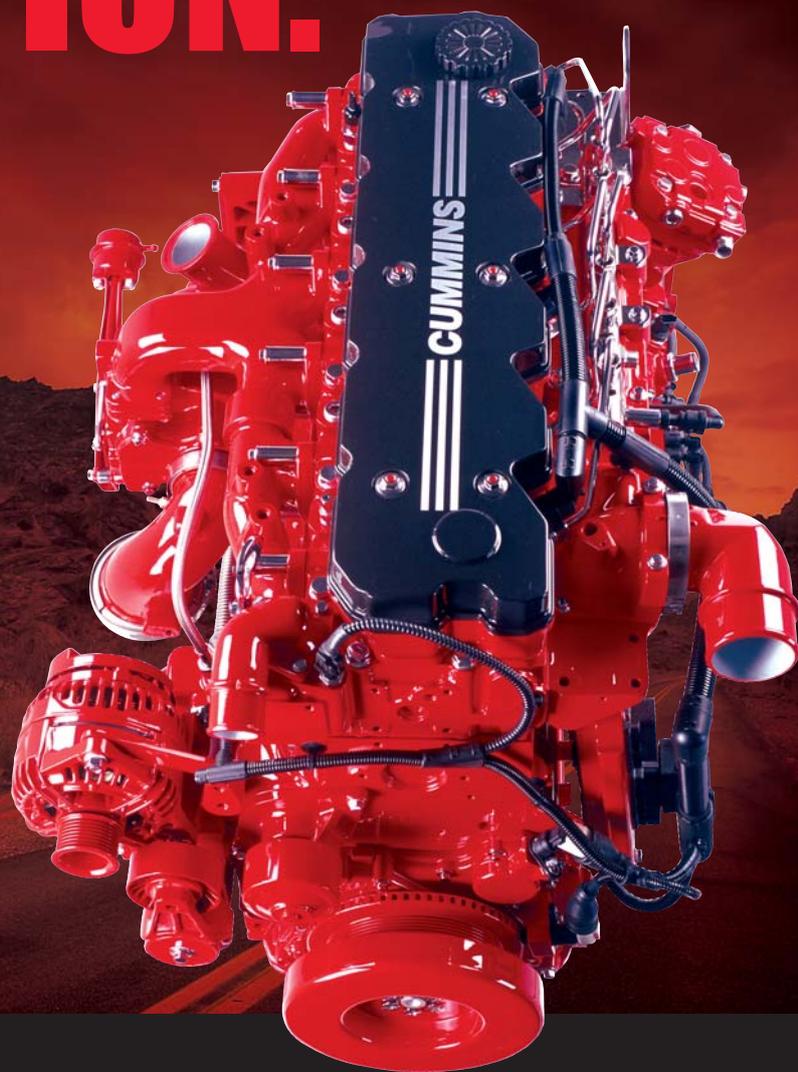




**EVERY
SOLUTION.**



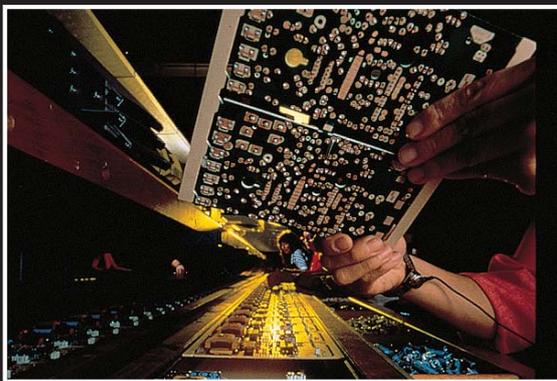
**CUMMINS EURO ENGINE RANGE
135-420PS**

EVERY SOLUTION.

The right technology

From the start Cummins design vision has been clear... to achieve more than meeting emission regulations and develop a range of engines to excel in every respect.

Cummins are focused on providing the highest engine availability at the lowest possible running costs, whilst meeting the latest emissions regulations. Our strategy is driven by evaluating customer needs and market conditions in order to provide the optimum products with the appropriate technologies wherever Cummins engines operate.



Equipped with a full portfolio of technology options, Cummins can provide every technology to meet global engine emissions requirements. Whether it is the simplicity of mechanical engines you need, or the flexibility of an electronic engine, Cummins have the right engine and the right technology to meet your needs, every time.

All engines are equipped with the combustion efficiency of high pressure fuel injection and premium componentry. Together with highly advanced Holset turbocharging and Fleetguard filtration expertise, both vertically integrated technologies within the Cummins group.

Experience with Expertise

Cummins is by far the world's largest independent manufacturer of diesel engines. With over one million Euro certified engines operating in truck, bus, coach and specialist vehicle applications around the globe, Cummins bring a unique level of experience to every

engine we manufacture, and the ability to provide the right engine for each installation. For vehicle manufacturers it offers a level of application expertise that few, if any, other engine companies can match. For the operator it offers world-class levels of performance.

