Heavy Duty Engine Parts

POWER

AFA INDUSTRIES™

World Class Technology That Works For You

AFA INDUSTRIES™

A dependable, quality-conscious and reasonably priced supplier of heavy duty engine parts

Originally a sealing products manufacturer for the automotive industry, AFA Industries, Inc. early on recognized the need for a dependable, quality-conscious and reasonably priced supplier of heavy duty engine parts. Since 1987 we have grown our domestic and international business, adding new and extending existing product lines to meet the needs of these specialized markets.

Due to the demanding nature of commercial and industrial diesel applications, our industry has always been aware of the need for the best technology, most durable materials and highest quality precision manufacturing. AFA, from the outset, determined that these three factors would drive every aspect of the company's operations. The ultimate test of our parts is NOT sales volume or lowest price, it is performance in the field.

Starting with sealing products, we developed an all pervasive system of quality control and inspection that is second to none. Technology is always state of the art. Materials are always OE Quality or better. Manufacturing methods are constantly monitored for consistency and efficiency. The result is a product that will meet or exceed the expected life cycle of any heavy duty diesel engine in any application – guaranteed.

As we have diversified into other product lines, we have kept our eyes trained on the same fundamentals that have made us one of the most respected sealing products suppliers in the industry. We earn that respect every day with every part. From the smallest "O" Ring to the largest Cylinder Liner we are aware that our reputation is on the line where it counts – driving commerce and industry.

Currently AFA specializes in replacement parts for Cummins®, Detroit Diesel®, Navistar® and Caterpillar® engines.

AFA has many years of experience supplying domestic and diverse international markets. Frequently our parts are in service in remote locations under harsh operating conditions, demanding superior quality and durability. Whether applications take your equipment to snow capped mountains, wind swept deserts or corrosive salt water environments, field proven AFA parts meet the challange.

We at AFA look forward to expanding our horizons to include new partnerships throughout our international markets with a special focus on North America. We encourage anyone in the heavy duty diesel engine market to join us in exploring future, mutually beneficial relationships.

HEAVY DUTY PISTONS

- Computer Aided Design for precision
- Function-driven metallurgical alloys
- Ni-resist compression ring inserts
- Proprietary coatings improve durability
- Available in one and two piece articulated

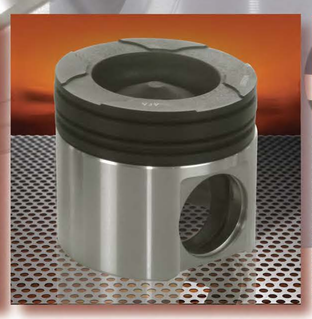
Engine pistons are the most highly engineered and technologically complex of the heavy duty power train components. Piston head configurations determine the shape of the combustion chamber and establish its ability to maximize the efficiency of the fuel burning process, distribution of forces and durability of the system. Materials vary by application and include a variety of alloys of aluminum, steel and cast iron. The thermal transfer properties, weight advantages and structural rigidity of aluminum/silicon alloy determine its use in many applications. The higher power classes needs are better met with forged steel which is more dimensionally stable and can support closer machining tolerances for better endurance.

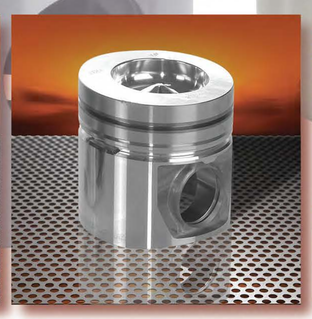
Two piece articulated pistons combine a forged steel head with an aluminum skirt, these designs combine the tighter sealing tolerances of steel with the weight and thermal advantages of aluminum and are used in high load or severe duty conditions.

All of our pistons include a metallurgically bonded NI-resist insert in the top critical land area. This alloy being much harder than the piston itself prevents groove distortion due to the extreme forces exerted on the compression ring. All pin bores are fully bushed.

Crowns and skirts may have an anodized or bonded graphite coating to improve durability.

Computer aided design insures accuracy of dimensions, structural integrity and long life. In specific instances, the OE specifications for a piston have required modification due to unanticipated performance inadequacies. In these applications, we have modified our product design to eliminate these issues in order to prevent the possibility of premature failure. In such cases, AFA's product exceeds OE performance levels.





