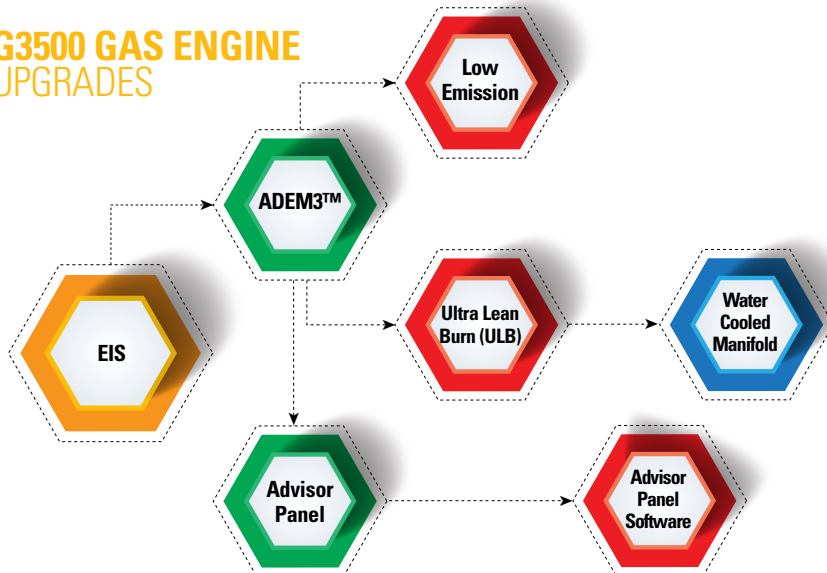


# Keep Your Investment Running Strong...

Cat® Gas Compression Engine Upgrade Kits



## G3500 GAS ENGINE UPGRADES



## G3600 GAS ENGINE UPGRADES





## KEY CUSTOMER

# Decision Factors

### **FLEET FLEXIBILITY**

Customers have more operating flexibility as they move through the upgrade offerings. The combinations of technology allows greater efficiency, increased altitude capability, and improved emissions flexibility. Customers can choose which options are best suited for their diverse applications.

### **COST**

Upgrade options will vary in cost, as a percent of the cost of a new engine, depending on the level of upgrade.

### **IMPROVED CONTROLS**

Integrated controls technology enables improved diagnostic capability and enhanced troubleshooting, engine configuration, and tuning capabilities.

### **FUEL EFFICIENCY**

The combination of technologies enables more precise fuel delivery and complete combustion for higher operating efficiencies and improved fuel economy.

### **ALTITUDE**

Upgrade options allow for increased altitude capabilities.

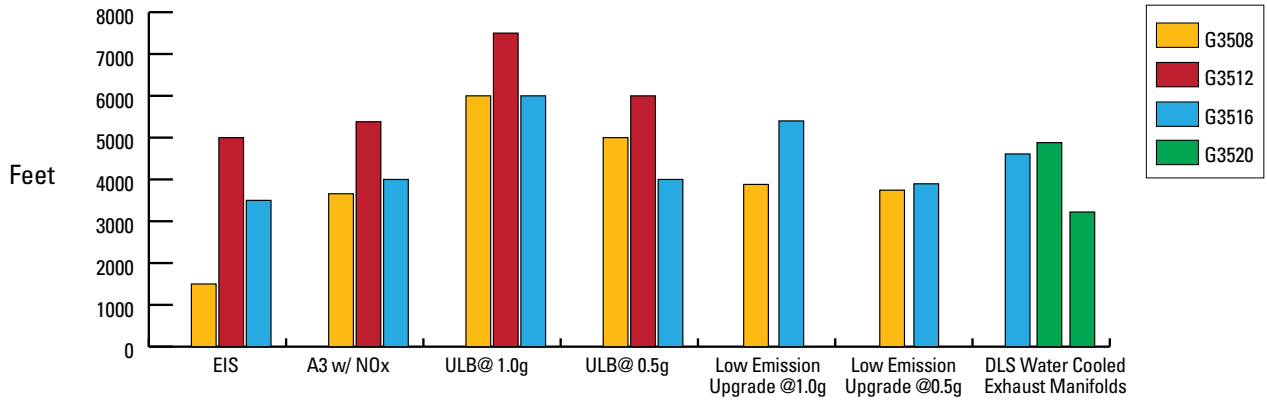
### **TURNDOWN**

Upgrade options allow for enhanced torque speed turndown.

