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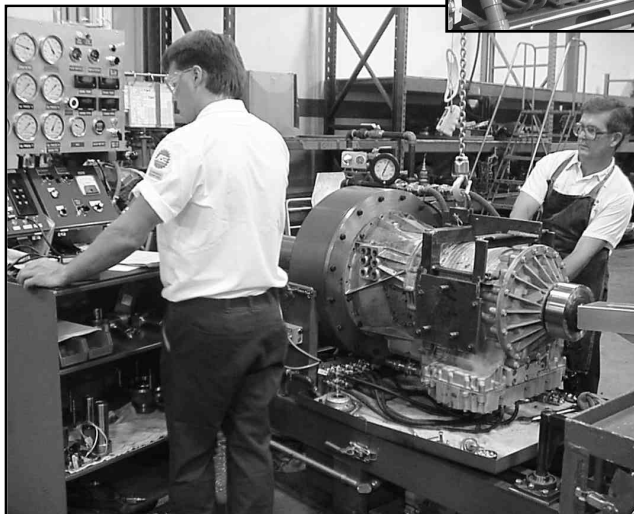
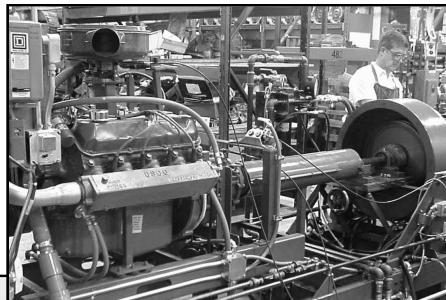
JASPER Develops New Transmission Dynamometer

Jasper Engines & Transmissions has engineered and developed, in-house, a new transmission dynamometer to meet the changing needs of transmission quality and productivity. "No longer is it acceptable to have a dyno that is designed to test just one type of transmission," says Craig Leuck, Transmission Department Manager. "A dynamometer has to have the versatility to be able to test different units so as to avoid any potential "unused" time in order to be productive."

Presently, JASPER has ten transmission dynamometers, one of which is powered by a 6-cylinder Cummins diesel engine that is solely focused on testing Allison transmissions ranging from the AT545 through the HT750. "This narrow range of focus doesn't allow for testing of light-duty automotive applications though, which means the dyno wasn't always running and therefore not being as productive as it could be," said Leuck.

"JASPER's newest dyno, which was built primarily to test Allison transmissions, including the new Allison World transmission, can also test any light-duty, rear-wheel drive transmission. In addition, it also has the capability to test the electronic systems of today's computer controlled transmissions," added Leuck.

The new dyno is powered by a 460 Ford CNG (Compressed Natural Gas) JASPER Cogen remanufactured engine and is backed by a Velvet Drive for reverse rotation capability to test V-730 transmissions. The load unit consists of an electric Eddy-brake/disc brake assembly. This unit allows for a more accurate load and stall test.



Transmission Dept. associates, Mark Greulich (left) and Sam Schwenk, dyno-test an Allison World transmission on the new dynamometer. The new unit is powered by a JASPER remanufactured CNG engine (pictured above).

Rick's Automotive, Inc.

Rick and Karen Hughlett founded Rick's Automotive in 1980 just a few yards to the north of their present location of 2121-B, South Campbell St., Springfield, MO.

Rick's Automotive is a full service auto and fleet repair facility that, counting the owners, employs eighteen people (Nine technicians, one shop foreman, three service advisors, one secretary, two porters and, of course, Rick & Karen). When it comes to promoting longevity and good employer-employee relations, Rick and Karen are on top of things because several employees have been with the company between ten to fourteen years.

On the service side of things, Rick's Automotive services approximately twenty-five cars per day, including import and domestic vehicles. They also service several fleet accounts.

Prosperous business has allowed Rick's Automotive to expand the physical size of their facility. Originating with 2,500 sq. ft. and five bays in 1980, they expanded to 6,000 sq. ft. and ten service bays in 1987. But the expansion won't end there. Rick recently purchased land adjoining the shop and will be adding an additional 4,000 sq. ft. and six more service bays to the facility. All said and done, Rick's Automotive will be a sprawling 10,000 sq. ft., sixteen bay auto repair and service center.

