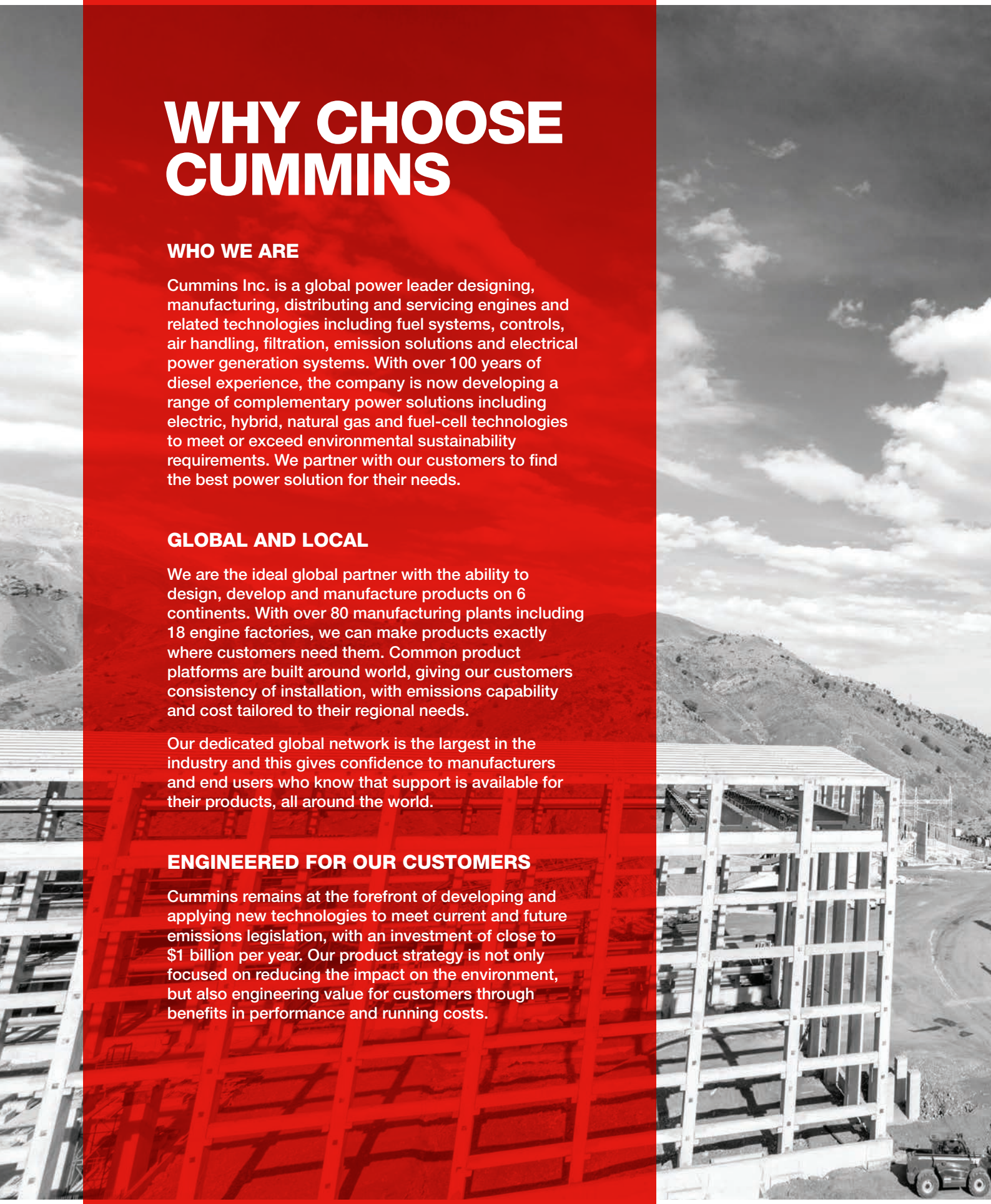
GLOBAL AND LOCAL

We are the ideal global partner with the ability to design, develop and manufacture products on 6 continents. With over 80 manufacturing plants including 18 engine factories, we can make products exactly where customers need them. Common product platforms are built around world, giving our customers consistency of installation, with emissions capability and cost tailored to their regional needs.