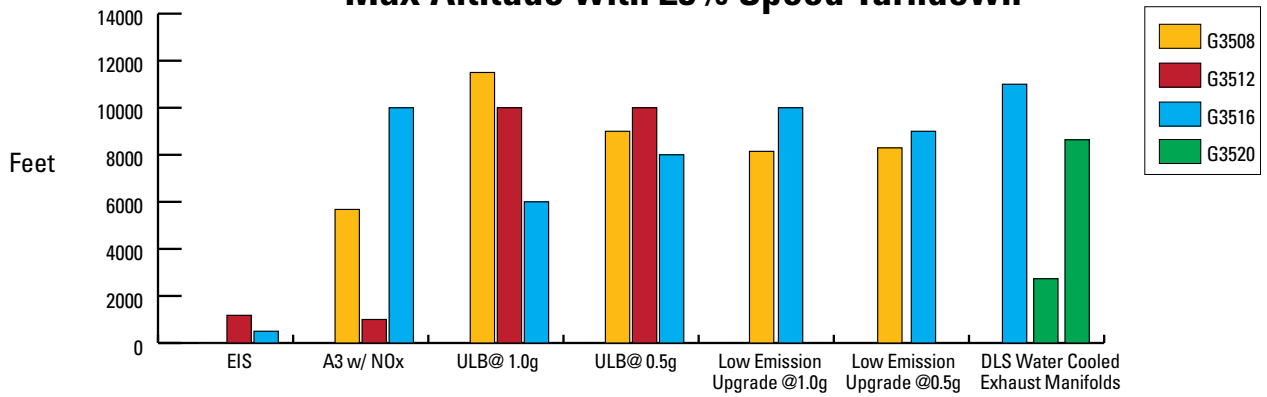
### **EMISSIONS**

Upgrade options offer the ability to reach emission levels and compliance for critical areas.