AFA INDUSTRIES™ SEALING SOLUTIONS

- Application engineering in every product
- Precision manufacturing
- Relentless quality control
- Exacting materials formulations
- Total system sealing solutions

Today's advanced heavy duty engine technology is putting increased demands on sealing products from top to bottom. Head gaskets in particular are subject to higher heats and pressures created by high performance, multi-fuel configurations.

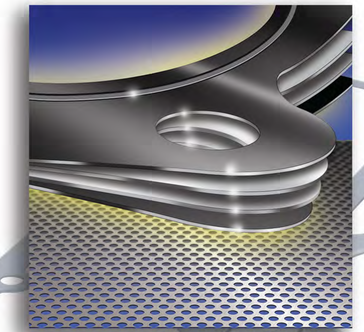
Graphite is particularly well suited to this difficult environment due to its inertness, thermal resistance and conformability. Especially in situations where the block and head alloys have differing coefficients of expansion due to the ability of the graphite to slide laterally on itself while maintaining an integral compression seal. The gasket is comprised of two sheets of graphite material bonded to a steel core. Fire rings provide the combustion seal and fluoroelastomer inserts seal fluid passages.

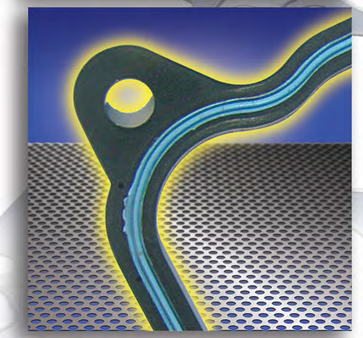
Multi-Layer-Steel (MLS) head gaskets have been developed in response to advancing engine technology and sealing demands. They consist of a number of layers of embossed elastomer-coated steel and stainless steel fillers. A hallmark of MLS is the design freedom it allows. Every part of the embossment topography can be engineered to precise specifications controlling compressibility, sealing forces and load distribution. Such precision minimizes the need for inserts and assures excellent sealing of both the combustion chamber and all other fluid passages. MLS designs take into account "scrubbing" and are able to maintain excellent sealing even in cases of extreme lateral head/block motion.

Molded silicone rubber is the material of choice for today's Valve cover and oil pan gaskets. Seamless construction and molded-in, redundant sealing beads combined with steel compression limiters assure a 1,000,000 mile seal every time.

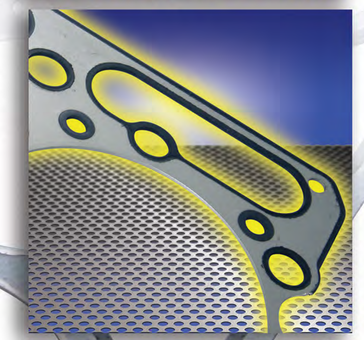
AFA takes a total engine sealing approach to each application, taking into consideration all the variables of pressure, thermodynamics, coolants and lubrication within that particular system as well as its historical failure rates. Applying world class engineering and manufacturing processes, our technical teams focus not only on applying the best materials combinations and configurations, but on eliminating problem sealing issues inherent in that particular engine.

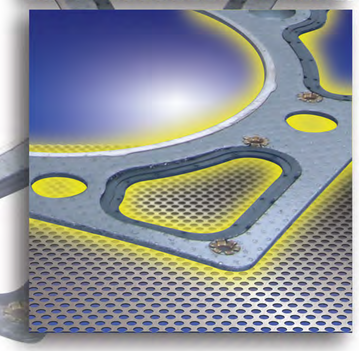
From the most sophisticated head gasket down to the smallest nitrile O-ring AFA combines world class engineering and state-of-the-art manufacturing to provide its customers with gasket sets that are exactly what is needed for a repair or complete overhaul.

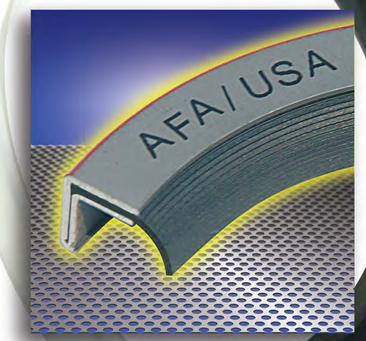




Carrier Gaskets employ a rigid steel or plastic framework with special elastomer beading that provides the actual seal. The elastomer bead can be configured to provide evenly distributed loads and ensure perfect clamping pressure across the entire sealing surface. Rigid carriers can carry clips and tabs that simplify and speed installation. Edge bonded gaskets possess the same features and are used in areas of structural joints and high loading.





