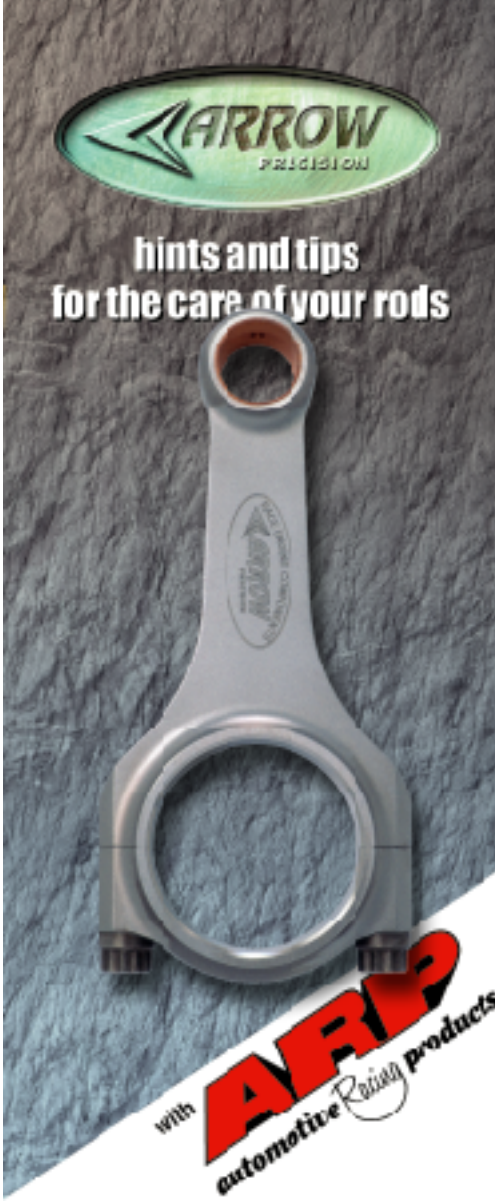
ARP Fastener Type

a	5/16 UNF Custom Age 3AG1.500-10U Torque 30ft/lbs, Stretch .0058"/.0062"
b	3/8 UNF Custom Age 4AJ1.600-10SLU Torque 50ft/lbs, Stretch .0068"/.0072"
c	7/16 UNF Custom Age 300-6701 Torque 85ft/lbs, Stretch .0068"/.0072"
d	5/16 UNF ARP 2000 3AG1.505-2U Torque 24ft/lbs, Stretch .005"/.0055"
e	3/8 UNF ARP 2000 4AJ1.500-2SU Torque 43ft/lbs, Stretch .0055"/.0059"
f	3/8 UNF ARP 2000 4AJ1.750-2SU Torque 45ft/lbs, Stretch .0068"/.0072"
g	7/16 UNF ARP 2000 4AP1.550-2CL Torque 65ft/lbs, Stretch .0056"/.0060"
h	7/16 UNF ARP 2000 4AP1.725-2CL Torque 75ft/lbs, Stretch .0064"/.0068"
i	5/16 UNF Wave-loc (44M UHL) AR301-2W Torque 32ft/lbs, Stretch .0058"/.0062"
j	5/16 UNF Wave-loc 254-6402 Torque 30ft/lbs, Stretch .0067"/.0071"
	_____ _____ _____



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Introduction

Arrow & ARP Care

Here at Arrow great care has been taken to manufacture and deliver the ultimate connecting rod for each and every one of our clients. All our rods are dispatched in first class condition, carefully sleeved and double boxed.

All areas of the rod have been rumbled and peened to create a compressed hardened layer. If this finish layer is removed a stress concentration will be created. This could cause a failure so don't modify or polish rods in any way. We can inspect or modify your rods and then return the surface hardness to its original condition so contact us prior to attempting any alterations.

During an engine strip, carefully check the rods for any signs of fatigue, in particular chips, cracks and discoloration. you may have purchased a secondhand engine fitted with our rods. We can offer a reconditioning service which includes a full inspection, crack detection, peen and re-bushing. All at no great cost, and far preferable to engine failure.

Please carefully read the instructions in this booklet to ensure a long and reliable partnership between your Arrow Rods & ARP fasteners.

The Importance of Proper Rod Bolt Stretch & Torque

Whether measured by stretch or by torque, properly pre-loading a rod bolt is essential for trouble free performance. If a bolt is installed without sufficient pre-load (or pre stretch), every revolution of the crank shaft will cause a separation between the connecting rod and rod cap. This imposes additional stretch in the bolt. The stretch is removed when the load is removed on each revolution, or cycle. This cycle stretching and relaxing can cause the bolt to fail due to fatigue, just like a paperclip that is bent back and forth by hand. To prevent this condition, the bolt's preload must be greater than the load caused by engine operation.

A properly installed bolt remains stretched by it's preload and isn't exercised by the cyclic loads imposed on the connecting rod. A quality bolt will stay stretched this way for years without failing. The important thing is to prevent the bolt from failing due to fatigue by tightening it to a load greater than the demand of the engine. Protect your bolts - tighten them as recommended!

