

July 2000

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Jasper Engines & Transmissions' Drivers Compete in Driving Competition

Five over-the-road drivers from Jasper Engines & Transmissions' transportation division, JET Transit, recently participated in the Indiana 2000 Truck Driving Championships held at the Indiana State Fairgrounds June 2 & 3. Drivers competing for JET Transit were Rick Fleck, Mark Flynn, Ernie Mehling, Rich Mehling and Dennis Schepers.

The Indiana 2000 Truck Driving Championships allow some of Indiana's finest driving professionals to compete against each other. The top driver from each division advances to the National Finals in New Orleans in August.

Winners were determined by judging drivers in various areas of competition that consisted of the following:

a timed obstacle course with six different driving maneuvers, an oral interview, an eighty question written test and a timed pre-trip vehicle inspection.

JET Transit drivers performed well in competition among one hundred drivers in their respective divisions: Straight Truck — Rick Fleck (6th place), 4-Axle Truck — Rich Mehling (4th place), 5-Axle Truck — Dennis Schepers (8th place), 5-Axle Sleeper Truck — Ernie Mehling (11th place), Tanker Truck — Mark Flynn (10th place).

Jasper Engines & Transmissions congratulates these professional drivers for a job well done.

JASPER — Quality Products delivered by Professional Drivers.



JET Transit drivers who participated in the Indiana 2000 Truck Driving Championships were: Back row (L-R) Mark Flynn, Rick Fleck and Ernie Mehling. Front row: Rich Mehling and Dennis Schepers.

Customer Profile

Professional Car Care Centers, Inc. d.b.a. RT Clapp of Knoxville & Oak Ridge

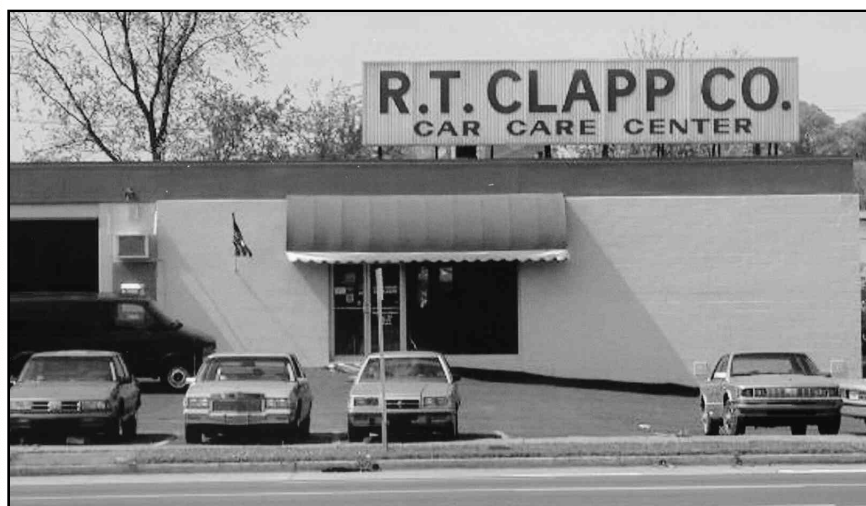
Since 1914, RT Clapp Professional Car Care Centers has taken care of customers' complete automotive needs. The company started as a battery company in the early 1900's and has since developed into the premier electrical repair/diagnostic service center in the greater Knoxville area. With 18 service bays in Knoxville and 12 bays in Oak Ridge, as well as a staff of 30 service professionals, RT Clapp is one of the largest independents in the Knoxville region.

RT Clapp is a full service automotive center that provides services ranging from oil, oil filter and lubrication to complete engine repair or replacement for import and domestic cars, trucks and vans. ASE Certified and AC Delco trained technicians utilize parts vendors chosen by the suppliers product quality, reputation and delivery convenience. RT Clapp is proud to consider JASPER as the primary supplier of remanufactured engines and transmissions for their customers. JASPER's 36 month/75,000 mile Nationwide Warranty, custom engine

installation kits, the "1-800" telephone numbers for technical support and pricing, and the quality remanufacturing process are the reasons for RT Clapp's continued expansion into the engine and transmission replacement market. In short, JASPER just makes it easy to do business.