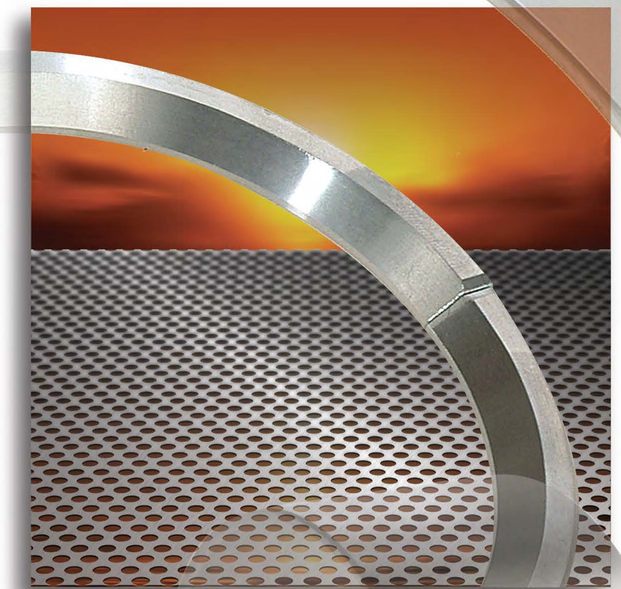


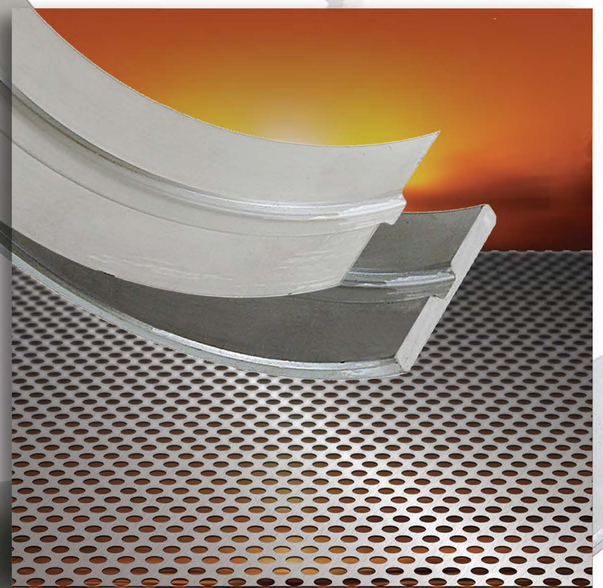
AFA crankshaft seals utilize Polytetrafluoroethylene (PTFE), a high molecular weight compound consisting of carbon and fluorine. This material has the lowest coefficient of friction against the carbon steel crankshaft.

AFA INDUSTRIES™

BEARINGS

- Meet or exceed OE design specifications
- Alloys equal or superior to original equipment
- Computer-aided-manufacturing for exact tolerances and repeatability
- Continuous quality-control inspection
- Application engineered to each engine





The focus of engine rebuilders is no where more finely tuned than on engine bearings. This interface between static and dynamic forces is critical to durability and the dependable power delivery.The combination of rotational and lateral forces being applied with each piston stroke is extreme and tolerance maintenance is critical to longevity as well as performance.

Bimetallic alloys have long proven to be the best all around heavy duty bearing materials and the choice of virtually all of today's original equipment manufacturers.The combination of moisture, diesel fuel/natural fuel vapors and post-combustion contaminants create a corrosive crankcase environment.

Ferrous based alloys demonstrate exceptional fatigue resistance, but are more vulnerable to these corrosive conditions Still preferred for use in some older engine applications, today's enhanced and extreme engine technology and environmental requirements are pushing the envelope in the direction of Aluminum-based materials,

Aluminum/Silicon alloy's high resistance to chemical attack from these agents make it the superior choice for most of today's demanding applications.The silicon additive enhances the operating characteristics of the material to greatly resist seizure and virtually eliminate bearing wear.

A plating-applied softer metallic layer enhances both conformability and embedability, trapping small abrasive particles before they damage crankshaft or wrist pin bearing surfaces.

Contemporary heavy duty, multi-fuel engines are pushing 1,000,000 miles before requiring a rebuild.AFA Bearings go the distance – and more.

- CAD/CAM Precision
- Application Specific base materials
- Advanced plasma coated facings
- Superior thermal conduction
- Emissions and durability compliant

AFA INDUSTRIES™

PISTON RINGS

With deep roots in sealing systems, AFA approaches piston rings with the same advanced technology and engineering vigor it applies to all heavy duty challenges.