In other types of bolted joints, this careful attention to detail is not as important. For example, flywheel bolts need only be tightened enough to prevent them from working loose. Flywheel loads are carried either by shear pins or by side loads in the bolts; they don't cause cyclic tension loads in the bolts. Connecting rod bolts, on the other hand, support the primary tension loads caused by engine operation and must be protected from cyclic stretching. That's why proper tightening of Rod bolts is so important. See the list on th back of this booklet for the recommended stretch and torque for your Rod Bolts.

Friction is an extremely challenging problem because it is so variable and dificult to control. The best way to avoid the pitfalls of friction is by using the stretch method. This way preload is controlled and independent of friction. Each time the bolt is torqued and loosened, the friction factor gets smaller. Eventually the friction levels out and becomes constant for all following repetitions. Therefore, when installing a new bolt where the stretch method can not be used, the bolt should be loosened and tightened several times before final torque. The number of times depends on the lubricant. For ARP recommended lubes, five loosening and tightening cycles is sufficient.

Proper Fastener Retention

There are three methods which can be employed to determine how much tension should be exerted on a fastener, using a torque wrench, measuring the amount of stretch and turning the fastener a predetermined amount (torque angle). Of these methods, the use of a stretch gauge is the most accurate.

It is important to note that in order for a fastener to function properly it must be "stretched" a specific amount. The material's ability to "rebound" like a spring is what provides the clamping force. You should know that different materials react differently to these conditions, and ARP engineers have designed bolts to operate within specific ranges.

If a fastener is over torqued and becomes stretched too much - you have exceeded the yield strength and it is ruined. If the fastener is longer than manufactured, even if it is only .001", it is in a partially failed condition. Therefore, ARP has engineered it's fasteners with the ductility to stretch a given amount and rebound for proper clamping.

We highly recommend the use of a stretch gauge when installing rod bolts where it is possible to measure the fastener. It's the most accurate way to determine correct stretch. The use of the torque wrench data is only for guide purposes.

Specification

CUSTOM AGE 625 PLUS

This newly formulated super-alloy demonstrates superior fatigue cycle life, tensile strength and toughness, with complete resistance to atmospheric corrosion and oxidation: ARP is the first to develop manufacturing and testing processes for fasteners with Custom Age 625+. Best of all it is less expensive and expected soon to replace MP-35 as the material of choice in the high strength, super-alloy field. Typical tensile strength is 260,000 psi.

ARP2000

An exclusive hybrid-alloy developed to deliver superior strength and better fatigue properties. While 8740 and ARP2000 share similar characteristics - ARP2000 is capable of achieving clamp loads in the 215,000 - 220,000 psi range. ARP2000 is used widely in short track and drag racing as an up-grade to 8740 chrome moly in both steel and aluminium rods. Stress corrosion and hydrogen embrittlement are typically not a problem, providing care is taken in installation.

Steel Connecting Rod Assembly instructions

To achieve correct bolt pre-load and to ensure B/E bore roundness after re-assembly.

- Ensure mating faces are wiped clean, Remove any old grease from threads of bolts and rod.
- Apply ARP moly assembly lubricant to seating face of bolt and threads of bolt and rod.
- Assemble cap to rod
- Torque to 15-20 ft/lbs.
- Tighten each bolt to recommended stretch value
  i.e. Loosen first bolt, zero stretch gauge, tighten until correct stretch is achieved.
  Loosen second bolt, zero stretch gauge etc. until all bolts have correct stretch.

NOTE: To optimise accuracy of the big end bore size and roundness, and to achieve correct bolt pre-load, each bolt should be stretch gauged. A torque wrench setting is given as a guide ONLY.

Titanium Connecting Rod assembly instructions

To achieve correct bolt pre-load and to ensure B/E bore roundness after re-assembly.

- Ensure mating faces are wiped clean, remove all old grease from threads of rods and bolts.
- Apply engine oil to seating face of bolt.
- Put washer onto each bolt and insert bolts through cap
- Coat threads of bolts and rod with Molykote Gn+ grease
- Assemble cap to rod and torque to 15-20 ft/lbs
- Tighten each bolt to recommended stretch value
  i.e. Loosen first bolt, zero stretch gauge, tighten until correct stretch is achieved.
  Loosen second bolt, zero stretch gauge etc. until all bolts have correct stretch.

NOTE: Hold rod in soft jaw vice, along beam. Every titanium rod must have each bolt stretch-gauged. Torque Wrench setting is guide only. Ensure that Gn+ grease does NOT come into contact with washer or bolt-seating face!

Notes

Note the stretch of each bolt here for a permanent record.

ROD #1 INSIDE BOLT IN_____ OUT_____ OUTSIDE BOLT IN _____ OUT_____	**ROD #2** INSIDE BOLT IN_____ OUT_____ OUTSIDE BOLT IN _____ OUT_____
ROD #3 INSIDE BOLT IN_____ OUT_____ OUTSIDE BOLT IN _____ OUT_____	**ROD #4** INSIDE BOLT IN_____ OUT_____ OUTSIDE BOLT IN _____ OUT_____
ROD #5 INSIDE BOLT IN_____ OUT_____ OUTSIDE BOLT IN _____ OUT_____	**ROD #6** INSIDE BOLT IN_____ OUT_____ OUTSIDE BOLT IN _____ OUT_____
ROD #7 INSIDE BOLT IN_____ OUT_____ OUTSIDE BOLT IN _____ OUT_____	**ROD #8** INSIDE BOLT IN_____ OUT_____ OUTSIDE BOLT IN _____ OUT_____