Our dedicated global network is the largest in the industry and this gives confidence to manufacturers and end users who know that support is available for their products, all around the world.

ENGINEERED FOR OUR CUSTOMERS

Cummins remains at the forefront of developing and applying new technologies to meet current and future emissions legislation, with an investment of close to $1 billion per year. Our product strategy is not only focused on reducing the impact on the environment, but also engineering value for customers through benefits in performance and running costs.



TRANSFORMING YOUR FUTURE

ENERGY DIVERSITY

Clean diesel, diesel hybrid, plug-in hybrid, natural gas, electric, renewable fuels, fuel cells

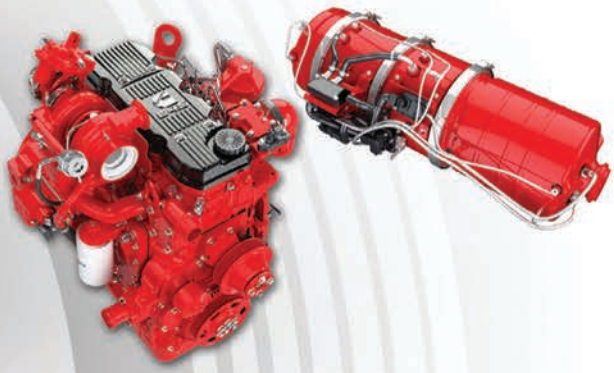
CONNECTIVITY

Remote monitoring: reduced repair costs, longer engine life, reduced downtime

As a global power leader, Cummins is demonstrating expertise across multiple product platforms including ultra clean diesel, natural gas, hybrid, full electric and fuel cell technologies as well as through in-house components expertise. All products are designed and manufactured by Cummins and fully integrated for optimal performance and the lowest total cost of ownership.

ULTRA CLEAN DIESEL

More power, lower running and maintenance costs,
smaller, simple and reliable

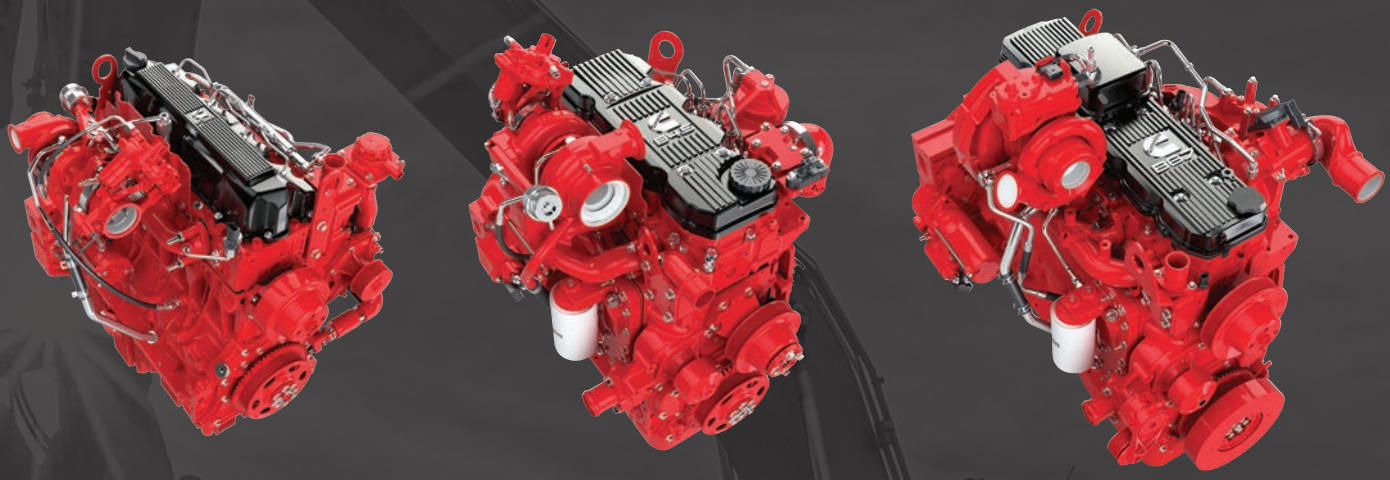


OPTIMIZATION

Enhanced transmissions,
hydraulic systems, cooling,
accessories and options

Our wide range of products and services are generating your power, moving your equipment as well as managing and maintaining your valuable assets. Cummins power is delivering reliable, efficient operation with optimized uptime for excavators, dump trucks, mobile lighting and more.

