OLIVER CONNECTING RODS

STRONGER *by Design*

CATALOG

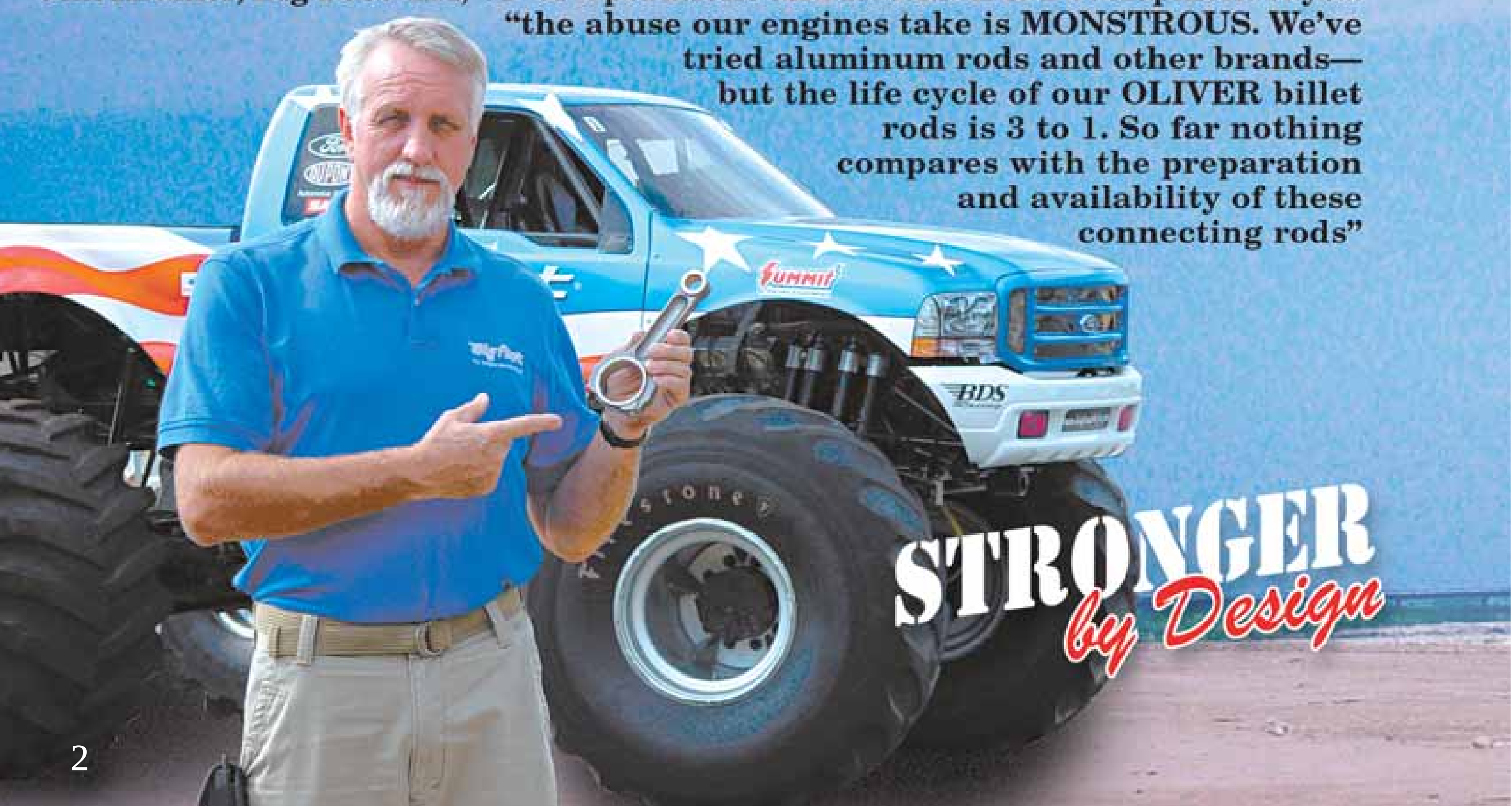
If you race it...
we build a rod for it.

Oliver American made billet rods made from E4340AQ designed by engineers, racers and engine builders using the latest design tools and manufacturing technology to create a new benchmark in quality, availability and service.

Oliver rods are available in the proper offset to fit most commonly used applications and are widely used in NASCAR, Nextel Cup, Busch Grand National cars and Craftsman Trucks. NHRA and IHRA drag racing, World of Outlaws sprint cars and late models, pavement late models and super modifieds. Oliver rods are also used in truck and tractor pulling, offshore powerboat racing, drag boats and world speed record vehicles.

Sometimes quality just speaks for itself!

Jim Kramer, Big Foot 4X4, VP of Operations and Research & Development says... "the abuse our engines take is MONSTROUS. We've tried aluminum rods and other brands—but the life cycle of our OLIVER billet rods is 3 to 1. So far nothing compares with the preparation and availability of these connecting rods"



Is it time to replace my rod bolts yet?

Always replace rod bolts in any engine whose history you don't know. This is the cheapest insurance for making sure that you will achieve long engine life. Endurance racing such as circle track, off road, truck & tractor pulling & offshore boat racing create extremely high stresses on all engine components, thus fasteners will need to be replaced often. The information below will help you understand where your rod bolts are in their fatigue life:

1. When you disassemble each rod as it comes from our factory, number each bolt: (for example for an 8 cylinder motor, number your rod bolts # 1 thru #16).
2. Make a list of numbers from 1 through 16 on a piece of paper that you will keep in your records for this particular engine. This will become your reference paperwork to compare lengths of each bolt during each assembly of this particular engine.
3. Using a Micrometer (.0001") with pointed ends (120 degree), measure the length of each bolt carefully (at room temperature and under zero load) and write down the specific length of that specific bolt on your list.
4. Install the bolts per Oliver Installation Instructions.
5. When you freshen the motor, repeat the above sequence of measuring bolts and compare the length of each bolt to your original paperwork.
6. When a rod bolt does not come back to its original length and takes a permanent set increase in length of .001" or greater, throw the bolt away and install a new one. Number and measure the new bolts in the identical manner.

By monitoring the bolt stretch in the above manner, you will stay ahead of the fatigue curve. Note: the above only applies to NEW connecting rod bolts. If you purchase a used motor or decide to start monitoring rod bolt life using the above method, always start the process by purchasing brand new rod bolts.