"We are very confident with the quality (of JASPER) and our customers like the warranty."

— Rick Hughlett

A unique aspect of the shop is that it's an ASE Blue Seal Shop and also a AAA approved auto repair facility. Rick is an accredited automotive manager with the Automotive Management Institute. He is also a master automotive technician with L-1 Certification and has held an officers position with the local ASA since 1984. In addition, he is on the advisory board for the local technical college and a member of the R.L. O'Connor Bottom Line Group, to which he contributes much of his success.

Aside from Rick's credentials, all of the technicians and service advisors at the shop are ASE Certified, with six being Master Certified and five having an L-1 Certification. Training has always been a very important part of Rick & Karen's business, not only technical training, but managerial as well. "Everyone in the organization must be on the cutting edge of their profession to be able to survive and continue to grow in today's marketplace," says Rick.



Rick's Automotive prides themselves in providing quality service and using quality products. "We were not satisfied with the quality of engines we were able to purchase locally. We became acquainted with JASPER at Vision 2000 in Kansas City, MO in 1996 and have been using them ever since. We are very confident with the quality and our customers like the warranty," says Rick Hughlett, co-owner of Rick's Automotive.

Selecting the Perfect Bearing for Every Application

By Matt Barkhaus
Engine Bearing Product Planner Federal-Mogul Corporation



Matt Barkhaus

has twenty years of experience with Federal-Mogul. He has been in various distribution and marketing functions within the North American aftermarket business. Matt is currently the engine bearing product planner within the Engine Parts Marketing Team. His product planning responsibilities include bearings, bushings, thrust washers and connecting rods. Matt has a B.S. Business Management degree from Wayne State University.



severe loads and withstand considerable heat. Finally, they're designed to serve as a replaceable wear surface, essentially sacrificing themselves over time to protect more expensive components.

It's the bearing engineer's challenge to create a product that can survive within an often-brutal operating environment - one featuring extreme temperatures, high operating speeds, oil contamination, occasional detonation, unpredictable dynamic loads and flexing created under certain operating conditions. As a result, bearings must provide a unique combination of fatigue strength, conformability to changing shapes and surfaces, embedability of hard particle debris, and resistance to corrosive compounds.

Strong yet forgiving, all this from components that are, at first glance, relatively simple, metal inserts manufactured in full-round or half-shells.

Making it all Work.

If you're specifying bearings from a world-class manufacturer such as Federal-Mogul, you're probably receiving products that feature application-specific designs - the perfect blend of metallurgy and component geometry to guarantee the performance you need and expect. That's an approach that's earned its way into tens of millions of engines worldwide.

Contrary to what some competitors might claim, no single engine bearing material can perform well in all operating environments. Babbit, for example, offers exceptional embedability but little fatigue resistance. Overplated copper-lead - once believed to be the "perfect" bearing material - can be susceptible to fatigue in many

new and remanufactured late-model engines.

How can you be sure the bearings in your engines are up to the challenge? By relying on an engine remanufacturer, such as JASPER, that uses a wide range of bearing materials and designs to address the specific requirements of each application.

No Compromises Allowed.

Selecting the best bearing material depends on the engine itself and its primary operating environment. One material might deliver outstanding embedability, but at a loss of fatigue strength. Another might provide maximum strength, but poor corrosion resistance.

Babbit bearings, which feature a very soft tin or lead-based lining, provide outstanding conformability and embedability.



These characteristics make babbit ideal for ultra-high-performance applications, in which the engine builder is looking for a sacrificial layer that will protect other components over a very short lifespan.

Babbit is not appropriate, however, for standard automotive or moderate performance engines, where extended service life is mandatory.

Tri-metal, or overplated copper-lead bearings cover a much
(Continued next page.)

Engine bearings are misunderstood. True, many bearings for a given application might look alike, and the technology behind specific bearing designs and materials might be similar from one manufacturer to the next.

It's in the application of that technology, however, where the similarities end. As a result, one company's bearing isn't like another; real advantages do exist and it's the engine remanufacturer's job to capture the right advantages for the anticipated service requirements of the engine.

