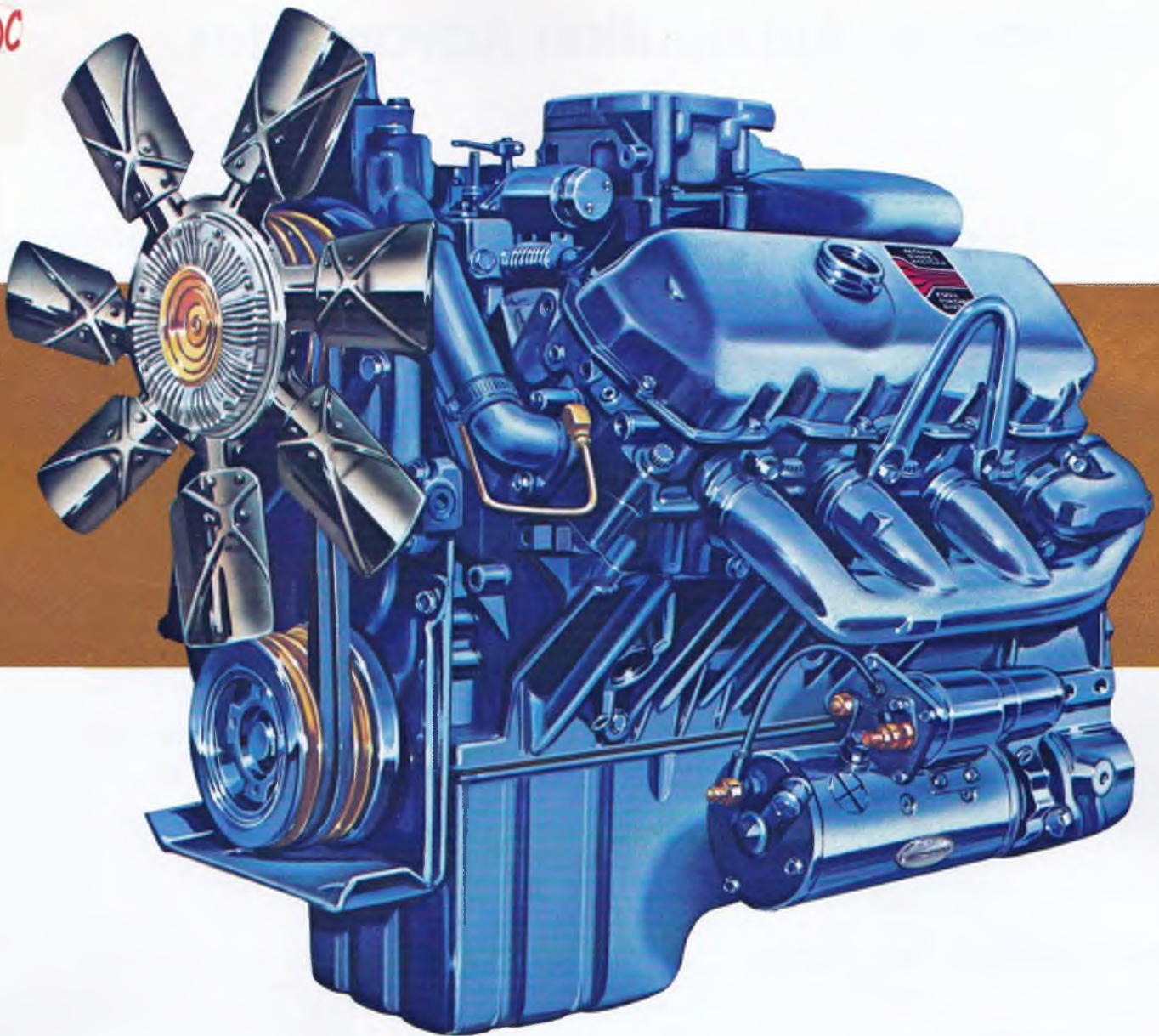


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The Fuel Pincher is ideal for many construction/industrial applications....

Sweepers, Air compressors, Lift trucks, Excavators, Cranes, Graders, Rollers, Harvesters, Fertilizer spreaders, Crane carriers and others.

Powering your equipment with the Fuel Pincher offers the following benefits.

- Proven durability and state-of-the-art diesel technology at a reasonable cost
- Rebuildability for complete overhaul capability
- Low cost parts
- Efficient high altitude performance
- Compact design
- Low noise emissions
- Excellent warranty coverage
- Impressive performance
- Outstanding fuel economy
- Good startability in cold weather—to 10°F without the use of starting aids.