Important Note: Each year, engine builders are creating engines that turn ever higher RPM. The resulting increased inertial loads on rods and bolts can result in shorter fatigue life and thus require either:

a) More frequent changes of rod bolts and/or
b) Purchase of rod bolts made from higher tensile strength materials.

While the cost of the higher strength materials (usually multi-phase stainless steels) can seem quite high, in the proper engine application, it is actually cheap insurance. Don't be afraid to spend a little more up front to upgrade to the higher tensile strength fastener when it is needed rather than spend considerably more later with the results of failed fasteners.

IT AIN'T HOW MUCH YOU GOT...

It has been said that the racing engine is a collection of highly stressed parts flying in loose formation. The connecting rod is the second most highly stressed component in the arrangement (the valve spring wins that particular contest). The maximum compressive force (the load that bends the beam) occurs just after TDC on the firing stroke. Strange as it may seem, the maximum load that the rod ever sees is the tension load at TDC on the exhaust stroke when all of the valves are open on overlap and there is no compression force to oppose the sudden change in direction. This is the load that stretches the rod, ovals the big end and places the bolts in cyclic bending stress - in other words the load that causes most of the damage.

For decades the standard of the industry in racing connecting rods has been the *"H" beam* rod with a double ribbed end cap. There is a strong perception that the *"H" beam* is inherently stronger in compression than the traditional *"I" beam* and that the cap requires a double rib to provide sufficient hoop strength to reduce "ovality" to acceptable minimums. This simply is not true. In mechanical design, it isn't only how much metal you use, *but also how you use it.*

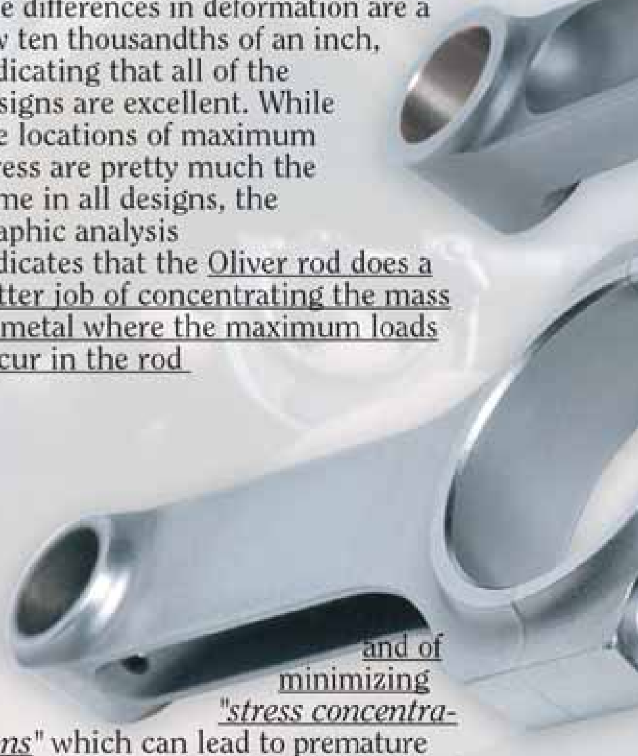
The traditional *"H" beam* racing rods were designed, more or less intuitively, by excellent engineers *before* the age of Computer Aided Design and Finite Element Analysis. Finite Element Analysis (FEA) is a sophisticated computer driven tool which allows engineers to predict the amount and distribution of stress and the extent and direction of the resulting physical deformation throughout a structure under any desired condition (or combination) of simulated load(s). It does so by dividing the structure into a vast number of equally shaped sections which intersect at "nodes". The divided structure is then meshed in a grid and the simulated load or loads are applied. The magnitude of the resulting stresses is graphically indicated by colors. Deformation is measured numerically and geometrically. The geometric deformation is typically exaggerated for clarity. By studying the concentrations of stress and the resultant deformations, we can both optimize the design and better understand the effects of design on fatigue and bearing wear. FEA provides a valid comparison of alternate designs under the same operating conditions-so long as the same assumptions and nodal geometries are used.

The accompanying figures and tables are taken from a comprehensive three dimensional FEA comparison of *Oliver's* standard *"parabolic I beam"* 665 gram rod typically used in Busch Grand National, Late Models and 410 cubic inch sprint cars with the leading competitors' 692 and 733 gram *"H beam"* products under typical Nextel Cup compressive and inertia loads.

Design factors such as bearing crush, pin bushing fit, geometric shape and bolt preload were included for their influence on stress and deformation.

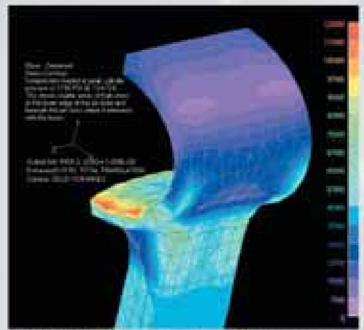
The dimensional deformations in the pin and bearing bores are summarized below:

The differences in deformation are a few ten thousandths of an inch, indicating that all of the designs are excellent. While the locations of maximum stress are pretty much the same in all designs, the graphic analysis indicates that the Oliver rod does a better job of concentrating the mass of metal where the maximum loads occur in the rod and of minimizing *"stress concentrations"* which can lead to premature failure from cyclic fatigue. This is largely due to the parabolic shape of the beam and the lack of small radii



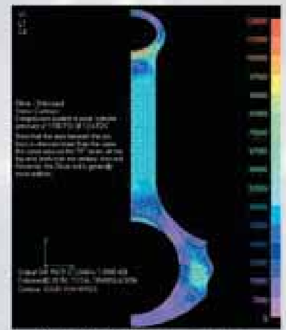
...IT'S HOW YOU USE IT

throughout. The rod is very carefully shaped to promote the efficient "flow of stress" throughout the structure. This is particularly noticeable in the geometry of the centrally ribbed cap. The central rib avoids the concentration of stress that is an almost inescapable result of the proximity of the bolt holes to the beginning of double ribs and is actually stiffer than the double rib. The end result is a lighter connecting rod that is stronger and stiffer in every respect than the leading *"H beam"* products - simply through more efficient use of less metal. We are all aware of the beneficial effect of decreased reciprocating and rotating mass and moment of inertia on the acceleration of our race cars...