PERFORMANCE SERIES TECHNOLOGY FOR GLOBAL CONSTRUCTION



F3.8™*

Displacement
3.8 Liters

Power
75-129 kW / 100-173 hp

Max. Torque
620 Nm Max. Torque

Emissions Level
Stage V / Tier 4 Final

Product Technologies
Single Module™ DPF/SCR
EGR-free
Wastegate turbo

B4.5™

Displacement
4.5 Liters

Power
90-149 kW / 120-200 hp

Max. Torque
780 Nm Max. Torque

Emissions Level
Stage V / Tier 4 Final

Product Technologies
Single Module™ DPF/SCR
EGR-free
Wastegate turbo

B6.7™

Displacement
6.7 Liters

Power
116-243 kW / 155-326 hp

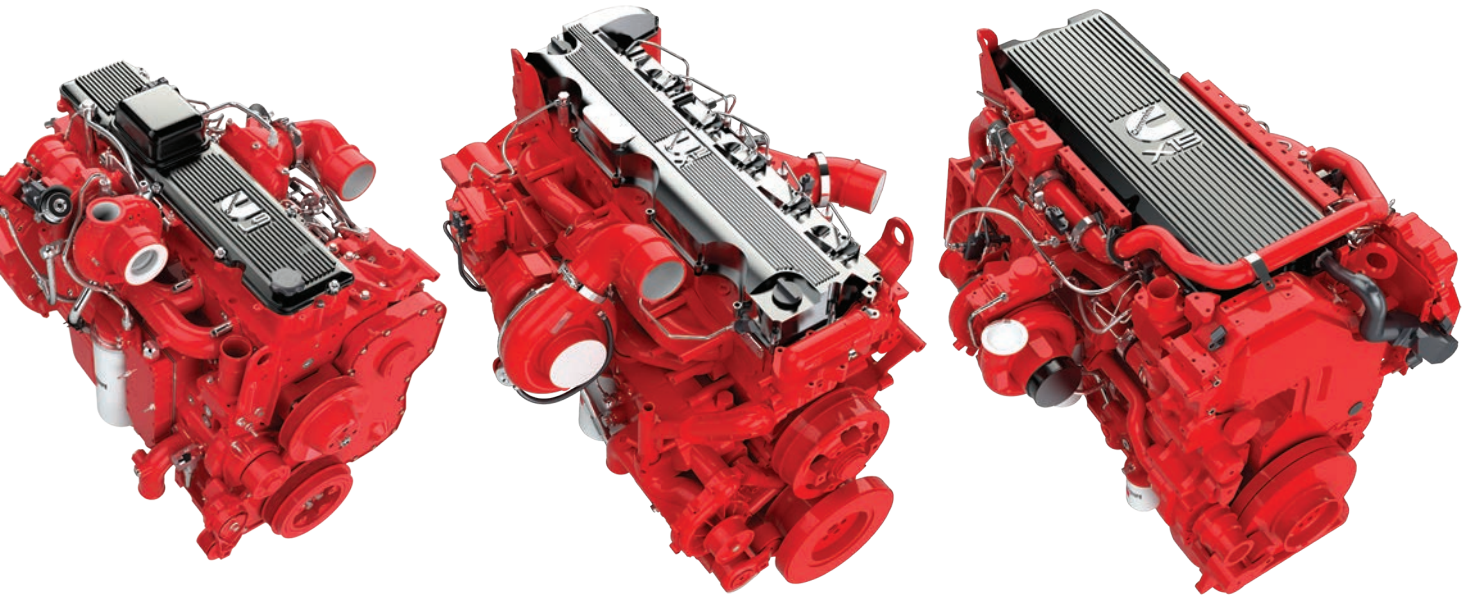
Max. Torque
1375 Nm Max. Torque

Emissions Level
Stage V / Tier 4 Final

Product Technologies
Single Module™ DPF/SCR
EGR-free
Variable Geometry turbo

Cummins Performance Series engines do more with less. For operators they deliver higher performance, more machine capability and lower total cost of ownership. For equipment manufacturers, the removal of EGR from the F3.8 to L9 range coupled with Cummins' Single Module™ aftertreatment reduces installation complexity and space claim.