Over \$200 million is invested annually in research and engineering to maintain our technology leadership across a power band extending all the way to 3,500 ps. With engine manufacturing in 8 countries and over 5,000 support locations worldwide, Cummins has evolved into a truly international engine company. An approach which reflects the needs of our global OEM partners.

Cummins European credentials are strongly rooted, based on over 40 years of manufacturing presence and now employing almost 5,000 employees in the EU. OEM customers can take full advantage of Cummins application engineering support and pilot vehicle testing facility. We also draw a special strength from our huge technical and manufacturing resources in the USA. Effectively, with a Cummins Euro Certified engine you get the results of a technical synergy between our most skillful designers on both sides of the Atlantic.



Emissions Regulations

European emissions standards are being implemented at different stages around the world. In fact they are expected to be the most widely used on-highway emissions rules globally, significantly more than any other.

GLOBAL AUTOMOTIVE EMISSIONS



Based on nearly 15 years of experience from Euro 1 onwards, Cummins has the Euro certified product to meet your requirements - wherever you are.

Every Alternative

Alongside the range of Euro certified diesel engines, Cummins can also provide high-quality, economical natural gas engines. These provide ultra-low emissions with excellent torque, high fuel efficiency and the reliability you expect from Cummins. Added to this, driver and passenger comfort is substantially improved by reduced engine noise. All are certified to Euro 3 emissions standards, and supported by Cummins global support network.

INTERACT Electronics

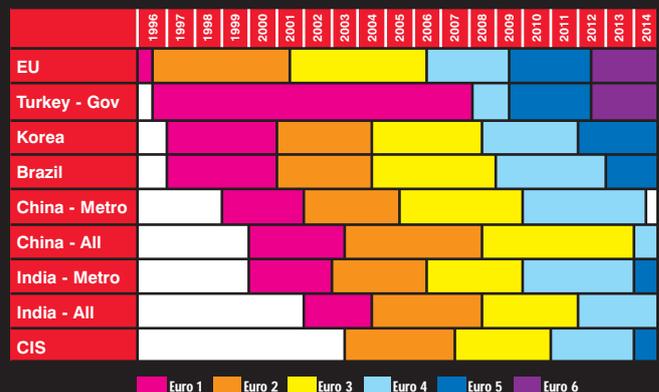
All Cummins electronic engines share the same INTERACT System with the benefit of commonality across the range. INTERACT electronics work to meet the emissions requirements and significantly reduce visible smoke, whilst maintaining optimum levels of fuel economy. They use high capacity electronic control modules to drive the full authority management system.

Engine mounted sensors continually feed back information to the engine control module, allowing it

to monitor all critical parameters. If monitored values such as oil pressure move out of a safe range, INTERACT's in-built protection system will automatically de-rate the engine torque and speed until the problem comes under control. Cummins electronic tools can then be used to quickly diagnose the cause.

With information systems such as RoadRelay™ 4 incab display, QuickCheck™ III handheld device and InSite™ software available.... diagnostics, monitoring and trip data evaluation have never been easier or more affordable.

EURO EMISSIONS REGULATIONS SCHEDULE



B Series

Cummins one litre per cylinder B Series engine family has set global standards of economy, durability, reliability and performance, ones which others have sought to follow. Because of this it enjoys unprecedented popularity in light to middleweight truck and bus applications.

With over 3 million in operation worldwide, working in the harshest environments with the toughest duty cycles, you can rely on Cummins B engines – every time. Its low weight, compact dimensions and simplicity of design mean it is ideally suited to meet the ever increasing demands of operators in terms of increased up-time and lower running costs.

The success of B Series engines has been built on two main principles:

- reliability is derived from simplicity
- durability stems from experience

In the B Series engines Cummins have integrated various engine sub-systems to provide a less complex engine with fewer parts. This means there is less to go wrong, and fewer parts for the operator to replace. The engines have been designed with fewer joints, gasket and seals to minimise the possibility of oil, fuel or water leakage. As part of this process Cummins has included features such as edge moulded

rubber gaskets, braided hoses, premium gasket materials and straight thread O rings to ensure that the B series is a leak free engine.

Key product features include:

Unitized Block Design:

40% fewer parts than traditional diesels, with fewer joints and simplified maintenance.

Plateau-Honed Cylinders:

Manufacturing process results in near-perfect cylinder geometry and virtually eliminates oil consumption.

Bosch In-Line Fuel Pump:

In-line pump delivers fuel to the cylinders at higher injection pressures for cleaner combustion and lower emissions.