Engine bearings, of course, represent a critical line of defense within any internal combustion engine. The first function of an engine bearing is to reduce friction between internal components. Engine bearings also must absorb

(Perfect Bearing Continued.)

wider range of applications. Tri-metal main and rod bearings from Federal-Mogul feature a very thin — and very strong — babbitt overplate bonded to a high-strength copper-lead matrix. The overplate absorbs debris and conforms to the crank surface.



Although tri-metal bearings remain popular among engine rebuilders, they are no longer used by most major OEMs. Why? Because engine manufacturers have determined that the new generation of bi-metal aluminum bearings provide significantly better seizure resistance, longer service life and quieter operation.

Leading bi-metal aluminum bearings contain a small percentage of silicon within the lining to enhance durability. In addition, the bearings' super-strong lining allows debris to move through the contact surface rather than become trapped between the bearing and shaft.

Overplated tri-metal bearings also are losing favor among heavy duty diesel engine remanufacturers. Corrosion concerns related to tri-metal formulations have led to the increased use of bi-metal aluminum bearings in these engines.

The Design

Better on the Surface.

Advanced materials can't do the whole job, the bearing manufacturer also has to incorporate a variety of design features that extend component service life and enhance engine performance.

The Groove. Half-groove main bearings can handle heavier loads, but bring less oil to the bearing face. Full-groove bearings do the opposite. Our company has eliminated these compromises with a three-quarter groove design that balances strength and oiling for peak efficiency and strength.

The Wedge Effect. The main bearings' thrust face can act as a hydrodynamic pump; that's why Federal-Mogul bearings utilize patented ramp-and-flat thrust surfaces to maximize the critical oil "wedge" between the bearing and journal. Result? Increased load capacity.

Crush. This is the small amount (a few thousandths) of bearing material that extends above the housing bore when the bearing half is in place. This extra material helps maximize surface contact by forcing the outside diameter of the bearing against the rod or main bore when the assembly is torqued to specification. By increasing surface contact, crush helps to compensate for bore distortion (under static and dynamic conditions) and increases heat transfer.

Eccentricity. Bearing housing bores vary in shape and size due to manufacturing tolerances and, more critically, changing load conditions. For example, because connecting rods experience high inertia loads in operation, the large end of the rod can be pulled out-of-

round. Bearing manufacturers compensate for this by adding eccentricity to the wall of the bearing; in essence, wall thickness will taper off gradually from the crown of the bearing to the parting faces. This provides the added clearance required by a flexing rod.

Accurate Beyond Measure.

Any bearing is only as good as its shape and fit. Look for certifications like QS9000, ISO9001 and Ford Q1 when selecting a bearing manufacturer. These accomplishments are signs the supplier uses the most advanced manufacturing and statistical process controls.

Faster Across the Line.

Of course, no bearings have it as tough as those used in high-performance applications. That's why you should depend on a brand that has a major presence in leading motorsports series like NASCAR and NHRA drag racing (And don't simply look for the decals on the side of the car - listen to what the engine remanufacturers say about the parts they really use in their qualifying and race-day engines).

Learn to Love "Ugly." Part of the hype of some performance bearings is their "pretty" appearance. What those suppliers don't tell you is that the flash tin plate that produces that shiny appearance also detracts from the bearings' performance. The cosmetic plate actually can migrate around the bearing back, accelerating wear and fatigue. If your bearing manufacturer only offers an "ugly" bearing, ask why. And if they tell you that the un-flashy appearance actually helps win races and extend engine life, believe it.



Are You Sitting Down?

Media Support of Aftermarket Efforts Discovered. Really!
by Kathleen Schmatz

What if the very venerable, buyer-friendly, unimpeachable, product testing, thought-by-some-to-be-pinko, Consumers Union and their publication, *Consumer Reports*, was on your side? And what if *Consumer Reports* reported that “old cars can offer better value than new ones,” and further that “many cars, if well cared for, can go 200,000 miles without falling apart?” Or, what if this important shoppers’ comrade published an easy-to-read chart that indicated keeping a 1992 model vehicle (they used the Taurus as an example), and paying \$3,550 in maintenance expenses over the next three years, was \$15,644 cheaper than buying a new vehicle, or \$18,759 cheaper than leasing a new one?