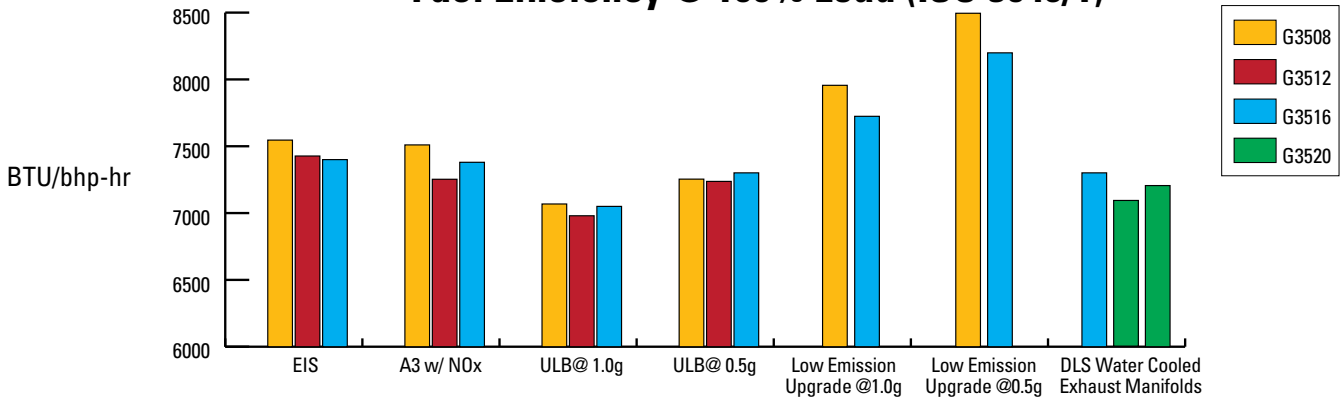
## Max Altitude without Derate



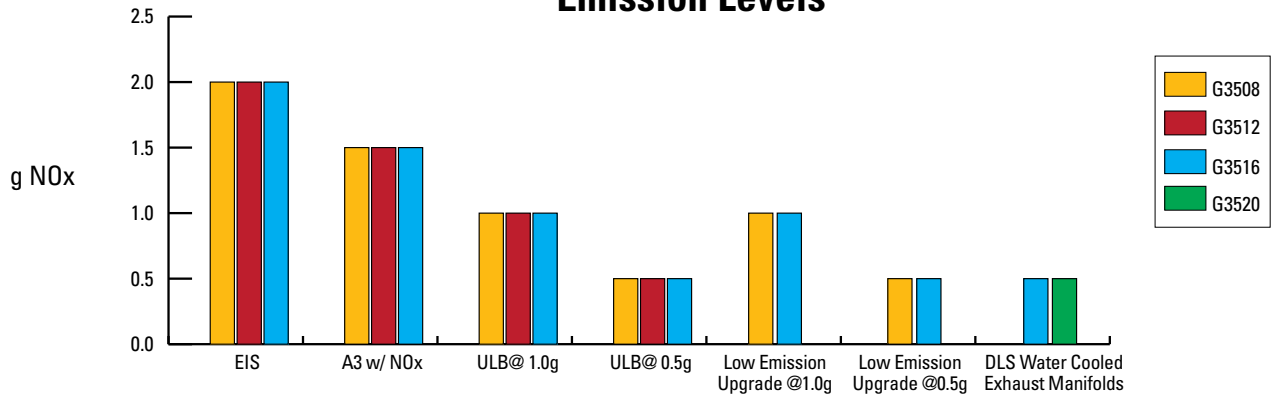
## Max Altitude with 25% Speed Turndown



## Fuel Efficiency @ 100% Load (ISO 3046/1)



## Emission Levels



	G3508				G3508 Low Emission Upgrade		G3512			
	EIS	ADEM <sup>3</sup> w/ NO <sub>x</sub>	ULB @ 1.0g	ULB @ 0.5g	Upgrade @ 1.0g	Upgrade @ 0.5g	EIS	ADEM <sup>3</sup> w/ NO <sub>x</sub>	ULB @ 1.0g	ULB @ 0.5g
	DM5888	DM8621	DM8827	DM8826	EM2115	EM2114	DM5118	DM5120	DM8829	DM8828
<b>Ambient Temp</b>	100° F (38° C)	100° F (38° C)	100° F (38° C)	100° F (38° C)	100° F (38° C)	100° F (38° C)	100° F (38° C)	100° F (38° C)	100° F (38° C)	100° F (38° C)
<b>Max Altitude w/o Derate,</b>	1500 ft (457 m)	3658 ft (1115 m)	6000 ft (1829 m)	5000 ft (1524 m)	3658 ft (1115 m)	3658 ft (1115 m)	5000 ft (1524 m)	5381 ft (1640 m)	7500 ft (2286 m)	6000 ft (1829 m)
<b>Max Altitude with 25% Turndown</b>	0 ft (0 m)	5678 ft (1731 m)	11500 ft (3505 m)	9000 ft (2743 m)	8254 ft (2516 m)	8254 ft (2516 m)	1177 ft (359 m)	1000 ft (304 m)	10000 ft (3048 m)	10000 ft (3048 m)
<b>Max Rating, bhp (bkW) @ rpm</b>	630 bhp (470 bkW) @ 1400 rpm	670 bhp (500 bkW) @ 1400 rpm	690 bhp (515 bkW) @ 1400 rpm	690 bhp (515 bkW) @ 1400 rpm	670 bhp (500 bkW) @ 1400 rpm	670 bhp (500 bkW) @ 1400 rpm	945 bhp (705 bkW) @ 1400 rpm	1005 bhp (749 bkW) @ 1400 rpm	1035 bhp (772 bkW) @ 1400 rpm	1035 bhp (772 bkW) @ 1400 rpm
<b>Fuel Efficiency @ 100% Load (ISO 3046/1)</b>	7546 Btu/bhp.hr	7510 Btu/bhp.hr	7068 Btu/bhp.hr	7254 Btu/bhp.hr	7988 Btu/bhp.hr	8545 Btu/bhp.hr	7427 Btu/bhp.hr	7253 Btu/bhp.hr	6980 Btu/bhp.hr	7237 Btu/bhp.hr
	10.7 MJ/bkW-hr	10.6 MJ/bkW-hr	10.0 MJ/bkW-hr	10.3 MJ/bkW-hr	11.3 MJ/bkW-hr	12.1 MJ/bkW-hr	10.5 MJ/bkW-hr	10.3 MJ/bkW-hr	9.9 MJ/bkW-hr	10.2 MJ/bkW-hr
<b>Emissions- NO<sub>x</sub></b>	2.0 g/bhp-hr	1.5 g/bhp-hr	1.0 g/bhp-hr	1.0 g/bhp-hr	1.0 g/bhp-hr	0.5 g/bhp-hr	2.0 g/bhp-hr	1.5 g/bhp-hr	1.0 g/bhp-hr	0.5 g/bhp-hr
<b>Done @ time of Overhaul</b>	Yes	Yes	Yes	Yes	Not Required	Not Required	Yes	Yes	Yes	Yes
<b>Availability</b>	Now	Now	Now	Now	Now	Now	Now	Now	Now	Now
<b>Order to Ship (days)</b>	n/a	30 Business Days*	Standard Stock Order	Standard Stock Order	30 Business Days*	30 Business Days*	n/a	30 Business Days*	Standard Stock Order	Standard Stock Order
<b>Packaged as kit?</b>	n/a	Yes	No	No	Yes	Yes	n/a	Yes	No	No
<b>Prerequisite</b>	n/a	EIS	EIS or ADEM <sup>3</sup>	EIS or ADEM <sup>3</sup>	ADEM <sup>3</sup> & Single Turbo	ADEM <sup>3</sup> & Single Turbo	EIS	EIS	EIS or ADEM <sup>3</sup>	EIS or ADEM <sup>3</sup>