On the technical side, RT Clapp utilizes Triad's TSW operations software with electronic parts and labor cataloging to give customers quick, concise estimates on major repair jobs. In addition, Mitchell's On Demand DVD information system supplies the service writers and technicians with the needed technical, maintenance and TSB information.

RT Clapp business partners - Rob Vandergriff, Valerie White and Barry Scarborough, have been using JASPER products since 1975, and recognize the importance of good service after the sale. Whether it's sales support, advertising or warranty repair, JASPER's staff will guide you through with minimal delay.



RT Clapp's philosophy is to "Do the Right Thing" in any circumstance and it begins with product choices for use on customer vehicles. With automobile prices and interest rates rising, customers are thinking twice about trade and more about repair. RT Clapp's plans are to strive to be and do the best, and they're proud JASPER can contribute to their plans.

Multi-Layer-Steel Head Gaskets Have Arrived...and Survived; Here's How to Use Them Effectively in Your Customers' Engines.

More power per cylinder, significantly higher operating temperatures and thinner head and block castings. Perhaps 20 years ago, these three characteristics would have been nothing less than a recipe for disaster in a conventional automotive engine.

Today, they're simply the recipe for a stronger and more forgiving head gasket - one capable of sealing in spite of extreme horizontal and vertical motion between the head and block. Increased motion is actually a result of several interrelated factors: Thinner, lighter cast iron and aluminum cylinder heads are more susceptible to thermal expansion; modern computer controls have allowed OEM's to dramatically increase engine efficiency and output; and, at the same time, manufacturers have had to reduce clamping forces to prevent local stress points and cylinder bore distortion. In other words, a sealing nightmare.

Why multi-layer-steel gaskets (MLS), and not one of the latest generations of "composite" or graphite gaskets? The shearing action created by the head's lateral motion in many smaller, more powerful late-model engines can destroy the core and facing of a non-MLS gasket, while the head's vertical motion - occurring every time the cylinder fires - overcompresses the layers in a conventional gasket, creating localized escape paths for combustion gases, oil and/or coolant.

MLS technology is engineered to withstand extreme casting motion, higher combustion pressures and a wider range of operating temperatures. MLS gaskets typically feature multiple solid steel

layers, some of which are heat-treated stainless steel separated by and coated with a very thin rubber layer. The layers are either "active" - meaning they are engineered to absorb the motion between the head and block - or shim layers, which simply give the gasket the appropriate compressed thickness.

The number of layers in an MLS gasket can range from two to five, depending on the sealing characteristics of the engine. In general, the more layers, the greater the motion the MLS gasket is capable of accommodating.

The active layers of a Fel-Pro MLS gasket feature precision-engineered, embossed beads at all critical sealing areas. This feature, combined with the full-hard stainless steel material, helps the gasket maintain contact with the head and block and spring back to its proper shape in spite of often-brutal pounding.

Engineered for the aftermarket, Fel-Pro MLS gaskets also incorporate a "stopper" layer featuring a very strong primary combustion seal created by folding the steel back onto itself.

There's one additional difference between OE-style and MLS gaskets, and it's an important one: Fel-Pro engineers developed a semi-cured (and very sticky) rubber coating that enables the Fel-Pro MLS gasket to seal effectively with surface finishes up to 60ra. An OE-style MLS gasket requires a finish no rougher than 30ra for proper fluid sealability.

The Other Side of MLS

It's no secret that MLS technology is more expensive than composite or graphite gaskets. The reasons are simple: materials and tooling costs. Rather than the single perforated or solid steel core found in a composite or graphite

gasket, an MLS gasket features as many as five solid sheets of steel, some of which are stainless steel. In addition, the tooling required to produce multiple layers of consistently shaped shims and precisely positioned sealing beads is tremendously more expensive than conventional equipment.