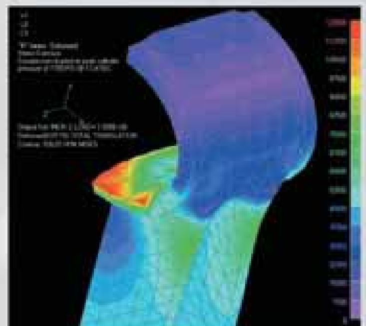


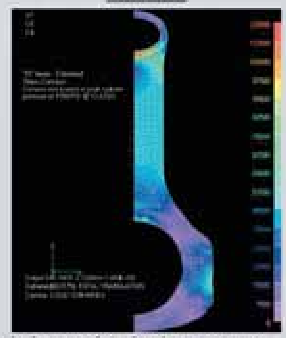
OLIVER: Stress contour. Compression loaded at peak cylinder pressure of 1150 PSI@ 13°ATDC.

This shows smaller areas of high stress at the lower edge of the pin bore and below the pin boss where it intersects with the beam.



OLIVER: Total transition contour. Tension loaded due to acceleration force at 8000 RPM. Note that the area beneath the pin boss is stressed lower than the same area on the H-beam. At the big end both rods are similarly stressed. However, the OLIVER is generally more uniform.

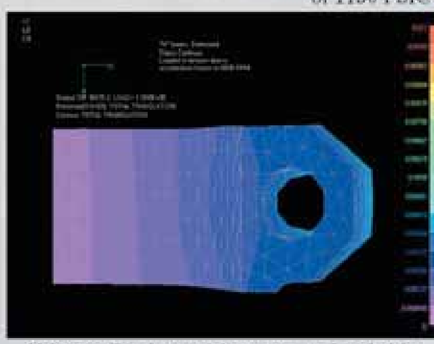




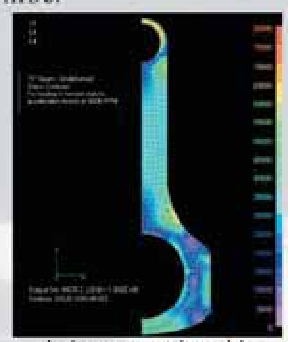
H-beam: Stress contour.Compression loaded at peak cylinder pressure of 1150 PSI@ 13°ATDC.

"Sometimes it takes an industry a while to recognize a new standard of excellence."

Carroll Smith, Automotive engineer



H-beam: Total transition contour.Loaded in tension due to acceleration force at 8000 RPM.

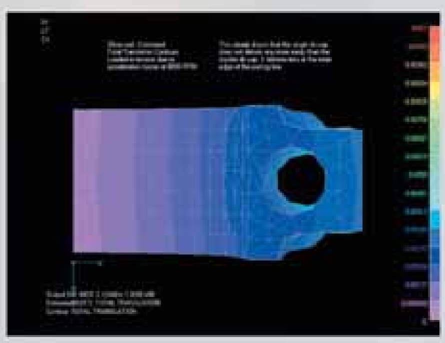


As in compression, this shows that the popular H-beam has some areas of high stress concentration at the beam to bore intersections.

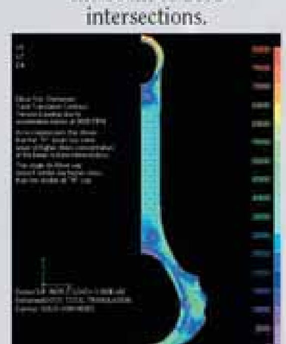
STRONGER *by Design*

The following table shows typical displacements at several key locations. Since bore sizes tend to deform in an hourglass or barrel shape in the axis, the displacements were taken at the center. The data speaks for itself.

		692 gram H beam	733 gram H beam	665 gram Oliver
Pin Bore	x - comp	+.0029	+.0028	+.0028
Pin Bore	x - tens	-.00088	-.00087	-.00062
Pin Bore	y - comp	-.0021	-.0021	-.0018
Pin Bore	y - tens	+.0028	+.0029	+.0027
Bearing Bore	x - comp	+.00046	+.00043	+.00068
Bearing Bore	x - tens	-.0003	-.00026	-.00027
Bearing Bore	y - comp	not analyzed		
Bearing Bore	y - tens	+.0046	+.0041	+.0044



OLIVER: Total transition contour. Tension loaded due to acceleration force at 8000 RPM. It clearly shows the single rib cap deforms less than the double rib cap. It deforms less at the inner edge of the parting line.



As in compression, this shows that the single rib OLIVER doesn't exhibit any higher stress than the popular H-beam.

To obtain maximum performance from all OLIVER Conn

Anyone who has spent any time at the race track has been witness to a catastrophic engine failure. An explosion of major proportions. It has happened to almost everyone from professional to budget racer. We're going to cover some of the things you need to understand in order to minimize this unhappy potential.

First, it is important to clearly understand the forces that are trying to tear the engine apart. As the horsepower potential increases, so do the forces imposed on the load bearing components. Let's address some examples of loads experienced by a typical racing engine.

Imagine about 18,000 pounds of pressure—trying to lift the head off the cylinder. Apply Newton's law, and you quickly realize the same force is attempting to blow the crankshaft out of the block—and on to the race track. Consider 16,000 psi, every time the crankshaft rotates and the rod caps experience "ovalation" as the crankshaft accelerates through it's arc and changes the load direction.

What keeps the engine together, assuming the basic parts have been designed correctly and are not compromised, are the fasteners. A unique system of spiral wedges that create unbelievable forces. Properly designed and manufactured fasteners are more than hunks of steel with threads on one end and a wrenching head on the other. It's easy to see that choosing the right bolt, then installing it correctly is the key to obtaining maximum service from your connecting rods. So, by far the most important longevity factor is fastener installation, and even this area is not without controversy.

There are people who believe a correctly tightened fastener requires the application of enormous amounts of torque in order to keep the bolt from loosening.

Acceptable bolts and studs yesterday may no longer do the job today. For a motor to stay together, the fasteners used must provide repeatable clamping forces that are greater than the loads acting upon them. So then the question is how do you really know when the clamping loads are enough?

STRETCH

If you get the idea that properly designed fasteners are basically a solid spring, you will have no difficulty understanding the concept of clamping force. In most cases, the manufacturer's instructions provide specifications that will cause the fastener to reach 75% to 80% of it's yield point, plus a calculated safety factor.

Calculating the clamp load you are actually getting can be complex. A correctly designed bolt, for example, may require an undercut shank to control where the actual stretch occurs. Undercutting prevents thread deformation and the concentration of load in stress sensitive areas.

The diameter of the undercut area can help you determine the clamp load achievable from a given bolt or stud. Simply apply the following formula.