Base materials consist of various grades of high strength, fine grained gray cast iron, ductile iron, carbon steel alloys and stainless steel. Profiles are piston matched to provide the optimum ring expansion and sealing forces based on the temperature and pressure developed in that specific power cylinder unit.

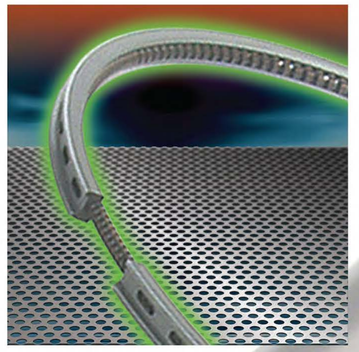
While the base materials themselves are extremely durable, engine technology advances have put even higher demands on the ring's cylinder wall contact surfaces. High temperature plasma deposition of chrome, moly and carbide based alloys produce facings of incomparable durability.

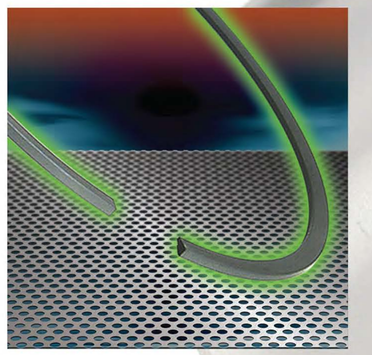
The combination of complementary, high performance, base material selection, piston matched profiling and plasma coated facings produces rings that defy fatigue breakage, thermal distortion and keep blow by at an absolute minimum.

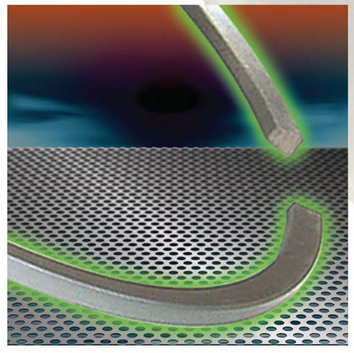
Advanced oil ring technology utilizing stainless steel, chromed and nitrided steel assure a clean cylinder wipe and prevent carbonizing of lubricants which can seriously degrade combustion sealing and even lead to ring seizure.

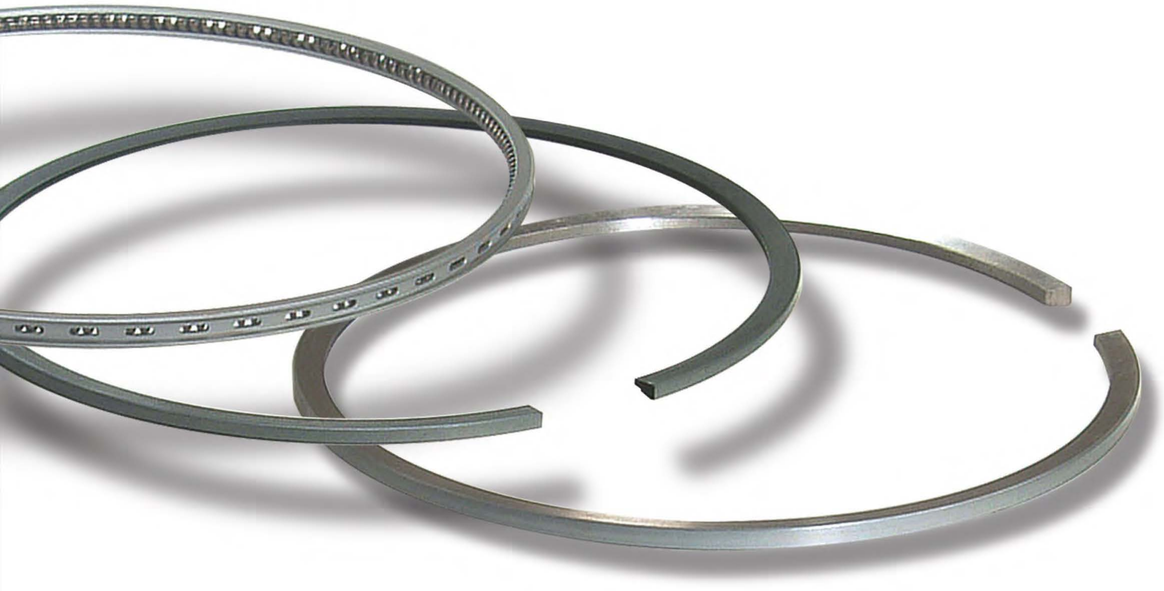
When your next rebuild is 1,000,000 miles away, AFA rings will get you there and beyond.