Fuel Pincher Application Advantages

Excellent high altitude performance

Flexibility is important to equipment users. Many applications demand high altitude operation. Very often in these situations performance suffers. To illustrate the Fuel Pincher's ability to retain its horsepower at altitude, we compared it with a competitive diesel.

The chart below shows our 200 HP Fuel Pincher engine versus a competitive 210 HP engine. **The Fuel Pincher lost only 3.8% HP when tested from 500 to 10,500 feet. The competitive engine dropped 26.7% HP with the same change in altitude.**

Low noise emissions

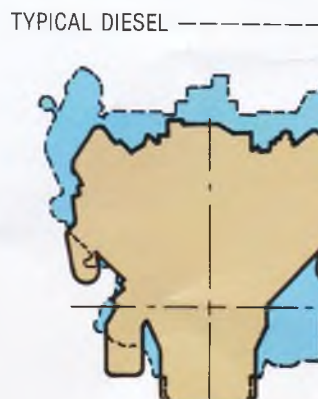
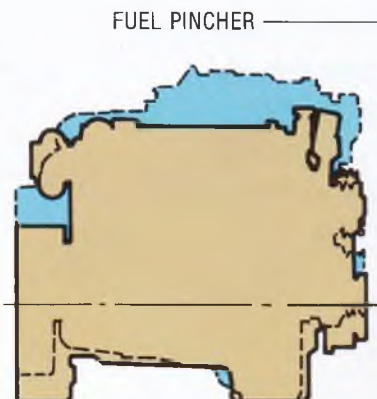
The Fuel Pincher couples exceptional performance with low engine noise levels. The chart below illustrates how well specially designed Fuel Pincher components, like laminated rocker covers, keep noise levels to a minimum.

ENGINE MODELS	POWER RATING HP RPM		ALTITUDE (FEET)							
			4,900		6,500		8,200		10,500	
			HP	% LOSS	HP	% LOSS	HP	% LOSS	HP	% LOSS
FUEL PINCHER	200	2800	198	1.0	196	1.8	195	2.6	192	3.8
COMPETITIVE ENGINE	210	2800	189	10.0	177	15.7	167	20.5	154	26.7

Compact physical size

The Fuel Pincher is lean and compact. It is virtually the same physical size as typical gasoline engines and more compact than most competitive diesels. This illustration shows how the Fuel

Pincher compares in size with a competitive diesel. Looking at the key exterior dimensions, the Fuel Pincher is 35 inches long, 32 inches wide, and 32.5 inches high.



Diesel Engine N

Engine
Fuel Pincher (8.2 NA)
Competitive "NA" Engine
Competitive "NA" Engine
Fuel Pincher (8.2 T)
Competitive "T" Engine
Competitive "T" Engine

Low part costs

Today's equipment buyer looks at the total picture . . . it isn't just performance . . . it is the total operating cost that has to be considered, including serviceability and parts costs. The



Excellent Warranty Coverage

This warranty demonstrates the confidence Detroit Diesel Allison has in the durability and reliability of the Fuel Pincher.

WARRANTY ON NEW DETROIT DIESEL FUEL PINCHER ENGINES USED IN CONSTRUCTION/INDUSTRIAL APPLICATIONS

Detroit Diesel Allison (Detroit Diesel Allison, Division of General Motors Corporation) warrants to the owner that it will repair in accordance with the warranty limitations and adjustment schedule below:

- Any defective or malfunctioning parts of each new Detroit Diesel Fuel Pincher (8.2 Liter) engine (referred to as Engine) used in industrial applications and;
- Each starting motor (referred to as Optional Equipment) supplied by Detroit Diesel Allison.

Noise Comparison

BHP @ RPM	Engine Noise @ 1 Meter dB(A)
160/2800	98.5
175/2800	102.5
210/2800	102.5
200/2800	98.8
175/2800	100.1
230/3000	104.0

Fuel Pincher is not only easy to service, but part costs are very competitive, and generally lower than the competition.

WARRANTY LIMITATIONS AND ADJUSTMENT SCHEDULE				
Item	Warranty Limitations (Whichever Occurs First)		Adjustment Charge to be paid by Owner	
	Months	Hours	Parts	Labor
Engine	0-12	No Limit	No Charge	No Charge
Optional Equipment	0-12	0-2,000	No Charge	No Charge

The warranty period will begin on the date the Engine is delivered to the first retail purchaser or, if the Engine is first placed in service as a demonstrator prior to sale at retail, on the date the Engine is first placed in such service.