Edge-Moulded Gaskets:

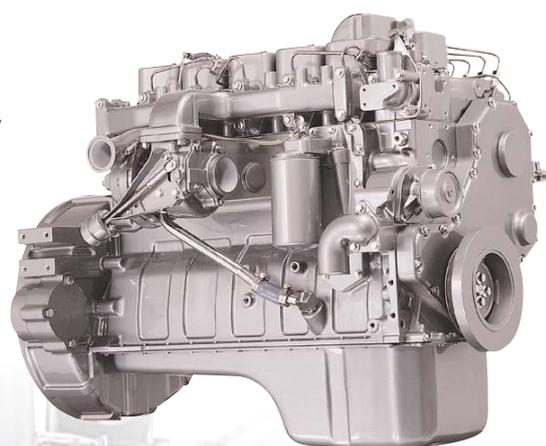
Rubber-edged gaskets seal tighter to eliminate possible leakage.

Improved Piston Design:

New raised top ring eliminates air space in the combustion chamber for improved combustion.

Cummins Holset Turbochargers:

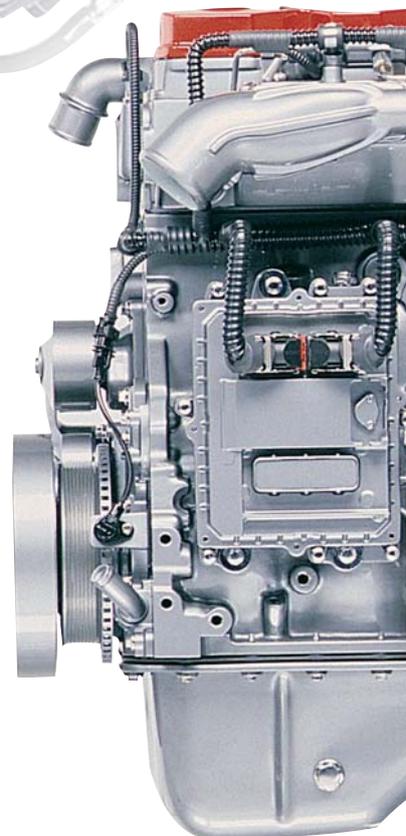
Turbocharger is wastegated to optimise operation for improved response across the torque curve.



Euro 2 Ratings:

Model	Power max.	Peak torque
6B235	235 ps @ 2500 rpm	800 Nm @ 1500 rpm
6B215	215 ps @ 2500 rpm	700 Nm @ 1500 rpm
6B180	180 ps @ 2500 rpm	650 Nm @ 1500 rpm
6B160	160 ps @ 2500 rpm	550 Nm @ 1500 rpm
6B145	145 ps @ 2500 rpm	520 Nm @ 1500 rpm
4B140	140 ps @ 2500 rpm	480 Nm @ 1500 rpm

Ratings metric horsepower.



140-235ps

The ISBe engines have taken midrange engine design to new heights of performance – reaching well beyond the best engine ever built in this class, Cummins own B Series. For Euro 3, it took a major leap forward – with power density, torque output and fuel-efficiency all increasing by a significant margin.

All this extra performance has been delivered with a new level of refinement. In fact, the ISBe is quieter and smoother than ever thought possible for a diesel of this size, with noise reduced by up to 9 dBA.

Overall running costs for the ISBe are lowest in class with exceptional fuel efficiency and reduced maintenance.

With such a compact, low weight engine package extending all the way up to 275ps/950 Nm, the 6-cylinder ISBe easily powers rigid and speciality trucks up to 26 tonnes, full length buses, fast

response fire vehicles and high mobility military vehicles. The 4-cylinder ISBe has brought a new power capability to 7.5-12 tonne rigids, midibuses and municipal vehicles.

The ISBe comes with some significant product enhancements versus its predecessor:

Common Rail Fuel System: provides high injection pressure independent of engine speed for refined and rapid power delivery, reduced noise, and improved cold start.

24 Valve Cylinder Head with Low Temperature Air-to-Air Aftercooling: perfectly matched to the high-efficiency turbocharger providing optimum levels of torque at both low and high rpm.

Vertically Mounted Fuel Injectors: centred over the symmetrical piston bowls deliver improved combustion conditions.

Rear Gear Train: drives the camshaft, fuel system and accessories for more efficient vehicle installation and noise reduction.

The ISBe comes with a number of servicing benefits to reduce running costs:

Rocker System: permits 200,000km before valve adjustment check for improved availability.

Latest Fleetguard Filters: incorporate 10-micron 'Stratapore' multi-layer technology for exceptional protection.