*Also available at a 55 kW (75 hp) rating, ideally suited for compact equipment requiring high levels of torque.



L9™

Displacement
9 Liters

Power
206-321 kW / 275-430 hp

Max. Torque
1846 Nm Max. Torque

Emissions Level
Stage V / Tier 4 Final

Product Technologies
Single Module™ DPF/SCR
EGR-free
Wastegate turbo

X12™

Displacement
12 Liters

Power
250-382 kW / 335-512 hp

Max. Torque
2305 Nm Max. Torque

Emissions Level
Stage V / Tier 4 Final

Product Technologies
DPF/SCR
EGR-free
Wastegate turbo

X15™

Displacement
15 Liters

Power
336-503 kW / 450-675 hp

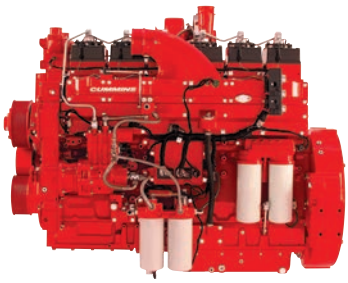
Max. Torque
2779 Nm Max. Torque

Emissions Level
Stage V / Tier 4 Final

Product Technologies
DPF/SCR
Cooled EGR
Variable Geometry turbo

All Performance Series engines are available as Power Units which are more than 60% pre-approved for installation. All Performance Series Power Units include an engine, Single Module™ aftertreatment (F3.8-L9), cooling system, hoses, air cleaner and either mounting feet or base rails.