This warranty covers only conditions resulting from defects in material or workmanship under normal use and service. Labor costs for Engine removal and reinstallation, when necessary to make a warranty repair, and costs of service supplies, such as lubricating oil, filters and engine coolant, when such items are not reusable due to a warrantable failure, are included.

THIS WARRANTY DOES NOT COVER:

- Conditions resulting from misuse, negligence, alteration, accident or lack of performance of normal maintenance services;
- Any Engine which has been repaired by other than an authorized Detroit Diesel Allison service outlet so as, in any way in the judgment of Detroit Diesel Allison, to affect adversely, its performance and reliability;
- The replacement of service supplies (such as lubricating oil, filters, engine coolant, and belts) made in connection with normal maintenance services;
- Loss of time, inconvenience, loss of the use of the Engine or other consequential damages.

The repair of defective Engine parts and optional equipment qualifying under this warranty will be performed by any authorized Detroit Diesel Allison service outlet within a reasonable time following the delivery of the Engine or optional equipment to the service outlet's place of business. The Engine will be repaired using new parts or remanufactured parts designated reliable and sold by authorized Detroit Diesel Allison Distributors.

The owner is responsible for the performance of regular maintenance services as specified in the Operator's Manual.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND OF ANY NONCONTRACTUAL LIABILITIES INCLUDING PRODUCT LIABILITIES BASED ON NEGLIGENCE OR STRICT LIABILITY. DETROIT DIESEL ALLISON DOES NOT AUTHORIZE ANY PERSON TO CREATE FOR IT ANY OTHER OBLIGATION OR LIABILITY IN CONNECTION WITH THESE ENGINES OR OPTIONAL EQUIPMENT. DETROIT DIESEL ALLISON SHALL NOT BE LIABLE FOR CONSEQUENTIAL DAMAGES RESULTING FROM BREACH OF WARRANTY.

Swirl-Fire Combustion

The Secret of the Fuel Pincher

No other diesel offers this advanced combustion system that provides maximum mixing of air and fuel, to pinch the power from precious fuel. Swirl-fire combustion. It combines the latest technology in air intake systems with the proven fuel atomizing ability of the Detroit Diesel unit fuel injector. Here's how it works:

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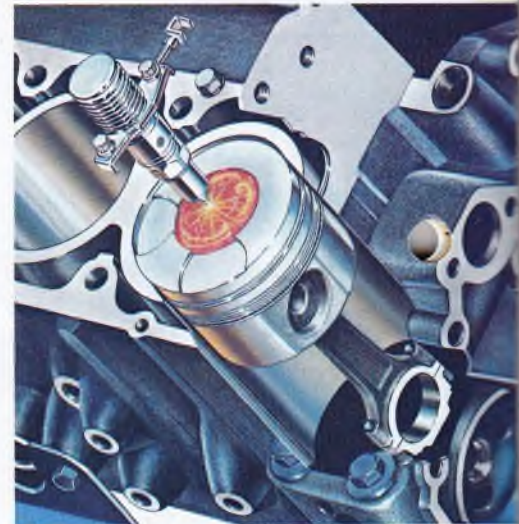
Intake Air Swirl

The intake air passage in the cylinder head is specially shaped to act as both a forcing cone and air-twisting chamber. It accelerates the speed of the incoming air, then imparts a twisting turbulence, or "swirl." When the air enters the combustion chamber, this swirl is further enhanced by the toroidal shape of the piston bowl. As the piston compresses this turbulent air mass, it creates hundreds of miniature tornadoes circling in one violent vortex.



Fuel Atomization

At the moment when this swirling air mass has been compressed to approximately 1/17 its original size, and heated to a temperature of 1100°F, fuel is forced into the combustion chamber through five minute holes under 15,000 psi pressure by the fuel injector. The patented Detroit Diesel unit fuel injector combines the functions of measuring, timing, pressurizing and atomizing into one mechanism that is located immediately above the combustion chamber. So fuel injection is precise and atomization is thorough.



Complete Combustion

The finely-atomized fuel is immediately engulfed by the super-hot, violently-swirling air. It ignites and burns at a controlled rate, with the tornadic air continuing to mix and re-mix with every atom of fuel. The result is complete burning of the fuel for the highest possible extraction of its energy potential.