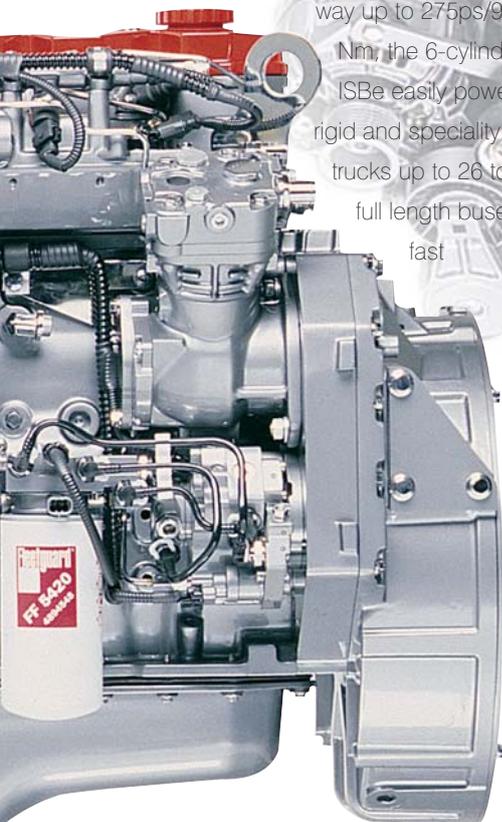
Low Oil Consumption: minimal top-up between services.

Rebuildability: designed for multiple engine overhauls, extending vehicle life.

Euro 3 Ratings

Model	Power max.	Peak torque
ISB [®] -275	275 ps @ 2500 rpm (202 kW)	950 Nm @ 1400-1700 rpm
ISB [®] -250	250 ps @ 2500 rpm (184 kW)	950 Nm @ 1400-1700 rpm
ISB [®] -220	220 ps @ 2500 rpm (162 kW)	820 Nm @ 1200-1700 rpm
ISB [®] -185	185 ps @ 2500 rpm (136 kW)	700 Nm @ 1200-1700 rpm
ISB [®] -170	167 ps @ 2500 rpm (125 kW)	600 Nm @ 1200-1700 rpm
ISB [®] -150	150 ps @ 2500 rpm (110 kW)	550 Nm @ 1200-1700 rpm
ISB [®] -135	135 ps @ 2500 rpm (99 kW)	500 Nm @ 1200-1700 rpm

Ratings metric horsepower.



135-275ps

C Series

Cummins 8.3 litre C Series six cylinder diesel engine comes with proven heavy duty characteristics. It is uniquely suited to a wide range of demanding applications, in trucks up to 33 tonnes, municipal and waste collection, long distance coaches, double deck buses and high performance fire fighting vehicles.

The engine comes with a low weight compact envelope, powerful enough to satisfy the most payload and productivity conscious operators. At the same time it offers the reliability and durability associated with large capacity Cummins diesel engines. The high power to weight ratio of the C series helps to maximise productivity. The durability and compact dimensions keep maintenance costs to a minimum.

The C Series engines have integrated engine sub-systems to provide a less complex engine with fewer parts. This means there is less to go wrong, and fewer parts for the operator to replace. The engines have been designed with fewer joints, gasket and seals to minimise the possibility of oil,

fuel or water leakage. As part of this process Cummins has included features such as edge moulded rubber gaskets, braided hoses, premium gasket materials and straight thread O rings to ensure that the C series is a leak free engine.

All these benefits mean that the C Series engine will work harder and for longer, at a lower cost in fuel and downtime.

Key product features include:

Unitized Block Design:

fewer parts than traditional diesels, with fewer joints and simplified maintenance.

BOSCH In-Line Fuel Pump:

Delivers fuel at higher injection pressures for cleaner combustion, lower emissions.

Edge-Moulded Gaskets:

Rubber-edged gaskets seal tighter to eliminate possible leakage.

Three-Ring Pistons:

Three-ring design with dual Ni-Resist inserts reduces friction for increased life and decreased oil consumption.

Replaceable Wear Components:

Mid-stop cylinder liners and valve guides are designed for easy overhaul. Cylinder liners are plateau-honed for near-perfect geometry, resulting in nearly zero oil consumption.

Holset HX40 Turbocharger:

Wastegated design optimises operation across the torque curve resulting in excellent low-end torque.

Non-Drainback Feature:

retains oil in vulnerable areas to save damage during cold starts.

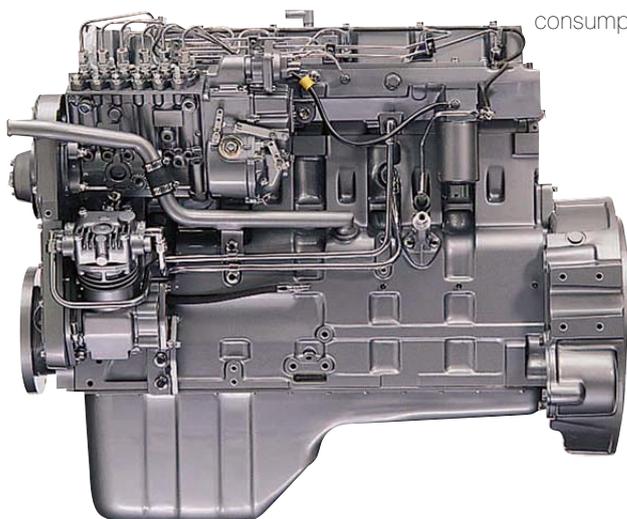
Integrated Main By-Pass Oil Filtration:

cuts bearing and piston ring wear by up to 60%.