CUMMINS CLEAN DIESEL TECHNOLOGY FOR QUARRYING AND MINING



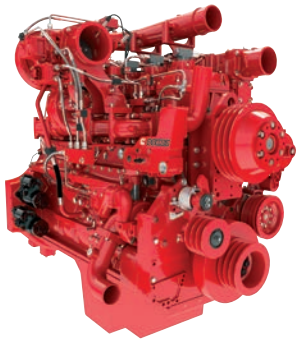
QSK19

Displacement
19 Liters

Max. Torque
3007 Nm / 2218 lb-ft

Power
567 kW / 760 hp

Emissions Level
Stage V / Tier 4 Final



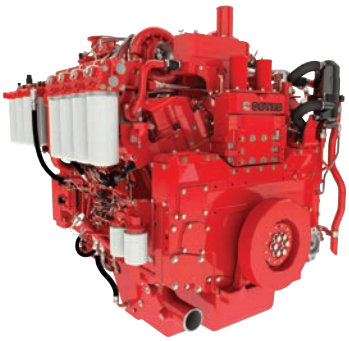
QSK23

Displacement
23 Liters

Max. Torque
3928 Nm / 2897 lb-ft

Power
567-783 kW / 760-1050 hp

Emissions Level
Stage V / Tier 4 Final



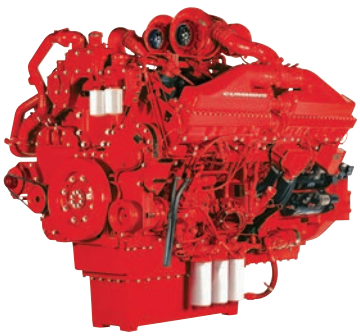
QST30

Displacement
30 Liters

Max. Torque
6612 Nm / 4877 lb-ft

Power
708-895 kW / 950-1200 hp

Emissions Level
Stage V / Tier 4 Final



QSK38

Displacement
38 Liters

Max. Torque
6242 Nm / 4604 lb-ft

Power
810-1193 kW / 1086-1600 hp

Emissions Level
Stage V / Tier 4 Final

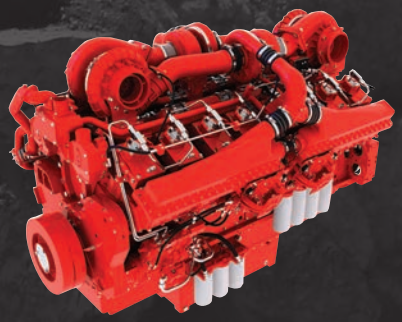
QSK50

Displacement
50 Liters

Power
1119-1491 kW / 1500-2000 hp

Max. Torque
9600 Nm / 7081 lb-ft

Emissions Level
Stage V / Tier 4 Final



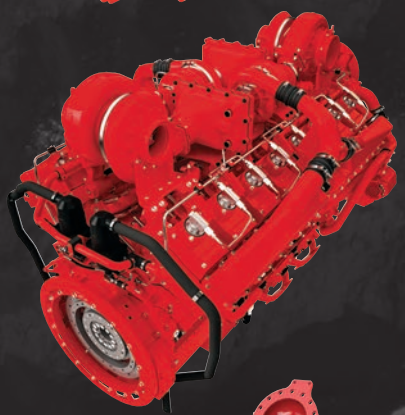
QSK60

Displacement
60 Liters

Power
1398-2125 kW / 1875-2850 hp

Max. Torque
11218 Nm / 8274 lb-ft

Emissions Level
Stage V / Tier 4 Final



QSK78

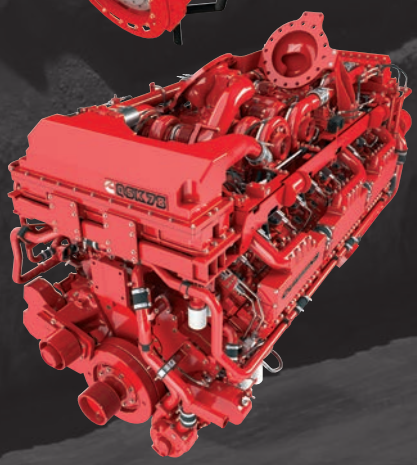
Displacement
78 Liters

Power
2610 kW / 3500 hp

Max. Torque
14077 Nm / 10383 lb-ft

Emissions Level
Stage V* / Tier 4 Final

* certification available on request

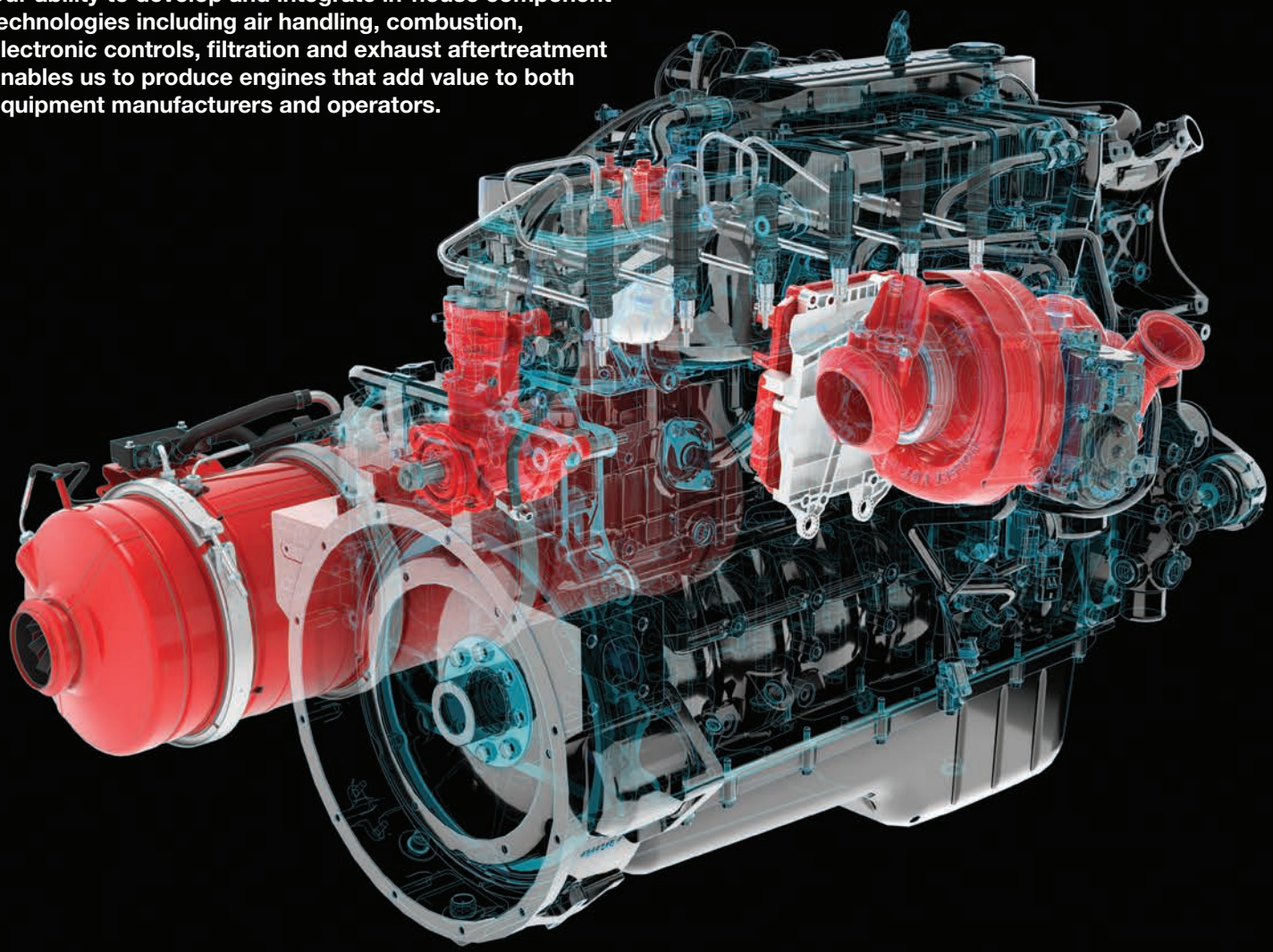


As market leader in the design, manufacture and service of engines for mining and quarrying applications, Cummins has a century of product expertise. In fact, more than 28,000 Cummins engines are active in mining operations around the globe in everything from excavators, drills and haul trucks to generators and underground mining equipment. These installations demonstrate our commitment to providing the highest uptime in the industry and reducing total cost of productivity and ownership for end users worldwide.

No matter what you're mining, or where your equipment runs, Cummins engines provide exceptional dependability, reliability and productivity – even in the most challenging environments.

IN-HOUSE COMPONENTS EXPERTISE

Our ability to develop and integrate in-house component technologies including air handling, combustion, electronic controls, filtration and exhaust aftertreatment enables us to produce engines that add value to both equipment manufacturers and operators.