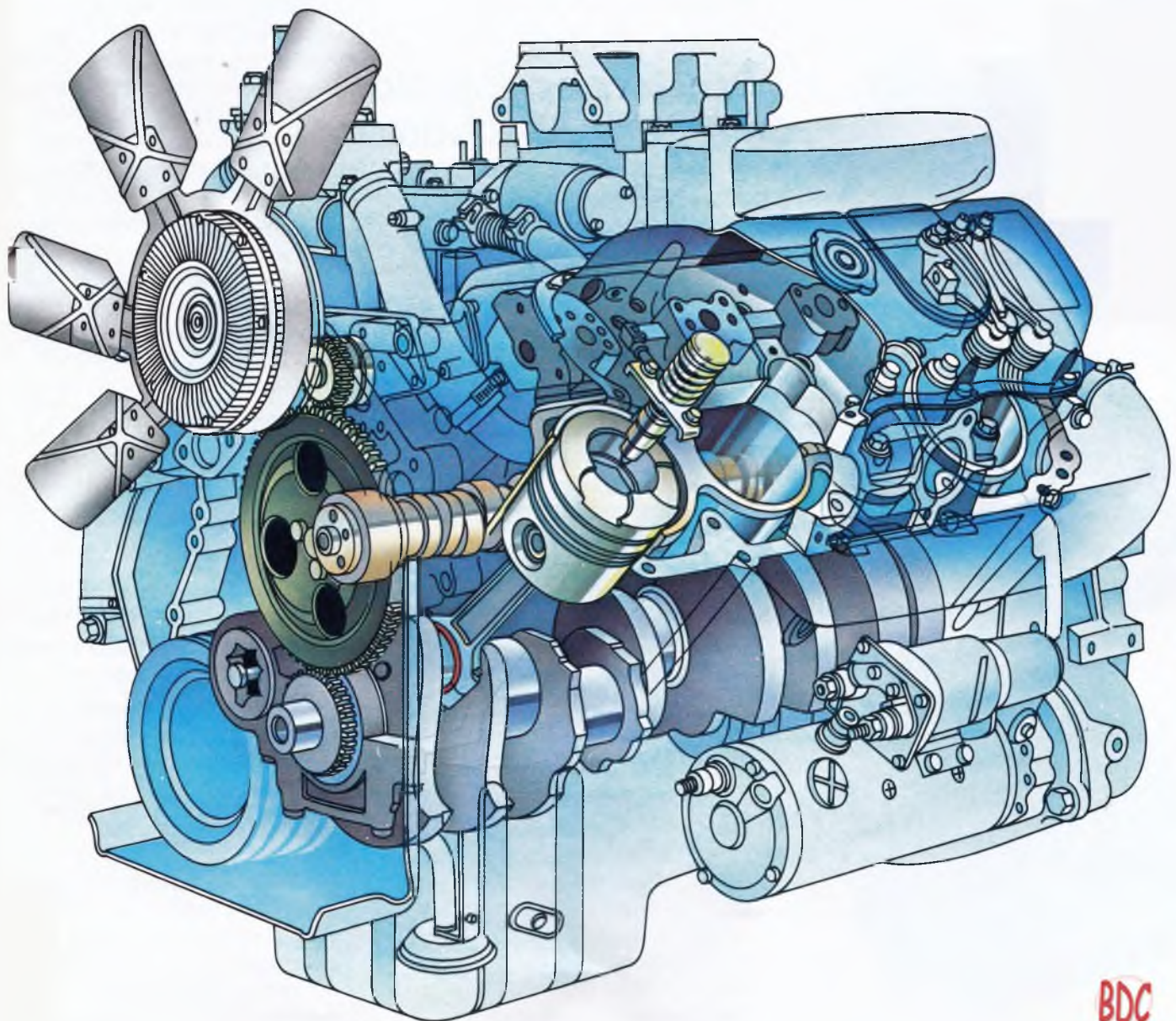


The Inside Story on the Fuel Pincher Diesel

The Fuel Pincher was designed "from the ground up" to be the logical diesel alternative to gasoline power. It **is not** a conversion of a basic gasoline engine. It **is not** an updated or modified diesel of older heritage. It **is** a brand new engine designed with the latest state-of-the-art technology, to meet the economy and performance demands of off-highway machinery.

Like most internal combustion engines, the Fuel Pincher has a block, pistons, and crankshaft; air, fuel, and exhaust systems. What makes it different from the others is a host of innovative approaches to the design and interaction of these parts. The result is an economical, durable engine that can be produced for an affordable price.

The following pages provide an inside look at the many innovations and special features found only in the new Fuel Pincher Diesel, from Detroit Diesel Allison.