A fantasy? A dream? Wishful thinking? Hallucination brought on by a head injury? Nope. Check out this month’s issue (August 2000) of *Consumer Reports*! Their “go shout it from the rooftops” cover story is: “Your Old Car: Fix it or Sell It.” Their advice to their readers: “Don’t be too quick to succumb to new-car reputation.” Further, there is a nice bright red sidebar headline reading: “Repent and Maintain.” As a matter of fact, they published the AAA estimate that “5 million breakdowns could be avoided each year if motorists inspected tires, belts and hoses and had worn

ones replaced.” Gotta love it!

Buy this magazine! In fact, buy a couple of copies. Make posters out of some of the quotes and charts and decorate your waiting area with them. Laminate pages from the story and keep it at your counter so you can refer to specific portions of the article when customers drop off and pick up their vehicles. Make copies and send them to customers you haven’t seen in a while, but who have a “family” of vehicles that you service. Send e-mails with some particularly pithy quotes (be sure to attribute to the Consumers Union) to your “connected” customers. But by all means, merchandise this!

This is a rare opportunity, folks! Here is an actual member of the media, outside of our industry, that devotes five important pages to making informed automotive maintenance decisions and doesn’t refer to technicians as long-tailed, lubricant primates — not even once. To the contrary, the editors chose to underline the importance of mechanics qualified by the National Institute for Automotive Service Excellence (ASE) and carrying the important ASE medallion. They also encourage vehicle inspections designated by the Car Care Council’s very valu-

able Certified Inspection program.

For an industry that has been plagued by image problems, many of which have been amplified and contorted by some media coverage, this is a gift — a third party opinion that is reasoned and researched. You can walk your customers through the five separate checkpoints to help them determine if their vehicle is a keeper. They are: 1.) Is it safe?, 2.) What’s it worth?, 3.) How’s it running?, 4.) Fatal flaws, and 5.) How reliable? There is a comprehensive reliability chart embracing 18 popular ‘92 models in regard to eight vehicle systems (A/C, cooling, electrical, engine, fuel, ignition, suspension and transmission) and their major parts’ repair costs in dollars and as a percentage of trade-in values.

You can contact Consumers Union by sending an e-mail to www.consumerreports.org. If you are not a subscriber, you can request this issue (back issues are \$5). After all, what would you rather your customers read in your waiting area? A five-year old Sports Illustrated featuring the Major League Baseball strike, or a publication that may actually support your efforts? Easy call.



Kathleen Schmatz is Babcox Publications’ Group Publisher and Vice President of Marketing. She has twenty-eight years of aftermarket publications experience. Kathleen serves on the Board of Governors of the Car Care Council and is Chairman of the Women’s Board of the Car Care Council. The following article appeared in the August 2000 issue of *Underhood Service, Import Car and Brake & Front End* magazines. It is being reprinted with the permission of Babcox Publications.

Understanding Positive Type Valve Stem Seals



(Article reprinted with permission from Engine Tech)

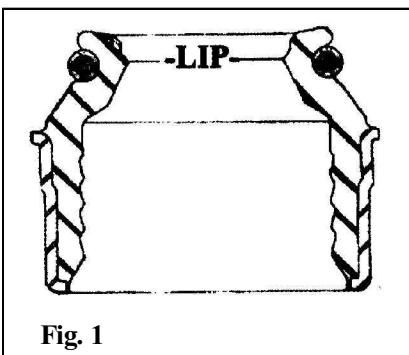
Most people's perception of a valve stem seal is limited to the visual; a piece of rubber with a hole in the center and a couple of wires around it. In reality a valve stem seal can be a very elaborate and sophisticated engine component.

There are three basic types of valve stem seals: the o-ring, umbrella and positive type. Although o-rings are still used in some applications, the majority of people have switched to umbrella type or positive type seals.

Umbrella seals are popular because of the broad range of stem size options (from 0.005 undersize to 0.015 oversize). Umbrella seals can be used on oversized valves without cracking or splitting, and they can withstand temperatures of up to 400° F.