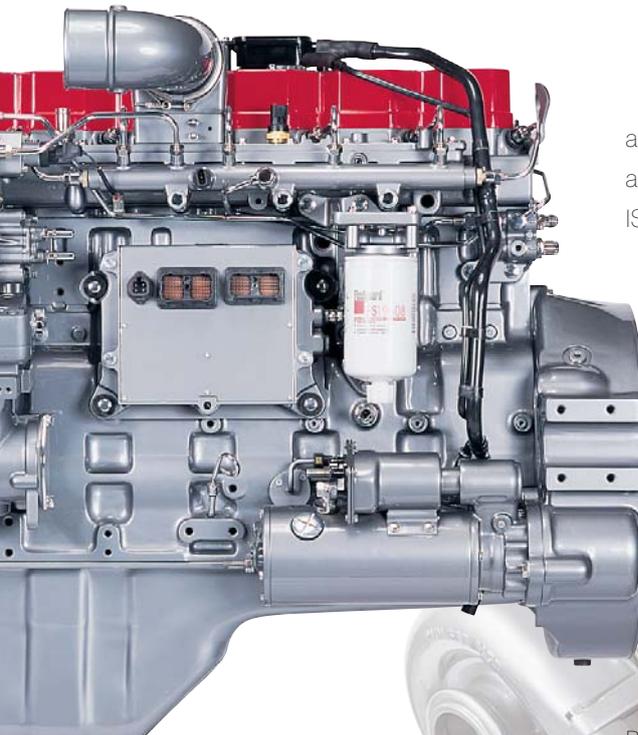
Euro 2 Ratings

Model	Power max.	Peak torque
C300	300 ps @ 2200 rpm	1125 Nm @ 1400 rpm
C280	280 ps @ 2200 rpm	1125 Nm @ 1400 rpm
C260	260 ps @ 2200 rpm	950 Nm @ 1300 rpm
C245	245 ps @ 2200 rpm	1025 Nm @ 1400 rpm
C220	220 ps @ 2200 rpm	800 Nm @ 1400 rpm

Ratings metric horsepower.



220-300ps



The ISLe Plus represents a new power capability for Euro 3, combining the lightweight advantages of a compact package with the structural strength of a heavy-duty engine. Weighing in at just over 700 kg, the ISLe Plus offers significant benefits for payload critical and high bulk volume operations. With unrivalled levels of torque for an engine of this size, the ISLe Plus provides the flexible power solution for premium rigids and lightweight tractors.

The ISLe Plus moves up to a new power band with larger displacement and added strength. The block has been redesigned to be compatible with the stresses imposed by higher gross vehicle weights, while bearing area size is particularly impressive for a 9-litre engine. Features such as articulated pistons, enhanced camshaft and roller cam followers,

and a high capacity lube system are all consistent with the larger ISMe engine. Longer oil drain intervals and an overhaul durability goal of 600,000 km further emphasise the heavy-duty credentials of the engine.

To achieve so much performance from such a compact package the ISLe Plus comes equipped with leading edge technology.

Versus its predecessor the ISLe Plus comes with some significant product enhancements:

Cummins High Pressure Common Rail Fuel System:

brings significant improvements to fuel efficiency and response. The system delivers high pressure injection independent of engine speed for optimum low speed performance and flexibility. It also provides a major reduction in engine noise of up to 30%.

New Cummins Electronic Control Module:

Highly precise multiple injections events are driven by an electronic control module with twice the processing speed and memory capacity previously found on engines of this size.

Articulated Pistons: with a forged steel crown and an aluminum skirt for high durability.

Valve Train: features roller cam followers for added durability.

C Brake by Jacobs: optional compression brake available.

The ISLe Plus comes with a number of servicing benefits to reduce running costs:

Rocker System: permits 240,000km before valve adjustment check for improved availability.

Latest Fleetguard Filters: incorporate 10-micron 'Stratapore' multi-layer technology for exceptional protection. Fuel filter features a water-in-fuel sensor.

Low Oil Consumption: minimal top-up between services.