\* Target turnaround from order to ship is 30 calendar days. Contact the direct ship customer service group at 800-566-7782 option 4, and then option 3 to inquire updated ESDs.

	G3516				G3516 Low Emission Upgrade		G3516J	G3520J	
	EIS	ADEM <sup>3</sup> w/ NO <sub>x</sub>	ULB @ 1.0g	ULB @ 0.5g	Upgrade @ 1.0g	Upgrade @ 0.5g	Wet Exhaust Manifolds	Wet Exhaust Manifolds	Wet Exhaust Manifolds
	DM5215	DM8543	EM1749	EM1748	DM9401	DM9400	EM1495	EM2413	EM2502
<b>Ambient Temp</b>	100° F (38° C)	100° F (38° C)	100° F (38° C)	100° F (38° C)	100° F (38° C)	100° F (38° C)	100° F (38° C)	100° F (38° C)	100° F (38° C)
<b>Max Altitude w/o Derate,</b>	3500 ft (1067 m)	4000 ft (1219 m)	6000 ft (1829 m)	4000 ft (1219 m)	5400 ft (1646 m)	3800 ft (1158 m)	4610 ft (1405 m)	3281 ft (1000 m)	4921 ft (1500 m)
<b>Max Altitude with 25% Turndown</b>	500 ft (1524 m)	10000 ft (3048 m)	6000 ft (1829 m)	8000 ft (2439 m)	10000 ft (3048 m)	9000 ft (2743 m)	11000 ft (3353 m)	9022 ft (2750 m)	2460 ft (750 m)
<b>Max Rating, bhp (bkW) @ rpm</b>	1340 bhp (1000 bkW) @ 1400 rpm	1340 bhp (1000 bkW) @ 1400 rpm	1380 bhp (1030 bkW) @ 1400 rpm	1380 bhp (1030 bkW) @ 1400 rpm	1340 bhp (1000 bkW) @ 1400 rpm	1340 bhp (1000 bkW) @ 1400 rpm	1380 bhp (1030 bkW) @ 1400 rpm	1725 bhp (1286 bkW) @ 1400 rpm	1480 bhp (1104 bkW) @ 1200 rpm
<b>Fuel Efficiency @ 100% Load (ISO 3046/1)</b>	7400 Btu/bhp.hr	7380 Btu/bhp.hr	7050 Btu/bhp.hr	7301 Btu/bhp.hr	7724 Btu/bhp.hr	8199 Btu/bhp.hr	7301 Btu/bhp.hr	7241 Btu/bhp.hr	7110 Btu/bhp.hr
	10.5 MJ/bkW-hr	10.4 MJ/bkW-hr	10.0 MJ/bkW-hr	10.3 MJ/bkW-hr	10.9 MJ/bkW-hr	11.6 MJ/bkW-hr	10.3 MJ/bkW-hr	10.2 MJ/bkW-hr	10.1 MJ/bkW-hr
<b>Emissions- NO<sub>x</sub></b>	2.0 g/bhp-hr	1.5 g/bhp-hr	1.0 g/bhp-hr	0.5 g/bhp-hr	1.0 g/bhp-hr	0.5 g/bhp-hr	0.5 g/bhp-hr	0.5 g/bhp-hr	0.5 g/bhp-hr
<b>Done @ time of Overhaul</b>	Yes	Yes	Yes	Yes	Not Required	Not Required	Not Required	Not Required	Not Required
<b>Availability</b>	Now	Now	Now	Now	Now	Now	Now	Now	Now
<b>Order to Ship (days)</b>	n/a	30 Business Days*	Standard Stock Order	Standard Stock Order	30 Business Days*	30 Business Days*	30 Business Days*	Standard Stock Order	Standard Stock Order
<b>Packaged as kit?</b>	n/a	Yes	No	No	Yes	Yes	Yes	No	No
<b>Prerequisite</b>	EIS	EIS	EIS or ADEM <sup>3</sup>	EIS or ADEM <sup>3</sup>	ADEM <sup>3</sup> w/ NO <sub>x</sub>	ADEM <sup>3</sup> w/ NO <sub>x</sub>	G3516B	G3520B	G3520B