Aftertreatment technologies

Single Module™ aftertreatment

- Combines DOC, DPF and SCR to facilitate the removal of EGR, and is up to 40% smaller and 20% lighter than previous systems.
- Modularity allows for ease of part replacement and reduced downtime.
- Offers easier system integration and flexible installation options.
- Advanced catalyst technologies offer improved NOx conversion efficiency and ash-loading capacity.
- Enhanced thermal efficiency and reduced aftertreatment warm up.

Flex Module™ aftertreatment

- Innovative packaging design saves installation space to fit the requirements of OEM configuration.
- Modular accessible design of product provides convenience of maintenance for customer.
- Advanced catalyst technologies facilitate DPF's larger ash capacity.
- Advanced control strategy and urea dosing system provide higher NOx conversion efficiency.

Turbocharging technologies

Holset® Series HE400VG:

Cummins continues to evolve the Holset VGT™ to meet future emission challenges, including EPA, CARB 24, and Euro 7 emissions requirements.

Our latest R&D investment has facilitated a 5% efficiency improvement and includes new developments to the rotor system, compressor stage and turbine stage, alongside a range of aerodynamic packages to tailor performance and meet demands on applications up to 15L.

Holset® Series HE600WG:

- Increased overall turbocharger efficiency by over 4 points compared to current product HE600.
- High pressure ratio compressor stage, aerodynamically tailored for off highway application.
- New compressor stage offers +3 points higher efficiency compared to current product HE600.
- New compressor stage offers increased flow range enabling customers using HE800 to switch to more compact and less expensive HE600
  - » helps meet downsizing requirements
  - » offers improved transient response and space claim benefits.
- New turbine housing offering higher durability (optimized thermal stress to improve fatigue life).

Fuel systems

Common rail with EDV – stop-start functionality. Capable of nominal operating pressure up to 2600 bar and sized for 4.5-15L engines.

CRFI-C Series – fuel injector showcasing electromagnetic and mechanical valve enhancements, as well as next generation controls integration to achieve state of the art performance.

