

R&R Aluminium Rods

Aluminium Rods are CNC machined out of their proprietary aluminium alloys developed exclusively for R&R. The Pro-series alloy has up to 24% increased tensile and yield strength over competitors rod alloys. All alloys are cold extruded under 2,000+ tons of pressure to ensure consistent grain flow and density. This yields the strongest and lightest rod possible with an exceptional fatigue life and reduced elongation. As with all our connecting rods, material has been ultrasonically tested, bores are precision honed to standards, mating surfaces are standard or circle-loc™ serrated for super-strength and perfect cap to rod alignment, and all corners are blended to eliminate stress risers. All connecting rods come with ARP rod bolts.

R&R Aluminium rods are available for most import or domestic applications by providing a fully custom rod at little or no cost above that of an "off-the-shelf" product. Aluminium rods are our speciality. Our in-house team is capable of designing and manufacturing a single set of rods or a few hundred sets, reasonably priced, with the shortest turn around time possible, ensuring quick delivery so you spend more time running your rods than you spend waiting for them.



We use genuine ARP 8740, ARP 2000, ARP L19, or ARP Custom Age 625 bolts exclusively.



You may ask, why are R&R's rods made out of billets and not forgings. It is often believed nothing is better than a forged connecting rod. Even though our rods are manufactured out of what looks like a square stock, it should not be confused for a casting or a plate.



Unlike a forging in which the aluminium is literally pounded into the shape of a rod, our material is cold worked and forced through a die at extreme pressures to form the billets from which the aluminium rods are CNC'd from. This work hardening builds the strength, grain structure, elasticity, and general characteristics that makes our aluminium rods superior to common forgings. Our alloy is then further artificially aged and heat treated, then stress relieved through additional manufacturing processes.

Why do I need an aluminium rod in my engine?

On many high horsepower engines, an aluminium rod acts like a shock absorber between the piston and the crankshaft. Without this cushion, the bearings may flatten, the crankshaft may crack, or the main caps will start walking/shuffling or even break. Using an aluminium rod ensures that all these components can withstand the stresses of a high horsepower engine.

What is the difference between a forged and aluminium rod?

Forgings are easier and cheaper to manufacture and until CNC machining became popular this was the only economical way to manufacture an aluminium rod. Billets actually cost more, but the finished product is actually stronger and lasts longer. Part of this is due to how the billets are manufactured, as extrusions allow for directionality of the grain structure, adding to how well aluminium rods function as a shock absorber.

What clearances do I need to run with an aluminium rod?

When running an aluminium rod, your running clearances need to be adjusted as the aluminium rod will grow more than a steel rod. A piston to head clearance of .060" minimum is recommended. Sides clearances need to be increased by .002-.005" over the steel counterpart depending on application and oil viscosity used. Wrist pins typically need to be run tighter than their steel counterpart as the heat from the piston transfers to the rod and increases running clearances during operation. Rod bearing clearances typically are run .001- .002" looser than with steel rods as the parting lines tend to burnish into each other during initial operation. Aluminium rod to camshaft and engine block clearances should also be kept to a minimum of .060".

Can I run my aluminium rods without a pin end bushing or can the pins be press fit?

You cannot run a press-fit pin on an aluminium rod, but for most applications, we recommend not using a pin end bushing, as the aluminium is an excellent bearing surface and bushings tend to come loose when the pin end of the rod is heated. We recommend you send your wrist pins to us for final pin fit.

What bearings do I run with an aluminium rod?

Many race bearings are offered for numerous applications with dowel pin holes already drilled in them. Tangs were not intended to prevent bearings from spinning. They are just used to locate the bearing side to side. As the aluminium rod grows more than a steel rod the bearing bore actually grows enough to allow the bearing to become looser than bearing manufacturer recommendation, requiring that a dowel is used to secure the bearing in location. If your bearings are not offered drilled for your application, we can modify them for a small fee,

Do I need to pre-heat my oil when running an aluminium rod?

There is no need to pre-heat your oil, but it is always good practice to get the engine up to operating temperature before subjecting it to high loads. This will provide longer life for all engine components. As aluminium heats up, it actually loses tensile strength, but gains ductility, which aids in its function to act like a shock absorber without breaking. Aluminium rods that fail before their life cycle typically are subjected to stresses prior to being fully warmed up.

Can an aluminium rod be rebuilt?

While we can resize both the pin end and the big end of the rod, usually aluminium will stress fracture long before this is needed and should be replaced as a maintenance item.

What aluminium rod bolts should I use?

We exclusively use ARP rod bolts in all of our aluminium rods, ranging from ARP 8740 up to Custom Age 625. Most aluminium rods use ARP 2000 or ARP L19, but call us and we'll help you figure out the right rod bolt for your particular application.

Can I upgrade my aluminium rod bolts in an existing rod?

No. Once the big end has been sized and honed, the same part number bolt with the same torque specification must be used.

How often do I need to change my aluminium rods?