So why have OEM's continued to migrate to MLS technology? In short, they're willing to pay the price of a more expensive gasket as long as it will enable them to continue to reduce casting weight while increasing power output. A graphite or composite gasket in its present form would be the weak link in one of today's high-efficiency engines; with MLS, the gasket is one of the strongest links - with projected service life reaching 150,000 miles or more.

The Remanufacturer's Challenge

Smooth and flat. That's the secret to achieving maximum sealing performance and service life from an MLS gasket. Surface finish standards for conventional gaskets simply won't provide an adequate seal when used with an MLS head gasket.

The continuing evolution of engine technology also is changing the way remanufacturer's select replacement gaskets. Aftermarket composite or graphite gaskets are ideal for a majority of the engines. In their present form, however, they do present limitations when used in MLS engines.

In particular, if an aftermarket-engineered MLS gasket is available for a specific application, that's a strong indication that MLS is the best way to ensure an effective seal. After all, if a conventional gasket could work in that application, Fel-Pro and other

aftermarket manufacturers wouldn't have invested in the materials and tooling to produce the MLS alternative. There may be instances, however, where a hybrid design featuring the conformability of a conventional gasket and the properties of MLS would be appropriate.

The best bet is to rely on your major-brand gasket manufacturer to provide the right design for a specific aftermarket application. After all, one design cannot be the cure-all for every sealing challenge.

The bottom line in installing MLS gaskets, of course, is achieving the proper finish and clamping force. Without a finish of 50 to 60 Ra (for a Fel-Pro-manufactured MLS gasket) or 20 to 30 Ra (for OE and other aftermarket MLS designs), the MLS gasket won't be able to conform and maintain a tight seal as the head moves laterally and vertically against the block. This is a significant change in philosophy compared to older gasket technologies, which need a little roughness - typically 70 to 100 Ra - to get the gasket to "bite," and seal, against the head and block.

The good news is that most shops with a modern surface grinder can achieve a finish of 20 to 30ra without investing in new equipment. If you're using a rotary broach, contact your equipment manufacturer for recommendations on achieving a proper finish for an MLS gasket; at a minimum, you'll probably have to alter the depth of the cut and feed rate. Also make the use of a profilometer a requirement on every MLS installation - it's an easy way to check your final finish and avoid unnecessary, and expensive, comebacks.

Clamping force is equally important: Follow the manufacturer's specifications religiously, and always replace the head bolts where required. The margin of error in today's engines is simply too narrow to try to save a few bucks on fasteners.

MLS technology has become a popular sealing solution at the OE level and among an ever-growing number of quality-conscious engine remanufacturer's. It's more complex and expensive than composite or graphite technologies, but provides the sealing performance you'll need on a growing range of late-model, high-output engines.

And like most technologies developed at the OE level, MLS gaskets are now available in aftermarket-engineered designs that simplify installation and maximize service life. A good thing made better; use MLS correctly and you'll see.

Gaskets with a "Brain."