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Design Features



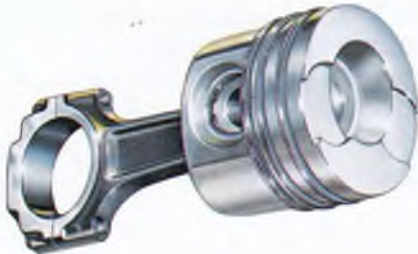
1. Cylinder Block

The advanced technology cylinder block was designed using computer analysis.

- Bore walls are a free standing design, which results in full length cylinder cooling for

long life and excellent noise containment.

- Four bolt main bearing caps are used for strength and durability.

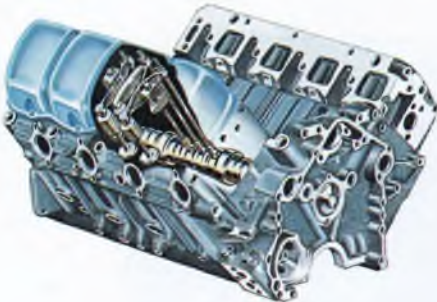


2. Piston and Connecting Rod

- The piston is constructed of an aluminum alloy which incorporates a ni-Resist top ring groove and a cam ground elliptical skirt.
- The piston has a toroidal-

shaped combustion chamber to reduce emissions, improve fuel economy and aid cold starting.

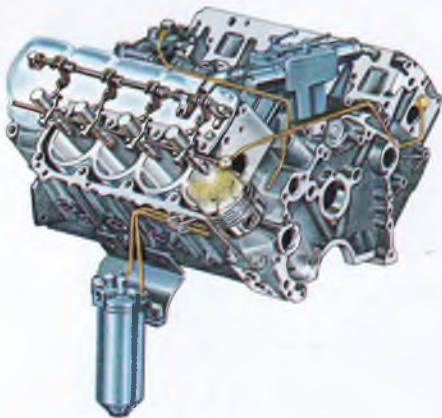
- The connecting rod is a short, rugged forging.



3. Valve and Injector Operating Mechanism

When designing the valve and injector operating mechanism for the Fuel Pincher, we used the finest materials and most up-to-date manufacturing processes and techniques. Consider the following features:

- Laser-hardened cam follower bodies.
- Heavy-duty roller type cam followers
- Dual valve spring system with a damper coil for protection from accidental overspeed.

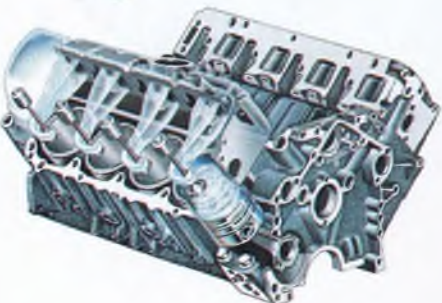


4. Unit Injector Fuel System

- The unit injector fuel system is of a proven patented design which incorporates a high technology precision machining process.
- Fuel reaches the injector through integral passages in the cylinder head, thereby eliminating the need for

external high pressure fuel lines.

- The injector measures the fuel, pressurizes, times and injects it.
- The unit injector fuel system contributes to excellent fuel economy, low emissions and ease of maintenance.



5. Air Intake System

The air intake system of the Fuel Pincher has been designed with the latest technology.

- Air for combustion enters the air intake ports in the cylinder heads from dual intake manifolds.
- The air intake port was designed with a unique

helical shape to optimize air swirl in the combustion chamber.

- This helical intake port causes micro and macro air swirl eddies in the combustion chamber for good fuel economy, low emissions and excellent performance.

Exhaust System

The exhaust system on the Fuel Pincher was engineered to give you maximum fuel economy and performance.

- As the rocker arm opens the exhaust valve, the burned gases in the combustion chamber enter the exhaust port in the cylinder head.
- The exhaust ports are short and round with uniquely designed smooth walls for

optimum exhaust expansion and flow.

- The exhaust ports are insulated with a computer designed stainless steel heat shield, which reduces the heat rejection to the coolant and on turbocharged engines provides additional thermal energy to drive the turbocharger.



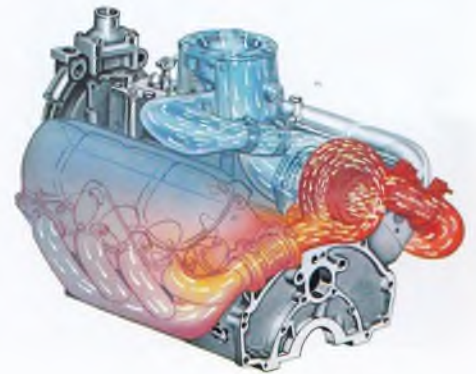
7. Turbocharger

With the Fuel Pincher you have a choice of a naturally aspirated or a turbocharged engine.