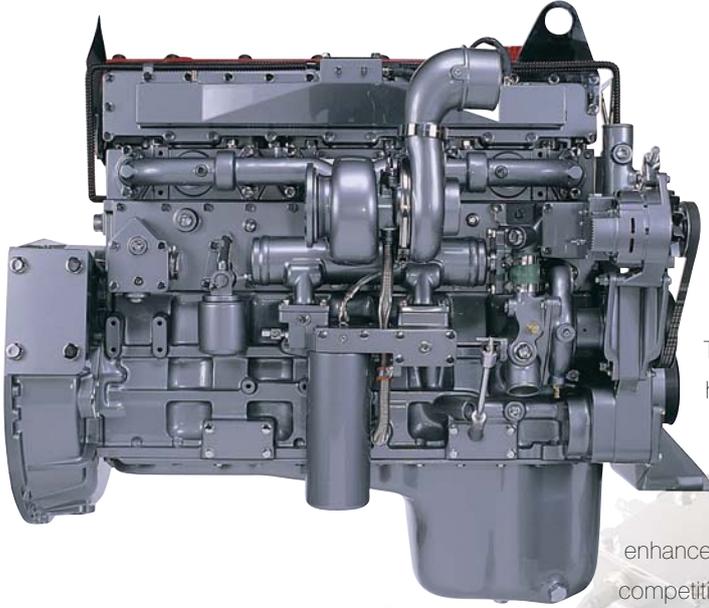
Mid-Stop cylinder: fully replaceable for ease of rebuilding.

Euro 3 Ratings

Model	Power max.	Peak torque
ISL ^e Plus -350	350 ps @ 2100 rpm (252 kW)	1550 Nm @ 1400 rpm
ISL ^e Plus -325	325 ps @ 2100 rpm (234 kW)	1425 Nm @ 1200 -1400 rpm
ISL ^e Plus -300	300 ps @ 2100 rpm (221 kW)	1250 Nm @ 1100 -1600 rpm
ISL ^e Plus -280*	280 ps @ 2100 rpm (199 kW)	1060 Nm @ 1200 -1400 rpm

Ratings metric horsepower. *Bus rating.

ISMe



335-420 ps

In every aspect of heavy duty performance this engine has set benchmark standards for fuel efficiency, driveability and reliability. The latest generation ISMe has powered an outstanding reputation even further ahead with improved transient response and higher overall refinement, enabling it to outperform larger engines. Structurally, the ISMe is at the forefront of heavy-duty design with a life-to-overhaul goal of one million km. Yet despite all this in-built strength the engine weighs only 940 kg, offering a substantial payload advantage.

Productivity matched ratings have been targeted at specific applications to achieve an optimum balance between performance and cost-efficiency. For 26 to 44 tonne gross vehicle weight trucks, premium long distance coaches and high capacity double-deck buses, operators are achieving the most productive power ever seen from a heavy-duty engine.

The highest rated ISMe-420 defines a new approach for 40-44 tonne operations. These engines focus on high torque capability in the driving range to optimise fuel economy and

enhance response compared to competitive engines. With 2010 Nm peak torque at 1200 rpm and over 1900 Nm available to almost 1500 rpm, they can perform with relaxed ease on the toughest duty cycle of a 44-tonner. Over the road driveability matches that of nominally higher horsepower engines. With the ISMe you get more for less.

ISMe comes with significant product benefits:

Holset HX55

Turbocharger: electronically controlled wastegate turbo delivers ideal air flow across the operating range by preventing overboost.

24-Valve Cylinder Head:

optimises air/fuel mixture to provide a faster response.

Fuel Injectors: vertically mounted and centred over the combustion chamber. Fully variable timing ideally matched to engine configuration.

Articulated Pistons: with forged steel crown and aluminum skirt for exceptional durability.

Camshaft: hardened cast iron for improved wear tolerance.

C Brake by Jacobs: optional compression brake available.

The ISMe comes with a number of servicing benefits to reduce running costs:

Rocker System: permits 240,000km before valve adjustment check for improved availability.

Latest Fleetguard Filters: incorporate 10-micron 'Stratapore' multi-layer technology for exceptional protection. Fuel filter features an optional water-in-fuel sensor.

Low Oil Consumption: minimal top-up between services.

Mid-Stop Cylinder Liners: fully replaceable for ease of rebuilding.

Euro 3 Ratings

Model	Power max.	Peak torque
ISM [®] -420 ESP	420/345 ps @ 1900 rpm	2010/1710 Nm @ 1200 rpm
ISM [®] -420	420 ps @ 1900 rpm (309 kW)	2010 Nm @ 1200 rpm
ISM [®] -385	385 ps @ 1900 rpm (283 kW)	1835 Nm @ 1200 rpm
ISM [®] -345	345 ps @ 1900 rpm (254 kW)	1710 Nm @ 1200 rpm
ISM [®] -335*	335 ps @ 1900 rpm (246 kW)	1410 Nm @ 1200 rpm

Ratings metric horsepower. *Bus rating.

Emissions Technology

Cummins engines will meet the Euro 4 emissions legislation with the Integrated Engine Management (I.E.M.) system using Selective Catalytic Reduction (SCR) technology. The system is controlled and monitored from the engine mounted ECM, providing a more reliable, cost effective, easier to install system. The I.E.M. strategy was formed around the ability to provide a total solution of engines, air handling and exhaust systems all under the Cummins umbrella. By working closely with Holset Turbocharging and Fleetguard Emissions Solutions, Cummins are in a unique position to provide a complete engine to exhaust pipe package.