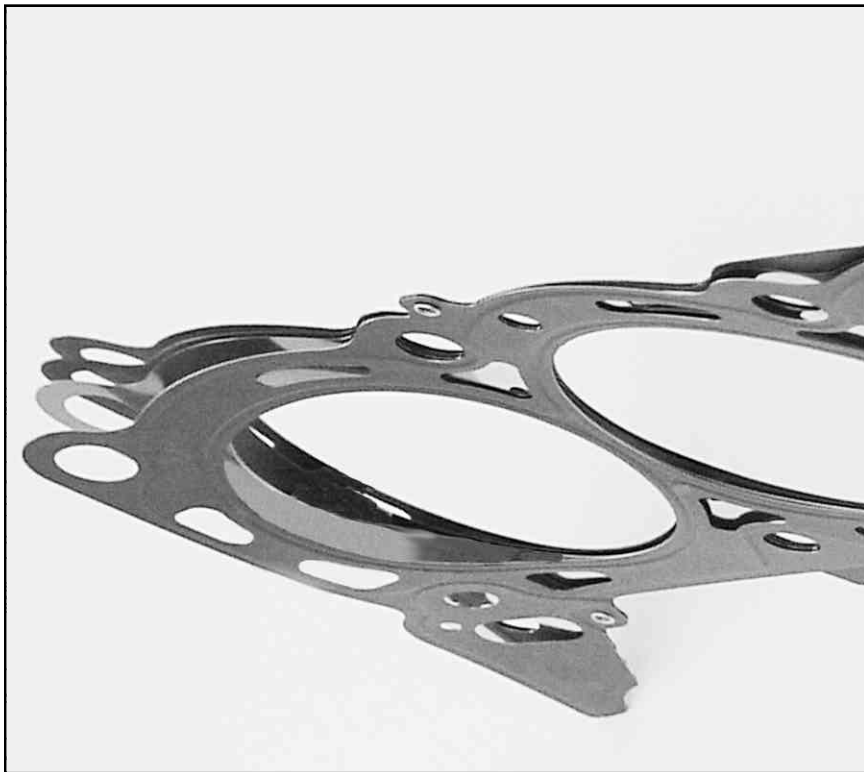
Just as MLS technology has become the solution for many hard-to-seal engines, other gasket concepts - some new, some not-so-new

- will one day earn a place in OEM and aftermarket-repaired engines.

One of these ideas is the so-called "smart" head gasket, which would feature sensors along the combustion seal. These sensors, in theory, would transmit a never-ending stream of performance data to the engine's computer to enhance operating efficiency.

The "smart" gasket hasn't made it into today's engines primarily due to cost, says Jerry Rosenquist, chief engineer for Federal-Mogul's Fel-Pro brand.

"We explored smart gaskets back in the 1980s, and could see a practical use for them," Rosenquist says. "It's essentially a concept that will be driven by OEMs - when they see a need for that kind of technology, we've got it. And we'll adapt the technology to solve aftermarket-specific challenges, just as we have with MLS head gaskets."



Multi-layered steel head gaskets are engineered to withstand extreme casting motion, higher combustion pressures and a wider range of operating temperatures. MSL gaskets can range from two to five layers. Pictured above is a four-layered gasket.

2001 Calendar Contest Deadline September 17th

JASPER is seeking quality color photographs of vehicles and equipment in which a JASPER gas or diesel engine, transmission, differential or stern drive has been installed, for its 2001 Calendar Contest. Photo categories are vehicles and performance-oriented cars and trucks.

Entrants must submit a color photograph, color slide or color transparency (35mm or larger) and a description of the vehicle or application along with the JASPER product that has been installed. Vehicles should be placed in a "show" type setting when photographed. Polaroid pictures *will not* be accepted.

Every entrant will receive an autographed JASPER race hat. All entries will be judged based on adherence to category, equipment appearance and the quality of the

photograph, slide or transparency. Winners will be required to sign a release consent form for photograph and name publication.

All entrants whose work appears in the calendar will receive a Jasper Motorsports race jacket and a \$100 credit toward their next purchase of an engine, transmission, differential or stern drive. Honorable mentions will receive a JASPER sweatshirt and a \$50 credit toward their next purchase of one of the above mentioned products.

Entry deadline is September 17th, 2000. The contest is open to all JASPER customers, distributors and associates. Entries should be mailed to:

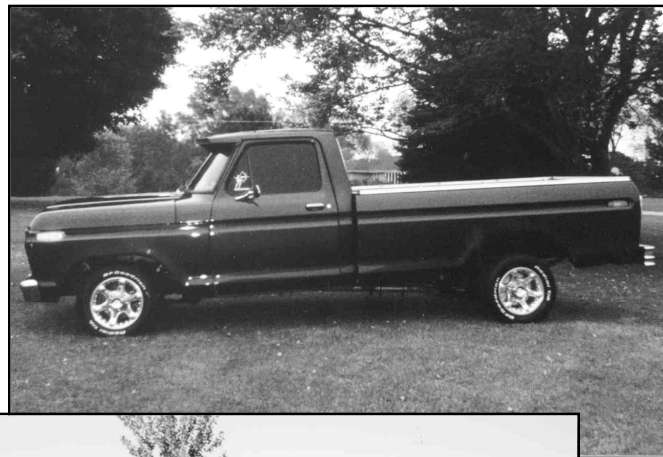
Jasper Engines & Transmissions
P.O. Box 650
Jasper, IN 47547-0650
Attn: Abby Brelage