- The turbocharger consists of two rotors that are mounted on the same shaft.
- One rotor, called the turbine, is driven by the hot expanding exhaust gases; the other rotor, called the compressor, is shaft driven by the turbine.
- The compressor pulls in clean fresh air, compresses it, and drives it through the intake manifold into the cylinder

head intake ports, effectively increasing the amount of air available for combustion.

- The turbocharger on the Fuel Pincher has separated dual exhaust inlets which increase turbocharger efficiency and help provide quiet operation. The benefit of the turbocharger is increased horsepower and torque, better high altitude performance and less engine noise when compared to a naturally aspirated engine.



Other Features

Rocker Cover — Laminated steel valve covers and valley cover are used for low noise radiation.

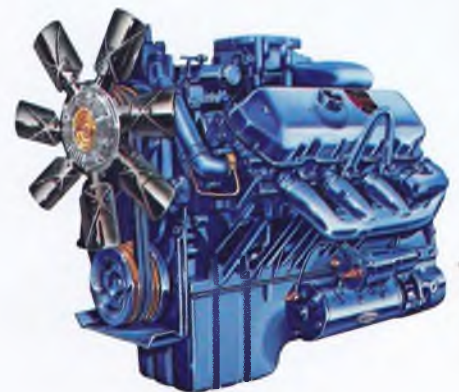
Filter — Dual full flow spin-on oil filters provide engine protection.

Intake Manifold — Advanced design techniques were used to optimize air flow into the intake manifold for excellent air distribution. A separate manifold on each bank is connected with an isolated crossover system for noise containment.

Crankshaft — The crankshaft was designed with large crankpin and main journal diameters with substantial overlap for maximum strength. Deep rolled fillets, using the Hegenscheidt rolling process, and burnished surfaces result in long life. The large bearing surface area and low firing pressures minimize bearing loads.

Camshaft — The short, rigid camshaft is a precision machined steel forging with large journal diameters and large base circles. Cam lobes are induction hardened for strength.

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Specifications



Basic Engine "NA"

Basic Engine	8.2N 4A40 Injectors	8.2N 4A53 Injectors
Model	4083-7100	4083-7100
Description	Naturally Aspirated	Naturally Aspirated
Number of Cylinders	8	8
Bore and Stroke	4.25 in X 4.41 in (108mm X 112mm)	4.25 in X 4.41 in (108mm X 112mm)
Displacement	500 cu in (8.2 Liters)	500 cu in (8.2 Liters)
Engine Type	4 Cycle	4 Cycle
Rated Gross Power: 85°F (29.4°C) and 29.00 in Hg (98.19 kPa) Bar. (Dry)	130 BHP (97 KW) @ 2800 RPM	160 BHP (119 KW) @ 2800 RPM
Continuous Gross Power: 85°F (29.4°C) and 29.00 in Hg (98.19 kPa) Bar. (Dry)	130 (97 KW) @ 2800 RPM	130 BHP (97 KW) @ 2800 RPM
Torque: 85°F (29.4°C) and 29.00 in Hg (98.19 kPa) Bar. (Dry)	318 lb ft (431 N•m) @ 1000 RPM	350 lb ft (475 N•m) @ 1200 RPM
Compression Ratio	18.3 to 1	18.3 to 1
Approximate Dimensions:		
Length	35 in (889mm)	35 in (889mm)
Width	32 in (801mm)	32 in (801mm)
Height	33 in (826mm)	33 in (826mm)
Net Weight (dry)	1096 lbs (497 kg)	1096 lbs (497 kg)

Basic Engine "T"

Basic Engine	8.2T 4A53 Injectors	8.2T 4C65 Injectors
Model	4083-7300	4083-7300
Description	Turbocharged	Turbocharged
Number of Cylinders	8	8
Bore and Stroke	4.25 in X 4.41 in (108mm X 112mm)	4.25 in X 4.41 in (108mm X 112mm)
Displacement	500 cu in (8.2 Liters)	500 cu in (8.2 Liters)
Engine Type	4 Cycle	4 Cycle
Rated Gross Power: 85°F (29.4°C) and 29.00 in Hg (98.19 kPa) Bar. (Dry)	160 BHP (119 KW) @ 2800 RPM	200 BHP (149 KW) @ 2800 RPM
Continuous Gross Power: 85°F (29.4°C) and 29.00 in Hg (98.19 kPa) Bar. (Dry)	160 (119 KW) @ 2800 RPM	160 (119 KW) @ 2800 RPM
Torque: 85°F (29.4°C) and 29.00 in Hg (98.19 kPa) Bar. (Dry)	369 lb ft (500 N•m) @ 1400 RPM	430 lb ft (583 N•m) @ 1700 RPM
Compression Ratio	16.9 to 1	16.9 to 1
Approximate Dimensions:		
Length	35 in (889mm)	35 in (889mm)
Width	32 in (801mm)	32 in (801mm)
Height	33 in (826mm)	33 in (826mm)
Net Weight (dry)	1121 lbs (508 kg)	1121 lbs (508 kg)