CERTIFIED OE QUALITY FORM · FIT · FUNCTION









AFA INDUSTRIES™

CYLINDER LINERS

- Finite Element Engineered
- Advanced metalurgy
- Plateau-honed interiors
- Exacting machining
- Superior heat distribution

Connecting rod sold separately

Sleeves, as well as being the containment vessel for the combustion process, serve as the thermal interface between the cooling system, engine block and moving parts of the power cylinder. Development of a new liner involves not only ensuring the exacting fit and tolerances to mate the sleeve into its surroundings; it involves extensive and complex Finite Element calculations. These calculations precisely map the force and thermal distribuition within the cylinder and provide the guidelines for producing a profile that is maximizes wall strength and heat distribution necessary in today's demanding applications.

Cylinder metallurgy is constantly evolving pushed by the technological advances of modern high output, multi-fuel engines. Failure analysis has pointed the way toward better casting techniques as well as higher grade cast iron and steels. Sophisticated heat treating techniques produce sleeves with a greatly increased durability and service life.

The critical, dynamic interior surface of these cylinder liners are machined to exacting specifications in diameter and parallelism. Initial honing produces the crosshatched pattern of valleys required to distribute the engine lubricant. Plateau-honing finishes the process (so named because the resulting surface profile resembles a series of plateaus).The harsh peaks of the initial honed surface (See figure 1) are removed leaving a substantially flat or plateau finish (See figure 2) with much greater ring sealing area, while maintaining a cross hatch pattern of valleys for oil retention.