A= Maximum Clamp Load

B= Ultimate Tensile

C= Diameter of stretch area

$$A = \left(\frac{C}{2} \times \frac{C}{2}\right) \times 3.1416 \times B$$

TENSILE

The term tensile is a lay-term that refers to ultimate tensile. The more a given material is stretched the closer you bring the material to the yield point. Which is not a happy thought—unless you know how this game works.

So then, ultimate tensile is the absolute point where the effective clamp load decreases as the fastener continues to stretch. Failure occurs when the material exceeds it's elasticity (also called modulus of elasticity) and the clamping force at the joint drops to zero.

Tensile is a function of many factors. One is hardness. Materials that are heat treated to higher Rockwell numbers also develop higher ultimate tensile. Which would lead you to conclude that more is better. Right? Well the answer is simply—NOT always.

ecting Rods, correct installation procedures are essential.

Tensile is only part of the story. All materials react differently at higher hardness levels. Some become very brittle, greatly reducing their fatigue life. Others may develop stress corrosion which is a special form of hydrogen embrittlement in which the material is attacked while under stress. This occurs when the hydrogen in the air we breath penetrates the material. It's as simple as improper handling. Moisture from your hands can deposit minute amounts of salt and acid on the surface of the material which starts the corrosion process. The corrosion remains on the fastener until stress is applied (from tightening). Hydrogen then attacks this corroded area and promotes more corrosion which attracts more hydrogen. The process feeds on itself.

There are several exceptions to this rule. One is some of the multi-phase, stainless steels. These materials can be processed into the 265,000 psi, ultimate tensile range—and still remain very ductile. Best of all, this material is 100% corrosion resistant. The down side of this good luck deal is you can look forward to spending about three times more than our standard bolt. Still, that sounds like great insurance if you're talking about an expensive race motor.

TORQUE

Torque is defined as the amount of friction that must be overcome to cause a nut or bolt to turn. Manufacturers of most quality fasteners designed for racing will supply some tightening specifications, torque reference number, or stretch data. You probably already know it is usually listed in foot pounds of torque. Of all the effort applied to a given fastener, more than 50% is the torque simply required to overcome friction, with perhaps as little as 10% actually contributing to preloading the joint.

Friction is an extremely challenging problem because it is so variable and difficult to control. Many fastener manufacturers recommend using the stretch method since the preload is closely controlled and independent of friction.

The friction for a particular installation can change from one application of torque to the next. That is, when a bolt is torqued for the first time, the friction is usually at it's highest value. Each additional time the fastener is torqued and then loosened, the friction factor becomes smaller.

We can't stress the importance of lubricants too much, because they are the main factor in determining friction. Motor oil is commonly used because of its ready availability. With the use of specially formulated, low-friction lubricants, the required torque can be reduced as much as 20% to 30%. But, it is important to realize that the reverse is also true. If the recommended tightening specifications are based on the use of a special lubricant—the use of motor oil or other non-specified lubricant will result in insufficient preload.

The torque must be increased to compensate for the added friction induced by the non-specified lube.

Surface finish is also a contributor to the friction factor. A black oxide finish, for example, behaves differently than a polished fastener. So you see it is very important to closely observe the tightening recommendations supplied with each type of bolt.

Without a method of accurately measuring the stretch, it is very easy to exceed the yield point of the material and essentially fail the fastener before you install the oil pan. So then, is there a predictable way to accurately follow the manufacturer's installation instructions—and end up with correctly installed parts? Absolutely, if you follow the principals of stretch. Because it is bolt stretch that provides clamping force, we primarily recommend the use of the stretch method. The second choice is the torque/angle method. Remember—check it twice and....well, you know the rest. Good racing!

OLIVER has a connecting r

Speedway Series:

Designed for severe applications were engines are subject to high RPM endurance racing, or high loads over a wide variation in RPM. These rods are often used in NASCAR Nextel Cup or large cubic inch late model dirt cars, also used in power added engines. This rod features 7/16” WSB bolts.

SPEEDWAY / STANDARD JOURNAL

Rod Length	Wrist Pin	Crank Pin	Journal Width	Part Number*
5.850"	0.927	2.100	0.940	C5850STSW8
6.000"	0.927	2.100	0.940	C6000STSW8
6.125"	0.927	2.100	0.940	C6125STSW8
6.200"	0.927	2.100	0.940	C6200STSW8
6.250"	0.927	2.100	0.940	C6250STSW8
6.300"	0.927	2.100	0.940	C6300STSW8

Standard Light Series:

Designed to be used in naturally aspirated high horsepower, high RPM engines. This workhorse rod is used in applications such as late model stock cars, NASCAR Busch Grand National series, 410 cubic inch sprint cars and Late Model dirt cars. This rod features 7/16” WSB bolts.

Rod Length	Wrist Pin	Crank Pin	Journal Width	Part Number*
STANDARD WEIGHT / STANDARD JOURNAL				
5.700"	0.927	2.100	0.940	C5700STLT8
5.850"	0.927	2.100	0.940	C5850STLT8
6.000"	0.927	2.100	0.940	C6000STLT8
6.125"	0.927	2.100	0.940	C6125STLT8
6.125"	0.927	2.100	0.940	C6125LS1-STLT8
6.200"	0.927	2.100	0.940	C6200STLT8
6.250"	0.927	2.100	0.940	C6250STLT8
6.300"	0.927	2.100	0.940	C6300STLT8
6.350"	0.927	2.100	0.940	C6350STLT8
STANDARD WEIGHT / SMALL JOURNAL				
5.700"	0.927	2.000	0.940	C5700SMLT8
5.850"	0.927	2.000	0.940	C5850SMLT8
6.000"	0.927	2.000	0.940	C6000SMLT8
6.125"	0.927	2.000	0.940	C6125SMLT8
6.125"	0.927	2.000	0.940	C6125LS1-SMLT8
6.200"	0.927	2.000	0.940	C6200SMLT8
6.300"	0.927	2.000	0.940	C6300SMLT8

Ultra Light Series:

Designed to be used in moderate horsepower applications were RPM in the 8,200 range are common. These rods are often used in 360 Sprint cars with Spec heads, or pavement late models. Lightweight pistons are recommended. This rod features 7/16” WSB bolts. (1.889” journal rods have 3/8” ARP 2000 bolts)