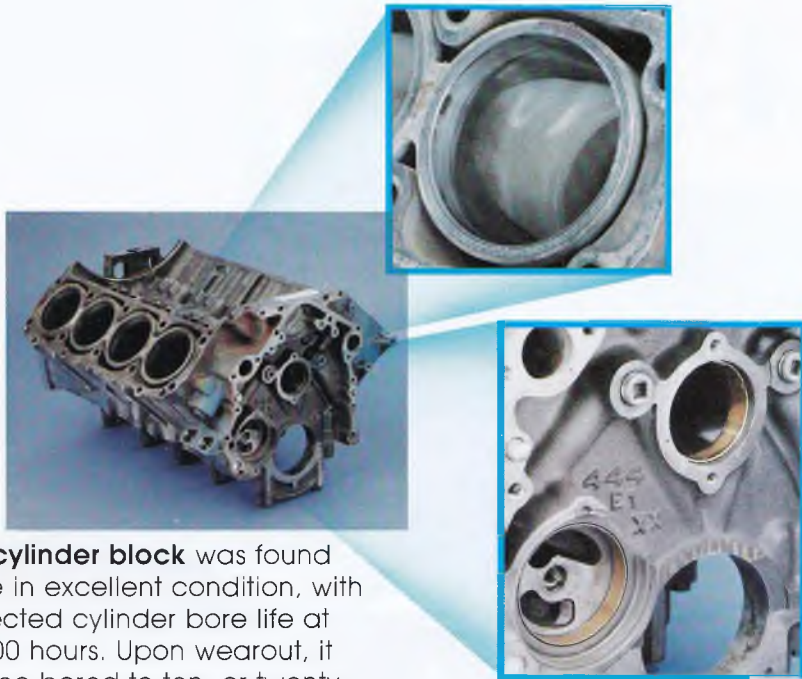
Testing Confirms Fuel Pincher Durability and Rebuildability



The photographs below are of major components from a Fuel Pincher that accumulated 3,000 hours of operation at a 100% load factor. As you can see,

these parts remained in like-new condition, showing little or no wear. In fact, they actually miked within new part specifications. From these findings we have

made life projections based on a 50% load factor, which is greater than that of the typical industrial/construction operation:



The cylinder block was found to be in excellent condition, with projected cylinder bore life at 14,400 hours. Upon wearout, it can be bored to ten- or twenty-thousandths oversize. Once bored to maximum, it can be "sleeved" back to its standard diameter.

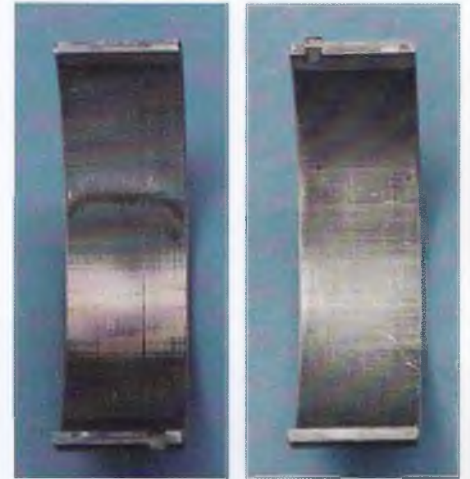
Camshaft and oil pump bushings are projected to live 6,466 hours before requiring replacement or rework



Crankshafts measured within new part specifications; main journals are projected to live 10,700 hours before needing to be ground; rod journals 15,800 hours.



Piston rings measured within new part specifications and are projected to live 9,000 hours before being replaced; the piston itself is projected to live 30,000 hours.



Rod bearings show they were barely broken-in. Their projected life is 7,500 hours.