Most OHC engines are pre-disposed to oil consumption when umbrella seals are used. In this case there is no option, positive valve stem seals must be used.

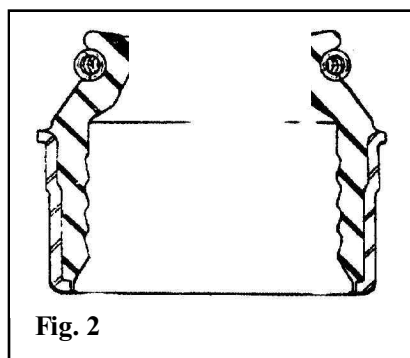
The main difference between positive seals and other seals is that the positive seals actually meter the amount of oil going to the guide. The other seal types merely shed the valve stem and guide from spray and splash. This metering capability results from the wiping action of the seal lip against the guide. Figure 1 shows a positive seal cross-section. It is easy to see



the similarity of the seal lip with the windshield wipers in our cars.

There are several other types of positive seals. One of the most common type is the block lip seal. It does not have the narrow lip, therefore its metering capabilities are limited. However, it still outperforms umbrella type seals in those engines that require positive seals.

It should also be noted that even among the seals with the "wiper blade" type lip there are different levels of sophistication in design and manufacturing. For instance, the lip can either be molded or machined. This is a critical difference since when you machine an elastomer (rubber) there is a considerable amount of movement during the process. This movement limits the ability of the manufacturer to ensure that the line of contact (the sharp edge of the lip), is on a horizontal plane. Seals with machined lips may not scrape the stem on a perpendicular angle. See Figure 2.



Other than material, the most important specification on a positive seal is the profile of the lip, not only the angles that form the lip but also the stability of the profile. Simply stated, the offset between the lip and the coil spring. Also, the offset results in a lever and

defines how much of the spring tension is transferred to the valve stem.

The drawings in Figure 3 illustrate how the profile changes during engine operation. The neutral position, shows the lip offset to be 0.3mm (0.012"). When the valve opens, the stem pushes the lip down 0.1mm (0.004") and considerably changes the angles. The angles are also changed when the valve closes, in the opposite direction, since the lip is pushed up - the profile is "stretched." Note how little variation occurs (0.1mm/0.004" on each side), on a good stable design, and how significant those changes are on seal performance. Using this example it is easy to understand the sophistication of such a design.

The other part of Figure 3 that should be considered is the interference between the seals and the chimney. This press fit ensures that the seal will remain static while the lip works. It is known that the load required to remove the seal from its chimney is proportional to the load required to install it, unless there is a step on the chimney/guide. This is important because the seals that are easy to install can easily come off due to stem actions against its lip. Do not be impressed with the phrase "It can be installed by hand".