How it Works

During optimum combustion there are undesirable but unavoidable emissions of nitrogen oxide and nitrogen dioxide. These are commonly amalgamated and termed as NOx. In the SCR process a re-agent AdBlue (32.5% urea dissolved in water) is used to react with and neutralize the NOx. AdBlue which is a non toxic, odourless, non flammable liquid is injected into the exhaust system. The exact amount of AdBlue introduced into the system is precisely controlled by the electronic dosing unit. In the heat of

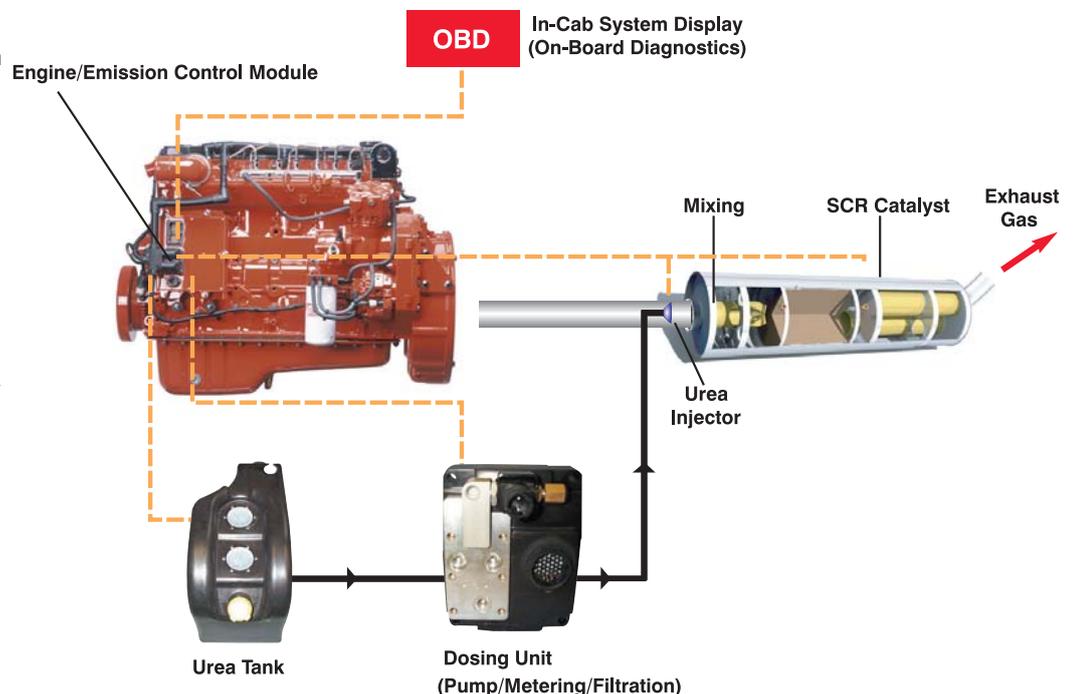
the exhaust stream the AdBlue hydrolyses and ammonia molecules are released. The NOx and ammonia molecules react in the catalyst. Nitrogen and water as steam are all that remain after the reaction. This is clean, safe technology as Nitrogen is completely harmless and makes up almost 80% of the air we breathe.

Advantages

The use of SCR as the right technology has been driven by ever increasing customer demands. Compared to Euro 3 the results show the following benefits:

- Fuel economy is improved providing a major cost benefit to operators. This can be up to 7%, depending on duty cycle.

- Service intervals are increased by over 50%, giving improved vehicle availability.
- Durability is improved due to optimised engine timing allowing less unburned fuel to cause sooting in the oil.
- The SCR system has lower heat rejection compared with other emissions technologies, meaning that little change is required to the vehicle cooling system.
- The complete system is supported by Cummins service network.



B Gas Plus

The Cummins Westport B Gas Plus is a 5.9-litre six-cylinder natural gas engine that builds on the rugged, reliable design of Cummins B Series diesel engine, one of the most successful engine designs ever built. The B Gas Plus delivers robust, dependable power from 195 to 230 ps with ultra-low emissions and proven reliability.

The B Gas Plus is known for excellent torque, high fuel efficiency and uncompromising performance. This reliable performer is ideal for shuttles, buses, local pickup and delivery trucks, step vans, yard spotters, street sweepers and other medium-duty applications. The B Gas Plus is offered in over 100 different models of trucks and buses manufactured by international OEM companies. Worldwide, more than 4,000 engines are in service. It is certified to Euro 3 standards, featuring lean-burn spark-ignited combustion.