\* Target turnaround from order to ship is 30 calendar days. Contact the direct ship customer service group at 800-566-7782 option 4, and then option 3 to inquire updated ESDs.



## ADEM3 UPGRADE



### **G3512 and G3516 Conversion to ADEM3™ with AFRC and NOx Sensor**

Upgrade your G3512 and G3516 engines in the field to the ADEM3 system which integrates engine sensing and monitoring, AFRC (air/fuel ratio control) with NOx sensors, ignition timing, and detonation control in to one comprehensive engine control system.

- Finer Engine Control
- Extended Engine Life
- Improved Diagnostics and Interface
- Expanded Safety and Shutdown Capability
- Remote Monitoring Capability

### **G3508 Conversion to ADEM3 and AFRC with NOx Sensor Including Twin to Single Turbocharger/G3508 Conversion to ADEM3 and AFRC with O<sub>2</sub> Sensor**

Upgrade your G3508 engines in the field to the ADEM3 system which integrates engine sensing and monitoring, (AFRC) air/fuel ratio control with NOx sensors, ignition timing, and detonation control in to one comprehensive engine control system. There is also an option to convert the twin turbocharger configuration to a single turbocharger.

- Increased Power
- Improved Turndown
- Improved Altitude Capability
- Improved NOx Emissions
- Improved Reliability
- Simplified Controls

## G3500 ADVISOR PANEL



### **G3500 Advisor Panel / Software Upgrade**

Upgrade your engine with Remote Advisor Panels. The additional software upgrade will allow for enhanced engine setup, troubleshooting, and diagnostics.

- Engine Setup and Troubleshooting Without Cat® ET
- Set Up Engine from Operator Interface Panel
- Complete Fault Code Text (Actual Text, Not Just Numbers)

## ULTRA LEAN BURN UPGRADE

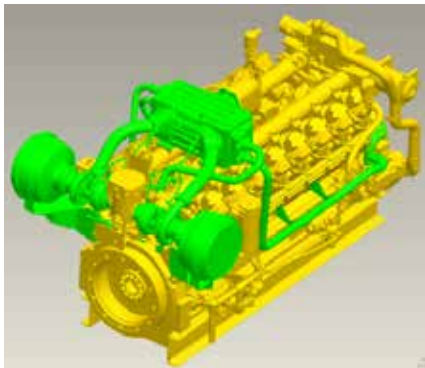


### **G3500B Ultra Lean Burn (ULB) Upgrade**

Upgrade your G3500 engines to Ultra Lean Burn technology. This proven technology utilizes state of the art ADEM3 systems, air/fuel ratio control, and NOx sensors to operate at not-to-exceed 0.5 or 1.0 g/bhp-hr NOx levels with higher altitude capability throughout the total speed range.