Rod Length	Wrist Pin	Crank Pin	Journal Width	Part Number*
ULTRA LIGHT / STANDARD JOURNAL				
5.700"	0.927	2.100	0.940	C5700STUL8
5.850"	0.927	2.100	0.940	C5850STUL8
6.000"	0.927	2.100	0.940	C6000STUL8
6.125"	0.927	2.100	0.940	C6125STUL8
6.200"	0.927	2.100	0.940	C6200STUL8
6.250"	0.927	2.100	0.940	C6250STUL8
6.300"	0.927	2.100	0.940	C6300STUL8
ULTRA LIGHT / SMALL JOURNAL				
5.700"	0.927	2.000	0.940	C5700SMUL8
5.850"	0.927	2.000	0.940	C5850SMUL8
6.000"	0.927	2.000	0.940	C6000SMUL8
6.125"	0.927	2.000	0.940	C6125SMUL8
6.200"	0.927	2.000	0.940	C6200SMUL8
6.250"	0.927	2.000	0.940	C6250SMUL8
ULTRA LIGHT / HONDA JOURNAL				
5.700"	0.927	1.889	0.940	C5700HNUL8-3.8
6.000"	0.927	1.889	0.940	C6000HNUL8-3.8
6.125"	0.927	1.889	0.940	C6125HNUL8-3.8
6.200"	0.927	1.889	0.940	C6200HNUL8-3.8

*Available for Ford block - Chevy journal additional offset.

Sport Light Series:

Designed for use in applications where horsepower and RPM are limited by rules. These rods are often used in 305 sprints, sportsman, and limited late models. Lightweight pistons and pins are recommended. This rod features 3/8” ARP 2000 bolts.

Rod Length	Wrist Pin	Crank Pin	Journal Width	Part Number*
SPORT LIGHT / STANDARD JOURNAL				
5.700"	0.927	2.100	0.940	C5700STSL8
6.000"	0.927	2.100	0.940	C6000STSL8
6.125"	0.927	2.100	0.940	C6125STSL8
SPORT LIGHT / SMALL JOURNAL				
5.700"	0.927	2.000	0.940	C5700SMSL8
6.000"	0.927	2.000	0.940	C6000SMSL8
6.125"	0.927	2.000	0.940	C6125SMSL8
SPORT LIGHT / HONDA JOURNAL				
5.700"	0.927	1.889	0.940	C5700HNSL8
6.000"	0.927	1.889	0.940	C6000HNSL8
6.125"	0.927	1.889	0.940	C6125HNSL8

rod for your style of racing.

Big Block-Max Series:

This rod is engineered for use in the most extreme applications were power adders are common, such as big block turbocharged/ supercharged endurance motors and blown alcohol drag cars. This rod features 7/16” WSB bolts.

Big Block Series:

These rods are designed to withstand the high torque and heavy hitting horsepower generated from today’s naturally aspirated big blocks. This rod is used in Super-Modified asphalt cars and big cubic inch naturally aspirated drag cars. This rod features 7/16” WSB bolts.

MAX / STANDARD JOURNAL

Rod Length	Wrist Pin	Crank Pin	Journal Width	Part Number
6.385”(+.250)	0.990	2.200	0.992	C6385BBMX8
6.535”(+.400)	0.990	2.200	0.992	C6535BBMX8
6.635”(+.500)	0.990	2.200	0.992	C6635BBMX8
6.700”(+.565)	0.990	2.200	0.992	C6700BBMX8
6.800”(+.665)	0.990	2.200	0.992	C6800BBMX8

STANDARD JOURNAL

Rod Length	Wrist Pin	Crank Pin	Journal Width	Part Number
6.135”(STOCK)	0.990	2.200	0.940	C6135BB8
6.385”(+.250)	0.990	2.200	0.992	C6385BB8
6.535”(+.400)	0.990	2.200	0.992	C6535BB8
6.635”(+.500)	0.990	2.200	0.992	C6635BB8
6.660”(+.525)	0.990	2.200	0.940	C6660BB8
6.700”(+.565)	0.990	2.200	0.992	C6700BB8
6.735”(+.600)	0.990	2.200	0.992	C6735BB8
6.750”(+.615)	0.990	2.200	0.940	C6750BB8
6.800”(+.565)	0.990	2.200	0.992	C6800BB8

TALL DECK / STANDARD JOURNAL

Rod Length	Wrist Pin	Crank Pin	Journal Width	Part Number
7.000”(+.865)	0.990	2.200	0.992	C7000BB8
7.100”(+.965)	0.990	2.200	0.992	C7100BB8
7.250”(+1.115)	0.990	2.200	0.992	C7250BB8
7.500”(+1.365)	0.990	2.200	0.992	C7500BB8
7.750”(+1.615)	0.990	2.200	0.992	C7750BB8
8.000”(+1.865)	0.990	2.200	0.992	C8000BB8

SMALL JOURNAL

Rod Length	Wrist Pin	Crank Pin	Journal Width	Part Number
6.385”(+.250)	0.990	2.100	0.992	C6385BB8
6.535”(+.400)	0.990	2.100	0.992	C6535BB8
6.635”(+.500)	0.990	2.100	0.992	C6635BB8
6.700”(+.565)	0.990	2.100	0.992	C6700BB8
6.800”(+.665)	0.990	2.100	0.992	C6800BB8

Ford/Mopar Series:

FORD

Rod Length	Wrist Pin	Crank Pin	Journal Width	Part Number
5.400	0.927	2.100	0.940	C5400SVO-STLT8
5.400	0.927	2.000	0.940	C5400SVO-SMLT8
5.400	0.927	1.880	0.940	C5400SVO-Q4UL8
5.400" SMALL BLOCK	0.927	2.124	0.830	F5400FDUL
6.200	0.927	2.100	0.940	C6200SVO-STLT8
5.850 MOD	0.866	2.000	0.938	F5850MD-SMUL8
5.933" 4.6L MOD	0.866	2.086	0.938	F5933MDUL
6.657" 5.4L MOD	0.866	2.086	0.938	F6657MDUL
6.800" BIG BLOCK	0.990	2.200	0.992	F6800BB8
6.800	0.990	2.200	0.992	F6800BBMX8

MOPAR BIG BLOCK / STANDARD JOURNAL

Rod Length	Wrist Pin	Crank Pin	Journal Width	Part Number
6.760" 440 MOPAR	0.990	2.375	1.017	MC6760BB8
6.860" MOPAR HEMI	1.030	2.375	1.017	M6860BB8
7.100	0.990	2.200	1.017	MC7100BB8

Every set of Oliver rods is balanced to +/- ½ gram on each end. All Oliver Connecting Rods may be upgraded to MP35N bolts at additional charge.