OLP3c – a compact design fuel pump with up to 2600 bar pressure rating and Active Inlet Metering (AIM) for superior transient rail pressure response.

Electronics and diagnostics

CM2850 – complete engine control module for high levels of performance in all conditions.

Filtration technologies

Industrial Pro – the Fleetguard FH239 series is an extra rugged fuel housing specifically designed for off-road equipment. It combines EleMax™ filter technology and multi-layered NanoNet® media.

Fleetguard Hydraulic Filters – filter elements are available in a variety of media and micron rating efficiencies. Filters can be selected for petroleum- and water-base fluid compatibility.

FleetguardFIT™ – through intelligent sensing and data analytics, award-winning FleetguardFIT provides real-time status updates of Fleetguard filters in your equipment so maintenance can be based on real-world conditions.

Air Filtration – Air filtration offers broad coverage for cabin and engine air intake systems. Using the highest quality components and manufacturer processes to ensure consistent protection in all environments. Cummins proprietary media can be customized for specialized environments and applications.

NanoNet® Fuel Filtration – designed to deliver fuel to your engine that meets the fuel injection equipment (FIE) manufacturer's suggested ISO 12/9/6 cleanliness level. The product is proven with millions of miles and hundreds of thousands of hours of testing in the field and can extend service intervals, maintain high efficiency, reduce downtime and maintenance cost.

NanoNet® Lube Filtration – improves oil flow ability both at cold and hot operating temperatures resulting in better overall fuel economy, as well as captures contaminants that can damage the engine. The LF14000NN holds between 11-24% more contaminant than the will-fit filters made by others.

Fleetguard Coolant – ES Compleat™ OAT (Organic Acid Technology) is a Life-of-the-Engine organic additive fully formulated extended life Ethylene Glycol (EG) antifreeze/coolant. It provides superior diesel engine protection against freezing, boil-over, cavitation, liner pitting, erosion, corrosion, elastomer gasket degradation, and scaling.

DIGITAL SOLUTIONS FOR MAXIMUM AVAILABILITY

MONITORING

Connected Diagnostics™

Make informed decisions on when to really stop equipment and when to continue working by understanding the suggested root cause of fault alerts and knowing how long you have before an issue is likely to escalate. Wirelessly connect engines to Cummins using telematics for continuous monitoring and diagnosis using alert notifications sent via a convenient mobile app, email or web portal.

REPORTING

Connected Advisor™

Keep projects on schedule by planning service stops more productively, using streamlined engine reports which include daily and monthly summaries of engine health, required field actions and active campaigns. You'll know exactly what's wrong and how to resolve it using our integrated and detailed expert recommendations that automatically accompany each report.

CALIBRATING

Connected Software Updates™

Cummins powered equipment can remain on a jobsite while beneficial performance or fuel efficiency enhancements are applied at a fraction of the cost using integrated telematics systems and wireless, over-the-air connectivity services. This enables operators to scale software deployment efforts with ease and calibrate engine control modules remotely with minimal downtime.

SERVICING

Cummins Guidanz®

Guidanz technology integrates and streamlines every aspect of the Cummins service experience, accelerating the diagnostic and repair process. The Guidanz mobile app, when paired with the new Bluetooth®-enabled INLINE™ mini datalink adapter, displays Cummins fault codes and other key engine information anywhere you need it. Its Immediate Assessment feature enables you to determine root cause of a fault, review estimated repair times and identify the most likely repair parts for easier service scheduling. You can provide this information to your nearest certified service provider ensuring you receive the right support and streamlining the repair process.

GLOBAL PARTS AND SERVICE NETWORK

In today's connected world, look no further than Cummins. Wherever your Cummins powered equipment operates, you have access to the largest number of certified service and support locations of any engine manufacturer.

Cummins distribution network

- More than 8,000 distributor and authorized dealer locations in over 190 countries
- Local Cummins-certified technicians ready to complete your in-shop or field service needs and deliver high-quality repairs and rebuilds quickly by using the best tools with the most advanced technology
- Engineers trained in powering applications and identifying options to improve product performance
- Complete range of Cummins products and Genuine Cummins new and ReCon® parts
- Three global parts distribution centers equipped to handle the most complex business processes
- 24/7 customer support

We are the experts with advanced technology to make your life easier while providing a seamless support experience.

Contact us:
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