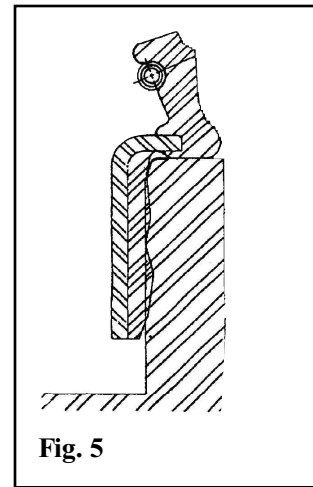
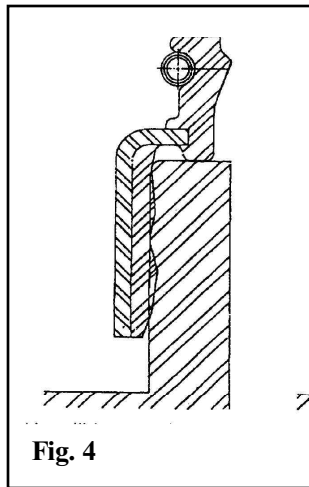
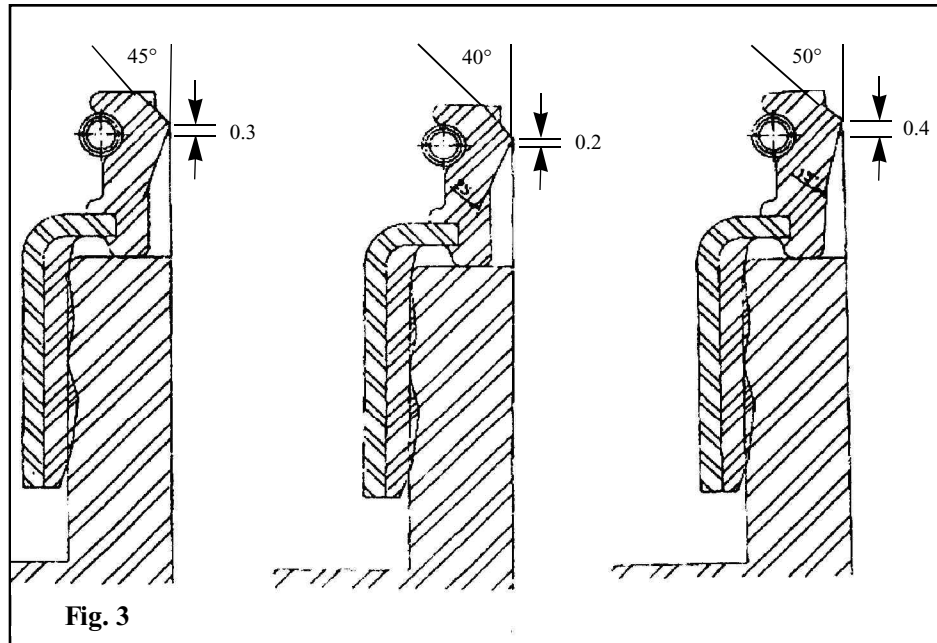
Another critical problem during installation is how far should we go when installing the seal onto the chimney. This is critical because there is a limited space between the seal and chimney, therefore if you push the seal too far it will alter the lip geometry. Ideally the inside of the shoulder should barely contact the chimney as shown in Figure 4, otherwise the elastomer below the shoulder will have nowhere to go
Continued next page.)

(Valve Stems Continued.)

other than up (See Figure 5). This becomes even more critical when the seal has its shoulders towards the outside, then the chimney could possibly tear the elastomer, depending on the amount of force being used.

Remember, even if the elastomer is being “lightly” compressed, the geometry of the lip, the same characteristic that manufacturers spend hours to evaluate, will be altered and the seal will not perform at its peak.

The bottom line is if you take care during installation of the positive type valve stem seal, the seal will control oil consumption and meter just the right amount of oil to the valve stem.



JASPER Product Videos Can Now Be Viewed On the Web

Jasper Engines & Transmissions product videos can now be viewed in their entirety on the JASPER web site.

Viewers can access the videos by logging on to the JASPER site at www.jasperengines.com. A video featuring an overview of JASPER is available on the home page, while individual product videos are available on the product pages. The videos are import & domestic gasoline engines, diesel engines, light-duty and mid-range transmissions, stern drives and differentials & rear axle assemblies.

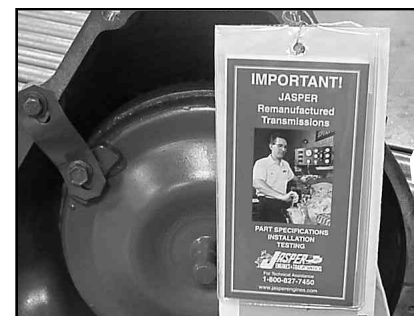
In order to view the videos, users will need Windows Media Player. If Windows Media Player is not installed on your computer, you can download it from a link on the JASPER site.

Be Sure Your Customer Receives the Product Information Packet!

The next time you do an engine, transmission or differential replacement, make sure the customer leaves not only with a smile on their face, but with the JASPER Product Information packet in hand also.

All JASPER remanufactured products leave the factory with an assortment of information (Product Information Brochure, Product Registration Card, Premium Service Plan and a Buyer's Warranty Guide) tucked inside a clear, plastic sleeve. The sleeve is wired to the product, as illustrated

in the photo. It is extremely important that the customer receives this packet for reasons such as completing the registration card and having warranty information if needed.





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