CERTIFIED OE QUALITY FORM·FIT·FUNCTION

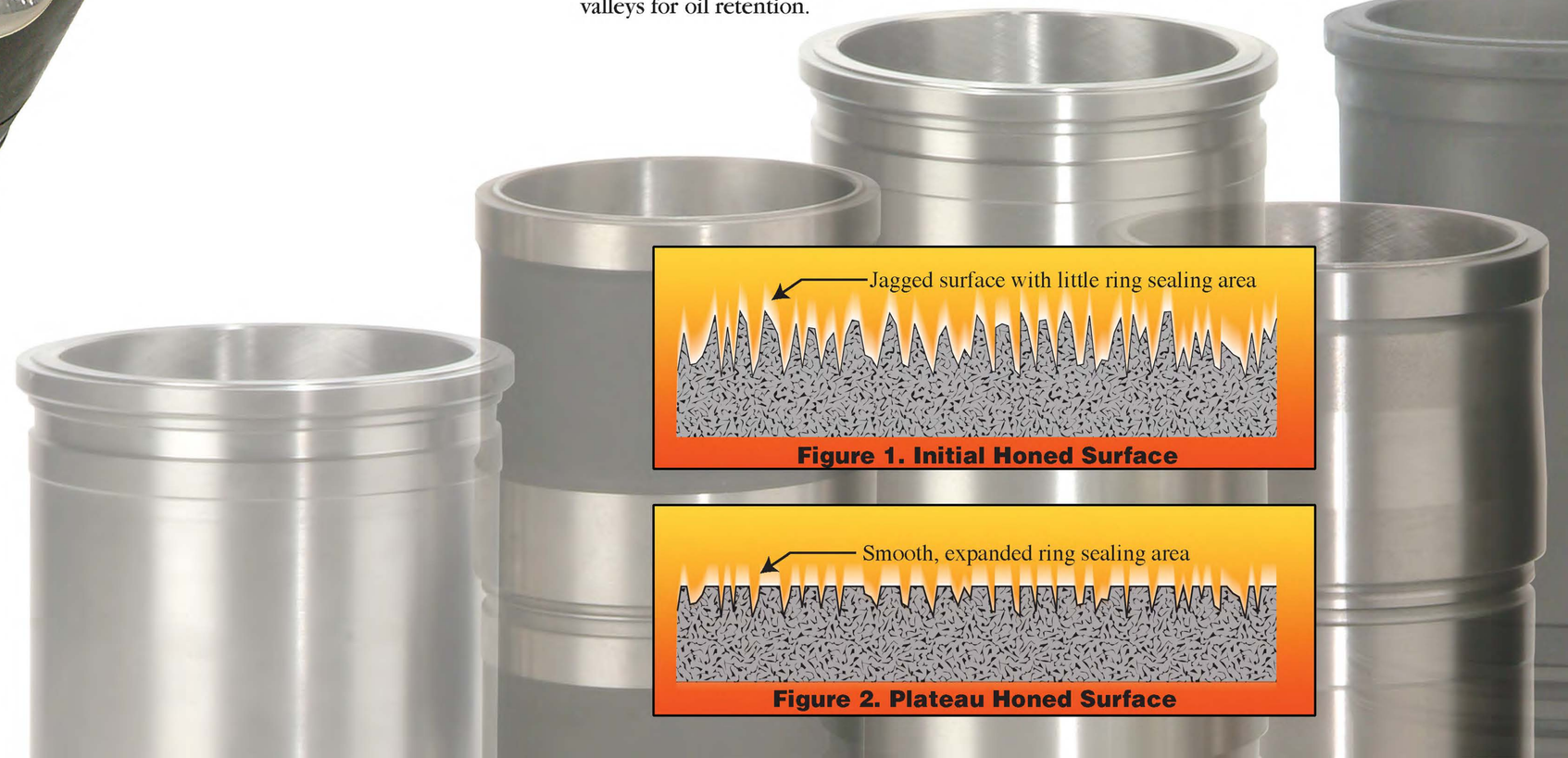


Figure 1. Initial Honed Surface

Figure 2. Plateau Honed Surface

AFA INDUSTRIES™

VALVETRAIN

- Total system engineering
- State-of-the-art manufacturing
- Precise metallurgy and heat treating
- Exacting machining
- Scrupulous quality control

Valvetrain and its components are a perfect example of AFA's Total System Engineering and Manufacturing. Exposed to combustion forces inside the cylinder and lubricant on the outside, this highly articulated system requires maximum precision and refined integration of each part in order to function as a whole. Reliability in this area is affected by many external factors. Reliability must be achieved through a careful application of engineering design, metallurgy and precision manufacturing.

AFA Industries
Warranty for Replacement Parts

Products Warranted

This warranty applies to all new engine parts sold and marketed by AFA Industries unless specifically excluded below. AFA replacement parts are warranted to be free from, defects in workmanship and material under normal use and service

U.S.A. Coverage

AFA applications are covered for 24 months, unlimited miles and unlimited hours of operation.

International Coverage

AFA applications are covered for 12 months, 100,000 miles or 3,600 hours of operation, whichever occurs first from date of first installation.

AFA responsibilities

AFA will pay for all parts and labor needed to repair the warrantable failure to the functional condition existing immediately prior to the failure, including progressive damage to the engine in which the part was installed.

Labor costs will be paid in accordance with published labor rates at no more than published flat rate times. No overtime or holiday rates will be allowed. Only new AFA approved parts will be used in making the repair. AFA will pay for the Lubricating oil, antifreeze, filter elements, belts, hoses and other maintenance items that are not reusable due to the warrantable failure.

Owner responsibilities

Owner is responsible for the operating and maintenance of the engine as specified in the Operating and Maintenance manuals. Before the expiration of the applicable warranty, owner must give notice to AFA of a failure considered to be warrantable.

It is the owner's responsibility to provide failed and associated parts for examination by AFA Technical Services Department in a condition that makes such examination possible. Owner is responsible for the cost of all repairs made to items other than the engine in which the parts are installed. Owner is responsible for the cost of lubricating oil antifreeze, filter elements belts, hoses and other maintenance items replaced during warranty repairs, except where such items are not reusable due to a warrantable failure.
Owner is responsible for lodging, meals and incidental costs incurred by owner or agents of owner as a result of a warrantable failure. Owner is responsible for "down-time" expenses and all business costs and losses resulting from a warrantable failure

Warranty limitations

AFA is not responsible for failures resulting from owner or operator abuse or neglect, such as: operation without adequate coolant, fuel or lubricants, over-fueling, over-speeding, lack of maintenance of lubricating, coolant or air intake systems, improper storage, starting, warms-up, run-in or shut-down practices.

AFA is not responsible for failures resulting from improper repair or installation or the use of parts not approved by AFA. This warranty DOES NOT apply to parts provided by AFA at no charge to the owner.

The warranty set forth herein are the sole warranties made by AFA in regard to its parts. NO AGENT, EMPLOYEE OR REPRESENTATIVE OF AFA HAS ANY AUTHORITY TO BIND AFA TO ANY ADDITIONAL REPRESENTATIONS OR WARRANTY. AFA makes no other warranties, express or implied, or of merchant-ability or fitness for a particular purpose.