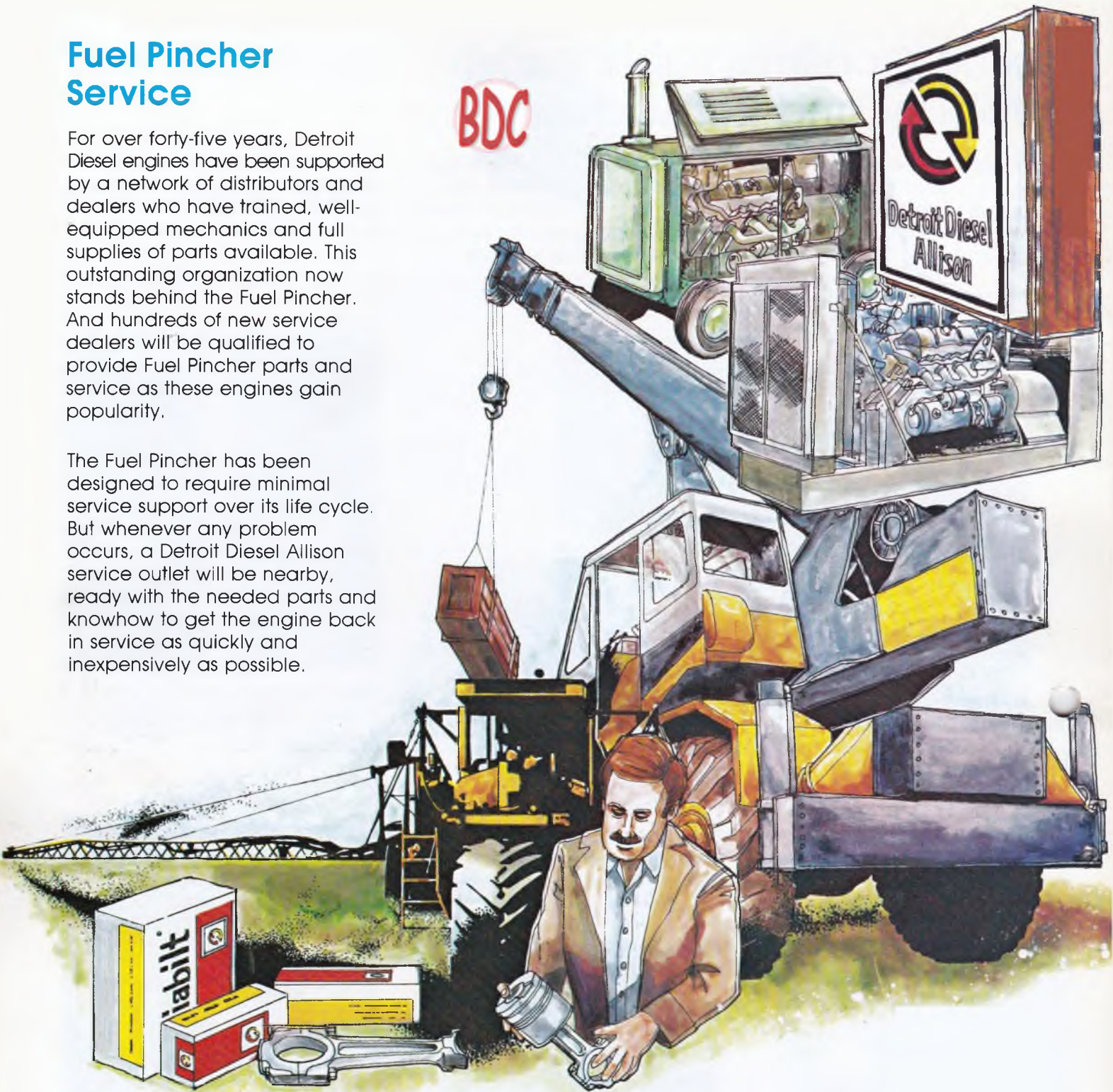


Main bearings were miked within new part specifications with a projected life of 7,500 hours before replacement becomes necessary.

Fuel Pincher Service

For over forty-five years, Detroit Diesel engines have been supported by a network of distributors and dealers who have trained, well-equipped mechanics and full supplies of parts available. This outstanding organization now stands behind the Fuel Pincher. And hundreds of new service dealers will be qualified to provide Fuel Pincher parts and service as these engines gain popularity.

The Fuel Pincher has been designed to require minimal service support over its life cycle. But whenever any problem occurs, a Detroit Diesel Allison service outlet will be nearby, ready with the needed parts and knowhow to get the engine back in service as quickly and inexpensively as possible.



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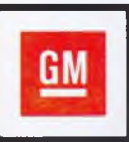
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(305/446-4900)



Detroit Diesel Allison Division of General Motors

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(313/592-5000)

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