Jacobs Electronics Announces "DIS" Ignition System

The newest member of the Jacobs Electronics ignition family is the DIS or "distributor-less ignition system."

Developed originally for the Ford Explorer, F-150 and Expedition, and now released across the full line of late model Fords, the Jacobs Electronics DIS system has produced impressive gains in mileage and on-the-road pulling abilities and has proven to be a "must have" performance and mileage enhancing accessory for owners of these vehicles. GM and Chrysler DIS units will be available soon.

For additional information, call 1-888-ignition and be sure to mention JASPER and the ATPA to receive special discounts when ordering.



Pictured here are a few of last years contest winners. These photos are example of the type of setting and background that we look for in choosing a winning entry.



Crankshaft Polishing for Today's Engines

To be successful at engine remanufacturing in today's market requires daily adaptation to new and changing technology. New engine design and improved after-market products are becoming available at a pace that has never been equaled in history. The company that thrives in this environment will welcome change and use these new tools to provide a quality product safer, quicker, and more economically than ever before. An emphasis on quality has to be maintained to provide value to the customer.

Crankshaft machining holds its place as one of the most critical areas in the remanufacturing process. Cranks with a poor journal (seal finish, excessive taper, or out-of-round journals) will undoubtedly fail when subjected to the close tolerances of the high output engine designed today. Many improvements in crankshaft machining technology, along with closer attention to accepted procedures have made it possible to do a very good job of meeting those tolerances in a production environment.

The oil film present between a crank journal and the loaded bearing surface is only about .00005 thick on a running engine. Microscopic burrs on the journals can gouge or scrape the bearing from the initial start-up, causing premature failure. All cast iron cranks form ferrite burrs on the surface when machined with sharp edges facing either into or away from the direction of crankshaft rotation. When the crank is ground and polished so that the burrs face away, the shaft is said to be machined favorably (see illustration 1). Although there is much debate as to which is the proper orientation for grinding, favorably or unfavor-

ably. The journals are generally polished favorably in order to assure that the burrs lay down and away from the bearing surface during rotation. Forged steel cranks do not form ferrite burrs when machined, but it is the accepted practice to polish them favorably as well.

The measurement of surface finish is performed with a profilometer. This tool reads Ra, which is the average roughness height and is measured in increments of .000001 (1 millionth or 1 micro-inch). Crank main and rod journals should measure 10 micro-inches or less when finished. Crank seal areas must read between 10-20 micro-inches to provide a good sealing surface.

Final surface Ra is a direct result of the measured parameters used during machining. The grinding stone should be dressed to provide a surface finish above 18 and at or below 24 micro-inches following the grinding process. The journal surface can actually be melted and smeared rather than ground when the stone is too smooth. Polishing cannot adequately correct this situation and proper journal-bearing contact will not likely be achieved. When the shaft has been ground correctly, polishing becomes a much simpler

process.

The most popular polishing machine design is the rotary belt polisher. The belt polisher is the standard machine, used exclusively in the industry and by JASPER for decades (see illustration 2). This machine uses a soft abrasive continuous belt with different grit sizes for various applications. The machine turns the belt against a rotating journal to remove stock and provide an acceptable finish. Some machinists use only one operation to finish the shaft, using just one polishing belt in the #300 - #500 grit range. It is preferable to use a two step process (which JASPER prefers), initially polishing with a # 700 grit belt to remove material and smooth the surface, then finish polishing with a # 2500 grit belt to achieve an Ra finish below 10 micro-inches. The two-step process gives an excellent finish while preventing taper and out-of-round conditions.