Sport Compact:

These rods are designed for use in the Sport Compact applications were the small displacement high rpm engines are being modified to make large amounts of horsepower.

SPORT COMPACT BILLET ROD

Rod Length	Description	Wrist Pin	Big End Dia.	Part Number
5.290”	Honda VETEC (B16A)	0.827	1.890	H5290HNVTEC
5.394”	N-VTEC (B18A/B)	0.827	1.890	H5394HNNV
5.394”	Honda 1.6, ALL D16 SOHC VTEC, non-VTEC & ZC	0.748	1.980	H5394VTEC
5.433”	Honda VTEC Rod (B18C)	0.827	1.890	H5433HNVTEC
5.540”	Honda non-VTEC S/4	0.827	1.890	H5540HNNV-UL
5.630”	Honda H22 VTEC,93-96 Prelude VTEC, 97 & later Prelude	0.866	2.010	H5630VTEC
5.981”	Acura NSX	0.866	2.163	A5981STUL-NSX
5.986”	Acura NSX	0.866	2.086	A5986SMUL-NSX
5.986”	Honda K24	0.828	2.008	H5986HNK24
5.975”	Honda N-VTEC (B18A/B)	0.827	1.890	C5765ECTC
5.906”	Mitsu 4G63-gen2 (Narrow Journal)	0.866	1.890	M5906MTUL-G2
5.906”	Mitsu 4G63-gen2 Turbo Extreme	0.866	1.890	MT5906LT-G2
5.315”	Mazda Prote’ge’ 2.0L FSDE	0.748	2.008	MZ5315PROE
5.400”	Mazda Prote’ge’ 2.0L FSDE	0.748	2.008	MZ5400PROE
5.137”	Subaru Legacy LT EJ18, 20, 22	0.906	2.164	S5137LT
5.180”	Subaru EJ25 LT	0.906	2.164	S5180LT
5.590”	Toyota 2JZGTE 6cyl, Supra, 2JZ-Turbo	0.866	2.166	T5590JZGTE

Connecting Rod Part Numbering System

XX ##### XXXX #

B	BUICK
C	CHEVROLET
F	FORD
H	HONDA
M	MOPAR
MZ	MAZDA
N	NISSAN
P	PONTIAC
T	TOYOTA
S	SUBARU

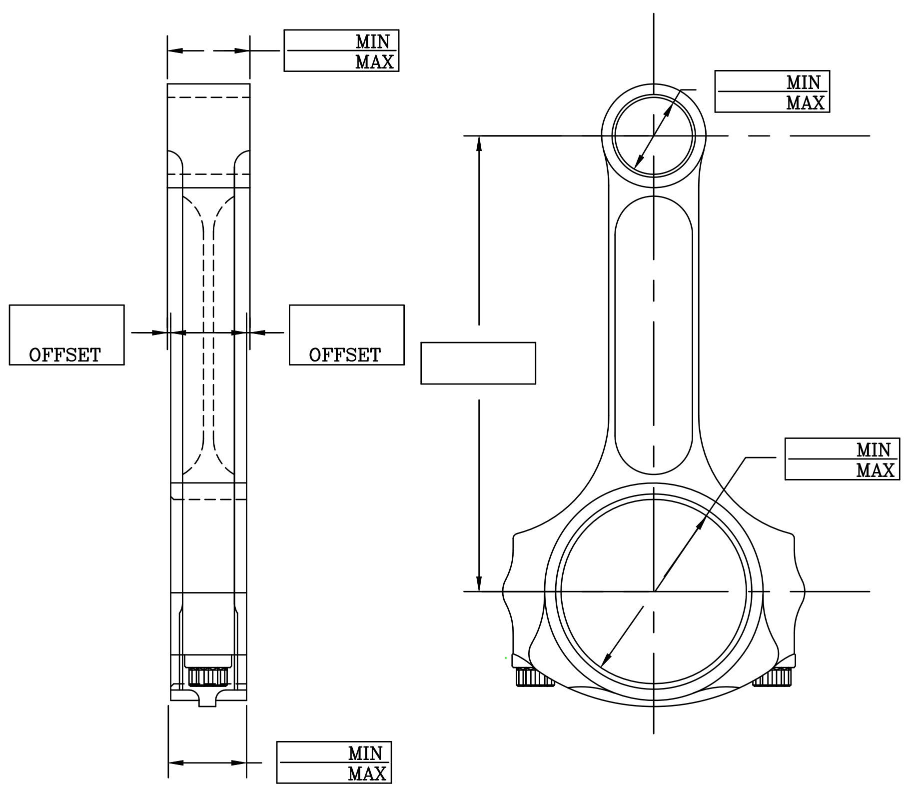
LENGTH WITHOUT DECIMAL
EXAMPLE: 6000 = 6.000

BB	BIG BLOCK
BBMX	BIG BLOCK MAX
EFMX	EVEN FIRE MAX
EFLT	EVEN FIRE LIGHT
FORD	FORD
HNSL	HONDA SPORT LIGHT
HNNV	HONDA NON-VTEC
HNUL	HONDAL ULTRA LIGHT
HNVTEC	HONDA VTEC
LT	LIGHT (STANDARD WEIGHT)
MTUL-G1	MITSUBISHI ULTRA LIGHT GEN 1
MTUL-G2	MITSUBISHI ULTRA LIGHT GEN 2
PINTO	FORD PINTO
PINTO-SL	FORD PINTO SPORT LIGHT
PONT	PONTIAC
SMBB	SMALL JOURNAL BIG BLOCK
SMLT	SMALL JOURNAL STANDARD WEIGHT
SMSL	SMALL JOURNAL
SMUL	SMALL JOURNAL ULTRA LIGHT
STSW	STANDARD JOURNAL SPEEDWAY
STKRP	STOCK REPLACEMENT
STLT	STANDARD JOURNAL LIGHT (STANDARD WEIGHT)
STSL	STANDARD JOURNAL SPORT LIGHT
STUL	STANDARD HOURNAL ULTRA LIGHT

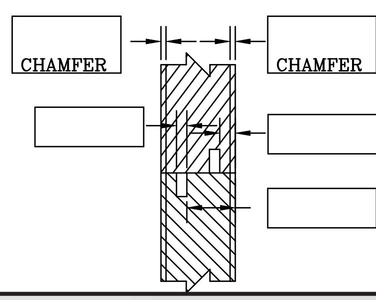
QUANTITY OF
RODS IN SET

LEAVE BLANK
FOR SINGLES

Custom Rod Specification and Order Form



# OF CYLINDERS	
BORE	
STROKE	
COMPRESSION	
RPM	
HEAD TYPE	
PISTON/RING WT.	
WRIST PIN WT.	
HORSE POWER	
TORQUE	
LBS. BOOST	
FUEL TYPE	
OIL TYPE	
TYPE OF RACING	
CAR WEIGHT	
TRACK TYPE	
TRACK LENGTH	
PIECES REQUIRED	
TARGET WEIGHT	



Complete this form and FAX a copy to: OLIVER Racing Parts at 616.451.3085
or use the convenient internet form found at: www.oliver-rods.com

Lube Tubes™ option reduces pin bushing failure...without compromising rod beam strength!