- G3508, G3512, G3516
- Lower Operating Costs
- Higher ROI
- Increased Horsepower
- Fleet Flexibility
- Lower Lifecycle Cost
- Done in conjunction with Major Overhaul
- Improved Efficiency and Altitude Capability
- 0.5g NOx Emissions Without Use of 3-way Catalyst

## LOW EMISSION UPGRADE



### G3508 and G3516 Low Emission Upgrade

Upgrade your G3508 and G3516 engines to low emission configuration enabling 0.5 or 1.0 g/bhp-hr NOx performance.

- Applicable for G3508 and G3516 with ADEM3, AFRC and NOx sensor
- 0.5 g/bhp-hr or 1.0 g/bhp-hr NOx Emissions
- Improved Altitude and Speed Turndown Capability
- Horsepower rating remains the same
- Components: Turbocharger(s) (including oil and water lines), 2-Stage Aftercooler, Air Cleaner(s), Water lines, Oil Cooler
- Radiator Cooling Capacity must be evaluated
- G3508 must have Single Turbocharger – Upgrade Kit is available

## WATER COOLED MANIFOLD UPGRADE



### G3516B and G3520B Water Cooled Exhaust Manifold Upgrade

Upgrade your G3516B or G3520B engine with the new water cooled, dual layered exhaust manifolds similar to G3500J engines.

- Maintains HP
- Lower Lifecycle Costs
- Achieve 0.5 g/bhp-hr NOx emissions
- Provides lower surface temperatures on engine exhaust system
- Radiator cooling capacity must be evaluated

## G3600 UPGRADES



### G3600 ADEM3 Upgrade

Upgrade your G3600 engines in the field to the ADEM3 system which integrates engine sensing and monitoring, air/fuel ratio control, ignition timing, and detonation control in to one comprehensive engine control system.

- Significantly Improved Uptime
- Improved Troubleshooting
- Available for All G3600 Models
- Improved Reliability Compared to Engine Supervisory System (ESS)



### G3600 VTC to TPS Turbocharger Upgrade

Upgrade your existing TPS turbocharger to the VTC turbocharger.

- Upgrade Turbo, Aftercooler, and ECM with Latest Software to get 0.5g NOx Compatible with ESS or ADEM3 Engine Controllers (Hydrax System only)
- Reduced Fouling Risk
- Up to double the time between service intervals
- Improved Uptime
- Improved Altitude and Turndown Capability



## Advantages of Cat Engine Upgrade

With these options, you can bring your older engine up to the latest technology level to improve operating efficiencies, including lower operating costs, improved fleet flexibility, and increased sustainability.



### Greater Return on Investment

By extending the useful lives of existing assets, customers realize greater returns on their initial capital investments.



### Lower Owning & Operating Costs

Through higher efficiency, improved capabilities, and the reliability and durability provided by genuine Cat parts, owning and operating costs are lowered.



### Increased Engine Uptime

Through improved diagnostic and troubleshooting capabilities in combination with genuine Cat parts, engine up-times are increased.



### Enhanced Performance

Customers benefit from higher horsepower, lower emissions, better fuel efficiency, and higher altitude capability.



### Environmental Sustainability

Improved fuel efficiency, lower emissions, and extending the useful life of older assets reduces the impact on our environment.