Proper grinding and polishing procedures, the right polishing belts for the application, and the type of machine can all affect journal integrity. Use of these new tools along with adherence to tested and accepted machining practices will result in a quality crankshaft, providing many miles of dependable service in the remanufactured engine.

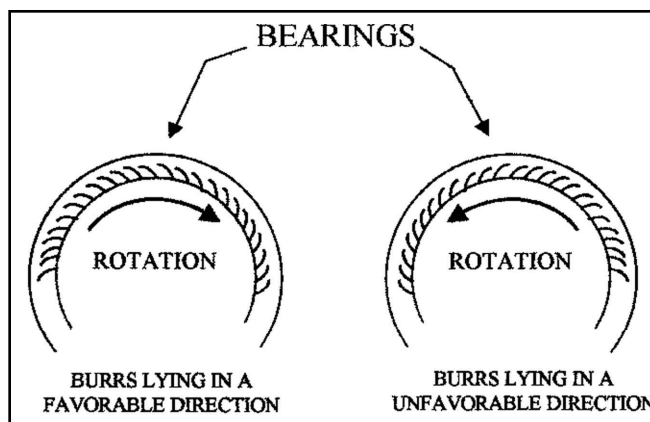
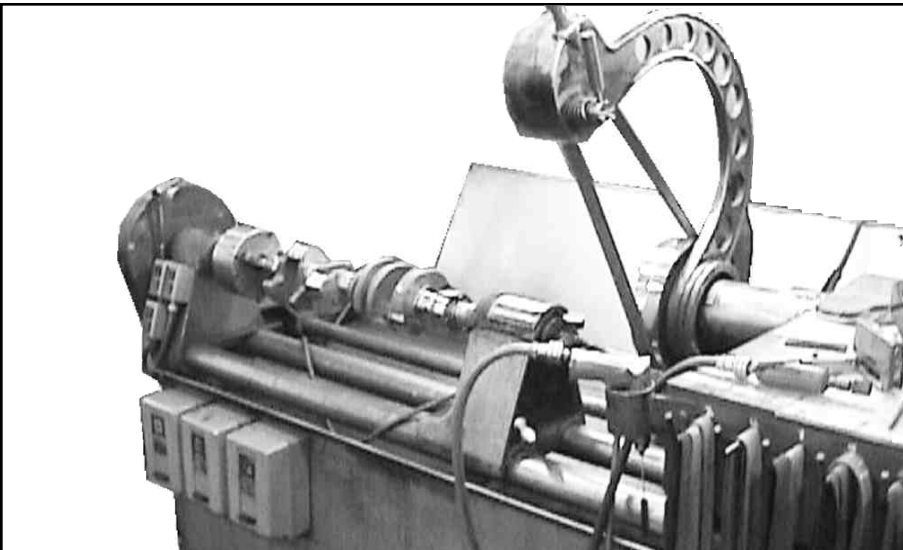


Fig. 1

Fig. 2



A new addition to JASPER's crankshaft polishing department is a state-of-the-art QPAC brand crank polisher. The QPAC unit is the same type polisher used by auto manufacturers, such as Ford Motor Company.

Do You Remember What You Read?

So you say you read the JASPER News & Updates from cover to cover? Now you can see how much information you've retained after you've read it. After you have answered the questions, simply clip out the coupon and send it to us. Each month we will take all the correctly answered coupons and randomly draw one out. The winner will receive a JASPER racing hat! Send to: **Jasper Engines & Transmissions • P.O. Box 650 • Jasper, IN 47547-0650**

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JASPER News & Updates - July Issue

1. What was the best place finish for a JET Transit driver in the Indiana 2000 Truck Driving Championships held June 2nd & 3rd? _____
2. What are MLS gaskets? _____
3. What is a "DIS" ignition system? _____
4. Final surface Ra is a direct result of the measured parameters used during machining. T or F



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