Pressure feeding lubrication to the wrist pin is not a new concept. But until now connecting rods typically produced for racing application were not particularly successful candidates.

The H-Beam design doesn't work... without producing unacceptable side effects. Because the oil passage must be drilled through the center of the rod section, the hole size is dramatically limited. Oil flow through a center drilled oil passage can be shut off completely during the power stroke. Plus, beam strength can be significantly affected unless the center section is thickened to compensate. In the end you get a heavier rod that doesn't effectively lubricate.

Offset Lube Tubes™ deliver pressurized lubrication continually around the wrist pin bushing.

*OLIVER **Lube Tubes**™ are precision, EDM drilled oil passages that deliver lubrication through the strongest, not the weakest section of the connecting rod.*

Bushing can be grooved to aid wrist pin oiling without decreasing high load contact areas.

The OLIVER Parabolic Beam® is perfect... the naturally thicker sections provide more than twice the lubrication potential, without weakening rod strength or increasing weight. Offset passages deliver lubrication all the way around the wrist pin. OLIVER Parabolic Beam® connecting rods are available with single or dual Lube Tubes™. *Please specify when ordering.*

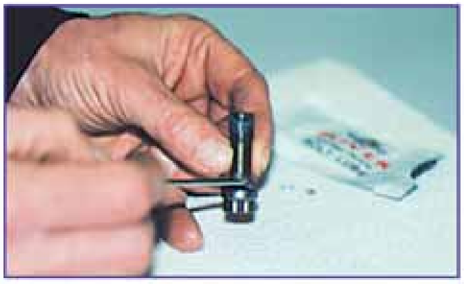
Ken Duttweiler
Duttweiler Performance

How about 2,200 horsepower without a problem!

"I'm impressed with their cycle and bearing life ...I've never worn one out."

Three step tightening procedure using the stretch method

Step 1
After cleaning and visual inspection of all components. Lubricate the bolt threads and under the head using the recommended lubricant.



Step 2
Bring the caps into alignment and tap into place, before installing bolts Do *NOT* use the bolts to pull caps into position.

Step 3
Seat the pointed ends of the stretch gauge into the bolt dimples. Adjust the gauge so it has approximately .050" preload. Align the needle to "0". With shims installed tighten until prescribed stretch is achieved.

Rod Bearing Preparation

Step 1
Remove connecting rod from the sealed pouch.

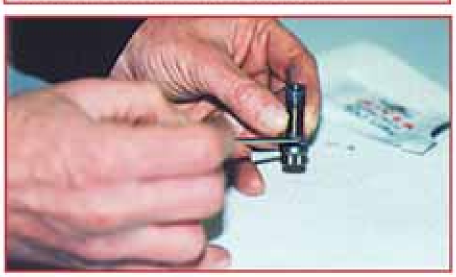
Step 2
Thoroughly clean the rods to remove the rust preventative.

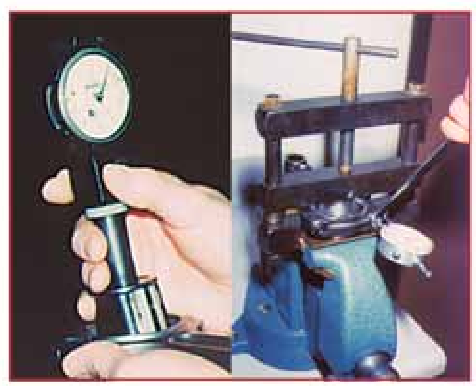
Step 3
Apply machinist dye to side of the rod. Lightly mark 1 to 8 with a metal scribe.

Step 4
Thoroughly clean bearing. Use a micrometer with a ball end attachment to measure the shell thickness. Select shells that will provide appropriate clearance. Install shells into connecting rods. Using care to align the hollow dowels with the mating counter bore, tap the rod cap into position with an appropriate hammer.

<u>DO NOT USE THE BOLTS TO PULL THE CAP INTO POSITION</u>

Step 5
Apply the recommended lubricant on the threads and under the bolt head.





Step 6
Use the stretch or torque angle method. Using a dial bore gauge, measure inside of the bearing to verify the oil clearance will be correct. You are now ready to install the pistons.

Tightening procedure using the torque & angle method

Step 1

Install rod and piston assembly into engine block. Using great care, be sure hollow dowels are aligned with the mating rod counter bores. Attach rod cap and tap into place with an appropriate hammer.

DO NOT USE THE BOLTS TO PULL CAP INTO POSITION

Step 2

Place shim stock between the rod and crankshaft thrust faces. This will help support the rod cap and prevent distortion in the rod housing bore during the tightening process. Seat the threads and snug up the lash by torquing the bolts to 30 ft/lbs.

Step 3

Install the appropriate size socket wrench to the male side of the Torque/Angle gauge. Attach a breaker bar on the female side of the gauge. Now engage a rod bolt with the gauge assembly and rotate the stop arm of the Torque/Angle gauge clockwise until it makes contact with the side of the rod (or any other solid place on the engine. Rotate the outside ring of the gauge clockwise until the pointer aligns at zero. Tighten bolt until pointer aligns at the degree mark specified in the instruction.

Step 4

After completing this process on all 16 rod bolts, set a quality torque wrench to 50 ft/lbs. Check torque all rod bolts to verify that no bolts will turn. If you find any that turn, even slightly, the angle portion of the tightening process was not successful and the bolt is still at 30 ft/lbs.

YOU MUST COMPLETELY LOOSEN THIS BOLT, RETIGHTEN TO 30 ft/lbs AND REPEAT THE TORQUE/ANGLE PROCEDURE .