### Safety

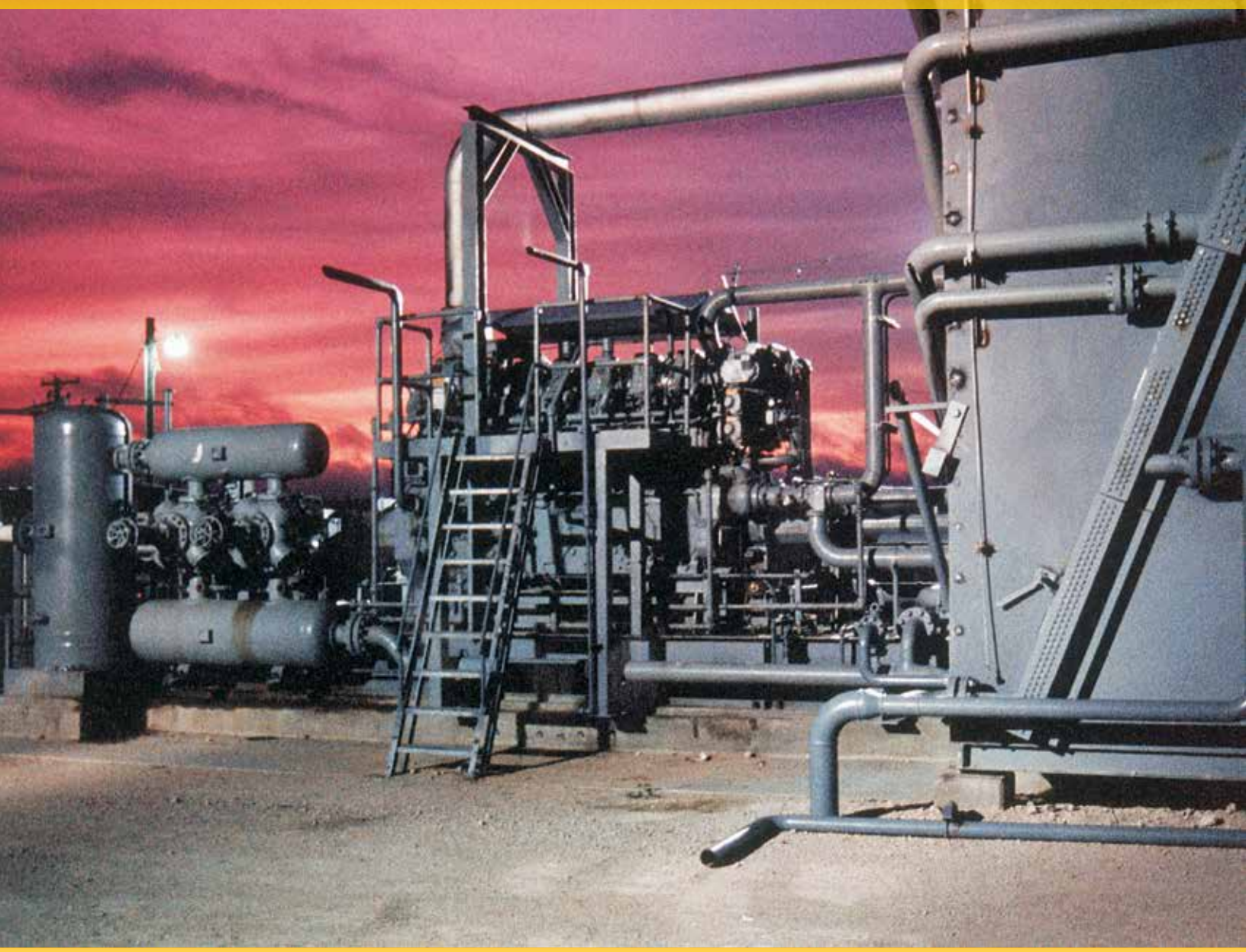
Upgrades that lower engine surface temperatures increase the safety of the environments in which the engines are located.

## The Cat Advantage

Guaranteed for fit and function, Genuine Cat Parts offer the right combination of quality and price for your commercial engine. Coupled with a world class dealer service network, Caterpillar and Cat dealers provide unmatched service and total parts support. Please contact your Cat dealer for details and confirmation of availability. They will help you make an informed decision.

For ordering and pricing contact your Cat dealer.





**LET'S DO THE WORK.™**

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PEDJ0130-02  
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