An aluminium rod acts like a shock absorber. There are only so many cycles even a shock absorber can withstand before it can't rebound further. Even though many customers say our rods last longer than other aluminium rods they have used in the past, this totally depends on the application and how the engine is treated. The best we can do is report back what our customers tell us. In street use, people report over 15,000 miles of mixed street/strip use on applications with high boost. The key is to replace the rod before it fatigues, so it's best to speak to your engine builder or search the internet forums for what other people have experienced.

I hear so many things about aluminium rods. What is myth and what is fact?

1. My aluminium rods are stretched

Answer: Myth. Many people say their aluminium rods have stretched. They actually grow while hot and contract to their original length when cooled back to room temperature. The only way they can become longer is if they are deformed or fractured, either from an engine failure or past their end of life cycle

2. Aluminium rods are only for drag racing

Answer: Myth. In some drag racing applications, aluminium rods have to be changed after only a few passes and in other cases, they have run for years or thousands of passes. We even have customers that use them in their street cars and diesel engines as our material has been engineered to have excellent fatigue characteristics which lend them for longer service life

3. Aluminium rods aren't good for circle track engines

Answer: Myth. While not common, we do have numerous people using them with great success

4. Aluminium rods aren't good for diesel engines

Answer: Myth. While this is also not common, we have been doing this for years on John Deere, International, and Duramax engines with excellent results. As with any application, these rods must be changed out before their end of life cycle

5. Aluminium rods aren't good for land speed race engines

Answer: Myth. Aluminium rods can handle sustained high rpm usage as there is only one heat cycle in a land speed race. Remember, it is heat cycles that shorten the life expectancy of an aluminium connecting rod

6. Do aluminium rods break or any rods break?

Answer: True. If you exceed the horsepower rating that the connecting rod was designed for or exceed the life cycle of the aluminium, the rod will break, we can guarantee that! A good example of this is titanium rods in road race engines are usually cycled out every 40-80 hours!

R&R Pro Custom Billet Aluminium Rods have been engineered to be the best in the industry and are available for these and many other applications:

Caterpillar, John Deere, International, Farmall, Buda, Cockshutt, White, Minneapolis Moline, Allis-Chalmers, Cummins, Powerstroke, Duramax, Porsche, Mitsubishi, Honda, Chevrolet GMC, Chrysler Dodge Jeep, Ferrari Maserati, Fiat, Volkswagen, Volvo, BMW, Kia, Toyota Lexus Scion, Hyundai, Mercedes, Audi, Isuzu, Bentley, Jaguar, Lamborghini, Nissan Infinity, Suzuki, Subaru, Rolls Royce, Mazda, Winton, MG, Can-Am, Lotus, Austin Healey, Lancia, Mini, Austin Martin, Alfa-Romeo, Triumph, Bugatti, Buick, Oldsmobile, Pontiac, Packard, Pierce Arrow, Studebaker, Duesenberg, Cadillac, Ford, Cord, Morgan, Auburn, Generac, Kawasaki, Briggs and Stratton, Kohler, Deutz, Peugeot, and countless others.



INSTALLATION INSTRUCTIONS FOR ALUMINUM CONNECTING RODS

1. Correct Clearances
 - A. Use plastigage or micrometers to obtain a minimum of .0025" bearing clearance.
 - B. Side clearance for each pair of rods should be .020-.060" for rods sharing a journal.
 - C. Side clearance for single rod per rod journal should be between .012"-.035"
 - D. Minimum clearance for wrist pins should be .0007"
2. Lubricants and Torquing
 - A. Clean and check rods well for debris. Apply 30W oil to bolts, then torque using the specifications below in three progressive steps. Do not use anti-seize or moly grease.
3. Rotating Clearances

TYPE OF BOLT	RECOMMENDED STRETCH	TORQUE DO NOT EXCEED
1/4" BLACK OXIDE		150 INCH POUNDS
5/16" ARP 2000		33 FOOT POUNDS
5/16" CUSTOM AGE		42 FOOT POUNDS
3/8" 8740	If using stretch method, please call for recommended stretch specifications for aluminum rods.	55 FOOT POUNDS
3/8" ARP 2000		65 FOOT POUNDS
3/8" L19		75 FOOT POUNDS
7/16" 8740		75 FOOT POUNDS
7/16" ARP 2000		80 FOOT POUNDS
7/16" L19		90 FOOT POUNDS
7/16" CUSTOM AGE		90 FOOT POUNDS

- A. A minimum of .080-.080" should be kept between all obstacles such as cam, pan rails, etc. (only cut on rods as a last resort—this is highly not recommended)

4. Maintenance
 - A. Never re-torque rods when they are hot. Do not replace rod bolts in a used rod.
 - B. Heavy chamfer side of rod always goes towards cheek side of the crankshaft.
 - C. Chamfered I.D. of washers must go toward head of rod bolts.
 - D. Check serrations for burrs. If necessary, repair with small jewelers file.

Do I want to use the torque or stretch method for tightening my rod bolts?

The stretch method is always better, but sometimes you are unable to do it or don't have the time to do it between races. If your stretch method specification is not shown above, please call, as this information is available. Additionally, when using the stretch method, it is possible to check for a rod bolt that has gone bad, as it will not come back to its original length measurement. It will remain permanently stretched beyond its elastic limit.