THANK YOU....for displaying confidence in us by selecting Oliver Connecting Rods. Our design engineers, machinists, assemblers, and inspectors have utilized their skills and many years of experience to ensure that all Oliver Connecting Rods meet the high standards of quality and performance for which Oliver has become famous throughout the world.

IMPORTANT BOLT INSTALLATION INSTRUCTIONS

PLEASE READ CAREFULLY!!

FAILURE TO FOLLOW ALL INSTRUCTIONS MAY RESULT IN PREMATURE ENGINE FAILURE.

DO NOT USE METAL STAMPS to number rods. Metal stamps may disturb the roundness of the rod bore. Paint toolmaker's layout dye on the rod and cap, then inscribe numbers.

NEVER use bolts to draw cap down on rod. Locate cap dowel sleeves into the counterbores of the rod. Then, CAREFULLY tap cap into place.

CLEARANCES vary, as to application. Measuring bearing surface at 12:00 o'clock and 6:00 o'clock, the general rule is approximately .001" clearance per 1.000" of crankpin diameter. Wrist pin clearance generally runs from .0007" to .0015".

OIL PRESSURE: We recommend 10 lbs. of oil pressure for every 1000 RPM. Thus, 7000 RPM = 70 lbs. oil pressure (hot).

Clean all parts thoroughly to remove all dirt and foreign oils. Spread Oliver bolt lube on threads and under head of bolt and tighten per instructions below.

For any fastener to supply clamp loads high enough to keep the parts bolted together, it must be stretched the proper amount. Torque does not measure bolt stretch, it measures friction. This is why we prefer the stretch method or the torque and angle method for tightening rod bolts.

To use the stretch method, measure and note the free length of each bolt before tightening with a stretch gauge or a micrometer with ball end attachments. Then, using the chart below, tighten the bolt until the proper stretch is achieved.

The torque and angle method uses the lead of the thread to stretch the bolt the proper amount. To use this method, simply torque the bolts the amount listed in the chart below (this low amount of torque snugs up the bolt and removes lash). Then, using a Snap-On #TA360 torque angle gauge, turn the bolt the listed number of degrees.

Bolt Type	Recommended Stretch	Torque & Angle
5/16 - Oliver/ARP 3.5	.0052" to .0057"	10 ft lbs + 55 deg
3/8 - Oliver/ARP 2000	.0052" to .0057"	25 ft lbs + 50 deg
3/8 - Oliver/ARP 3.5	.0057" to .0061"	25 ft lbs + 55 deg
7/16 - Oliver/ARP STD (Black Bolt)	.0048" to .0055"	30 ft lbs + 40 deg
7/16 - Oliver/ARP WSB	.0053" to .0058"	30 ft lbs + 40 deg
7/16 - Oliver/ARP 3.5	.0060" to .0065"	30 ft lbs + 50 deg

As a final check to make sure no bolts were missed: Before bolting the oil pan on, set a torque wrench at 50 ft lbs (use a wrench set at 30 ft lbs for 5/16" bolts), and check all rod bolts. If any bolt turns before reaching the preset torque, it has not been properly tightened. You must loosen these bolts and tighten them properly.

Meet the OLIVER RACING PARTS Tech Guys...

Tom Daggett
Product Engineer

- 23 years in automotive design
  - GM Powertrain
    Engine & Transmission Components
  - Bosch Diesel Fuel Systems
    Diesel Fuel Injection Systems
- 12 years as Team Manager & Crew Chief for Daggett Racing
  - Holds 2 Sprints on Dirt Championships
  - 3 King of Michigan Titles
  - Over 50 Feature wins

Tim Schorle
Sales/Technical Service

- 25 years experience in the Racing Industry
  - G & G Performance Engines
    Precision Machinist/Engine Assembler for all types of Drag Racing Engines as well as tractor and truck pulling
  - K-Line Ind.
    Dyno. Technician/Technical Customer Service
  - Douglas Marine Corp. (Skater)
    Engine Installation of Supercharged and Carburated Big Block Chevy engines

- 22 years as Engine Builder/Owner of Schorle Racing Engines
  - Building primarily Drag Racing engines. Chevy, Ford, Super-chargers, NHRA Stockers, Sand Dragsters, etc.
  - Schorle Engines are routinely among the top 10 points holders in their respective categories

Ed Twork
Sales/Technical Service

- 30 years experience in the Racing Industry
  - Baker Engineering
    Engine Design & Assembly, Cylinder Head Design / Porting For Late Model and Dirt Late Model small block Chevy and Ford as well as 410 Sprints
  - Performance Engineering
    Engine Design & Assembly, Cylinder Head Design / Porting for Grand National Buick V6 turbos, Late Model SB, BB blower and drag engines as well as Sport Compact 4 & 6 cylinder turbos

- 13 years as Owner/President of Advanced Porting Racing Engines
  - Sport Compact 4 & 6 cylinder turbos, Grand National Buick V6
  - Builds 4 stroke Go-Kart racing engines
  - Holds 8 Go-Kart Championships with un-told numbers of Feature wins

OLIVER RACING PARTS

LIMITED WARRANTY

Please read carefully. We warrant the OLIVER Billet and OLIVER Forged rods are manufactured from Mill Certified Aircraft Quality, vacuum carbon-arc deoxidized, E4340 steel, meeting AMS 6415-M (alloy), AMS 2301-G (cleanliness) and ANMST A322-91 specifications. OLIVER Racing Parts guarantees workmanship to meet or exceed the machining tolerances that are generally accepted within the motorsports industry, as of the date of delivery. All products manufactured by OLIVER Racing Parts should be installed ONLY by professional engine builders who are knowledgeable about the assembly of high performance engines.

If OLIVER Racing Parts receives notice that a product is defective, out of tolerance or not as specified above, within thirty days of delivery, OLIVER Racing Parts may, at it's option, repair or replace the part in question. If the defective parts are determined to be non-replaceable, the buyer shall be entitled to a refund of the original purchase price.

These remedies are the buyer's sole and exclusive remedies. In no event shall OLIVER Racing Parts be liable for direct, incidental or consequential damages of any type.

This warranty is exclusive. No other warranty, whether written or oral, is expressed or implied. OLIVER Racing Parts specifically disclaims the implied warranty of merchantability and fitness for a particular purpose.

Any modification to any OLIVER Racing Parts product, or parts therein, in any manner, made after their departure from the OLIVER Racing Parts facility will render all warranties null and void.

Special Note: All instructions MUST be carefully read before installation.
For additional technical information go to www.oliver-rods.com

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