The B Gas Plus is also designed for either compressed (CNG) or liquefied (LNG) natural gas vehicles, using methane number 65 or greater.

Features and Benefits

Air/Fuel Regulation:

Cummins closed loop electronic control system, using the CM556 control unit, maintains efficient operation using sensors to monitor and control various engine parameters, backpressure, intake manifold temperature, fuel inlet pressure, knock detection, air-fuel ratio and fuel mass flow.

Air Intake System: charge air cooling is utilized to reduce emissions by lowering intake manifold air pressures.

Catalyst: required for all models to be certified to Euro 3.

Control

System/Electronics:

features full drive-by-wire, enhanced controls and full authority electronics. The ECM monitors engine sensors, controls fuel and ignition systems, sets engine parameters and provides state-of-the-art data links.

Fuel Tolerance:

designed for compressed (CNG) or liquefied (LNG) natural gas vehicles. Its wide fuel tolerance, down to methane number 65, increases uptime worldwide.

Turbocharger:

Holset turbocharger with watercooled bearing housing and electronically controlled wastegate provides improved response and performance without sacrificing durability.

Crankshaft:

Induction-hardened forged-steel crankshaft provides maximum strength and multiple regrind capability for long-term cost savings. Crankshaft is supported by seven main bearings for optimum durability.

Euro 3 Ratings

Model	Power max.	Peak torque
BGe-230 30	230 ps @ 2800 rpm (172kW)	678 Nm @ 1600 rpm
BGe-200 30	200 ps @ 2800 rpm (149kW)	630 Nm @ 1600 rpm
BGe-195 30	195 ps @ 2800 rpm (145 kW)	570 Nm @ 1600 rpm



195-230 ps



The powerful Cummins Westport C Gas Plus has the highest power-to-weight ratio in its class and is offered in many of the world's finest buses and trucks.

Building on the rugged, reliable design of Cummins diesel engines, the Cummins Westport C Gas Plus engine is a six-cylinder Lean-Burn Spark-Ignited (LBSI) natural gas vehicle engine that delivers from 250 to 280 ps with ultra-low emissions. It provides excellent torque, high fuel efficiency and reliable, robust performance, with excellent ratings for both medium-duty and refuse collection truck and urban bus applications. The C Gas Plus is known for easier maintenance and longer service with extreme reliability and durability. Service intervals are similar to those of the base diesel engine.

Since it was introduced in 2001, more than 4,000 of these clean natural gas, six cylinder, 8.3-litre engines have powered transit fleets, medium-duty trucks and refuse collection vehicles in cities throughout the world, every day.

Its ECM (Electronic Control Module) allows engine performance to be tailored to fit the vehicle mission with road speed governing and cruise control, as well as an engine protection system and complete self diagnostics.

The C Gas Plus combines these performance advantages with ultra-low emissions – certified with a catalyst – to Euro 3 standards, featuring lean-burn spark-ignited combustion.

Features and Benefits

Air/Fuel Regulation:

Cummins closed loop electronic control system, using the CM556 control unit, maintains efficient operation using sensors to monitor and control various engine parameters, backpressure, intake manifold temperature, fuel inlet pressure, knock detection, air-fuel ratio and fuel mass flow.

Air Intake System: charge air cooling is utilized to reduce emissions by lowering intake manifold air pressures.

Catalyst: required for all models to be certified to Euro 3.

Control

System/Electronics: features full drive-by-wire, enhanced controls and full authority electronics. The ECM monitors engine sensors, controls fuel and ignition systems, sets engine parameters and provides state-of-the-art data links.

Fuel Tolerance: designed for compressed (CNG) or liquefied (LNG) natural gas vehicles. Its wide fuel tolerance, down to methane number 65, increases uptime worldwide.

Turbocharger: Holset turbocharger with watercooled bearing housing and electronically controlled wastegate provides improved response and performance without sacrificing durability.

Euro 3 Ratings

Model	Power max.	Peak torque
CGe-280 30*	280 ps @ 2400 rpm (209 kW)	1152 Nm @ 1400 rpm
CGe-270 30**	275 ps @ 2400 rpm (205 kW)	1017 Nm @ 1400 rpm
CGe-250 30**	250 ps @ 2400 rpm (186 kW)	1017 Nm @ 1400 rpm
CGe-250 31*	250 ps @ 2400 rpm (186 kW)	895 Nm @ 1400 rpm

* - Truck and Bus
** - Truck

250-280 ps

EVERY WHERE.

At Cummins, we recognise that it's not just about investing in the best engine technology. Equally important is the investment we make in our service support. With a network of over 5,000 dealer locations, few other engine companies come close to Cummins global support capability. And that support goes even further with QuickServe – our commitment to rapid response. OEM and fleet customers can access on-line a complete portfolio of engine diagnostics, maintenance procedures, repair and parts information.



QuickServe

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