ARP®
automotive Racing products

2020

Catalog & Tech Guide


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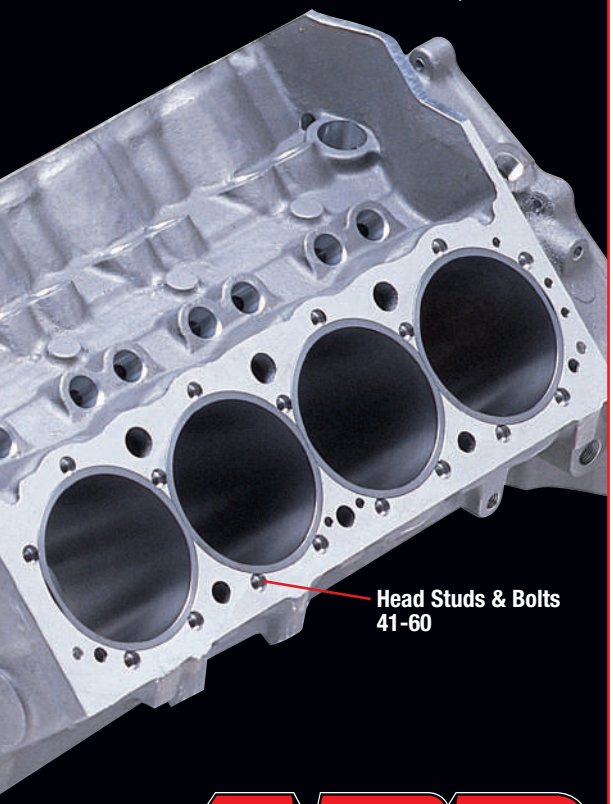

ARP automotive Racing products

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A Brief History

They say that to be successful you must identify a need and satisfy it. Back in 1968 racing enthusiast Gary Holzapfel saw that many of his friends' broken engines were caused by fastener failure. At the time, there were no commercially available studs and bolts up to the challenge. So Holzapfel called upon his many years of fastener making experience for a leading aerospace subcontractor and founded ARP® (Automotive Racing Products). In the ensuing years, the firm has grown from what was literally a backyard garage workshop into a highly diversified manufacturer with five operational entities in Southern California with a combined area in excess of 148,000 square feet. These include forging, machining, finishing and packaging/warehousing facilities in Santa Paula and Ventura, California. There is even a unique racing-themed restaurant at the main Santa Paula facility (called "Hozy's Grill" - which is open to the public).

Gary Holzapfel
Founder and chairman

Today, ARP's product line contains thousands of part numbers, and has expanded to include virtually every fastener found in an engine and driveline. These range from quality high performance OEM replacement parts to exotic specialty hardware for Formula 1, IndyCar, IMSA TUDOR, NASCAR and NHRA drag racing and marine applications.

Three generations are now involved in the company – Gary: founder & chairman, Mike: president, Ryan: manufacturing

As a matter of fact, ARP's customer list reads like a "who's who" of motorsports around the world. In the past several years, virtually every major championship on the planet has been won with engines prepared by ARP customers. These include Nascar Monster Energy Nascar Cup, IndyCar, Formula 1, IMSA TUDOR, NHRA Top Fuel, Funny Car & Pro Stock, Nascar Xfinity and Camping World Truck Series. And so it goes. ARP works closely with many, many teams as a supplier of engine and driveline fasteners, and has clearly become recognized as "the" preeminent source for serious racers.

In addition to its core automotive business, ARP has an Aerospace Division, and is one of the very few companies in the world fully licensed by the United States Government to manufacture MS-21250 fatigue rated fasteners.

ARP also manufactures a variety of industrial fasteners on a contract basis, and is known for its ability to promptly provide efficient solutions to problems at hand.

Packaging, warehousing and sales operations are handled out of Ventura.

ARP's state-of-the-art manufacturing facility in Santa Paula.

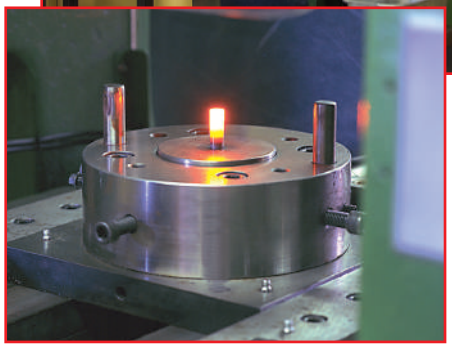
Material comes from the mill in large coils...which subsequently will be fed into cold-headers and formed into bolts.

The Manufacturing Process...

In order to ensure optimum quality control, ARP has grown to be exceptionally self-reliant and now controls all aspects of the manufacturing process. All operations are performed in-house and closely monitored. This is how ARP has been able to establish a reputation for "zero defects" quality throughout the industry.

The process begins right at the mill, where ARP orders only premium grade materials including several proprietary alloys. The ever-popular 8740 chrome moly steel, for example, comes from the mill in four distinct grades. The lowest is "commercial," which is followed by "aircraft quality." ARP uses only the top two grades (SDF and CHQ), which cost twice as much, but provide the foundation for defect-free fasteners. These materials come in bar stock (for studs) and huge coils (for bolts).

Transforming raw material into a fastener begins with "hot" and "cold" heading processes. Material is fed into powerful devices and cold forged, or induction-heated and formed under tons of pressure.



Some bolts begin as induction-heated lengths of bar stock that are forged on huge presses with the desired head shape.

ARP's bank of cold-headers can handle material up to 5/8" diameter and form bolts in a multi-phase operation.

Lengths of bar stock are automatically fed into special machines and cut to the appropriate length.

An overview of part of ARP's expansive machining operations. The shop is laid out for optimum efficiency.

Following the basic shaping, material is heat-treated to desired levels. This crucial process is done entirely in-house to assure total quality control. ARP uses special vertical racks to hold each piece individually and assure complete 360° penetration. This is far superior to commonly-used methods of dumping items into a large bin and batch-treating.

Studs are centerless ground to guarantee concentricity. The thread rolling operation (to MIL-S-8879A specs) is done after heat-treat, which accounts for a fatigue strength up to *twenty times higher* than fasteners which are threaded prior to heat-treat.

ARP manufactures nuts in a multi-step process that begins with raw material being fed into a giant forming device that "blanks" the hex and 12-point nuts and continues with highly sophisticated automated threading equipment tapping each nut with an accuracy of .001″ (which is five times higher than the aerospace standard). This ensures an exceptionally close-tolerance fit between the bolt/stud and nut.

Metal finishing is also performed in-house at ARP. Operations include black oxide coating of chrome moly or polishing stainless steel to a brilliant luster.

The Grinding Department is where all studs are centerless ground to ensure that they are perfectly concentric. As many as ten machining steps are required to achieve this level of accuracy.

Powerful cold-forging equipment is used to make ARP's hex and 12-point nuts. Multi-stage dies are employed to precision-form the finished "blanks."

A series of CNC-threading machines are employed by ARP to accurately tap the threads in nuts. Tolerances held are better than aerospace standards.

ARP performs the thread rolling operation after heat-treating, which results in a fatigue strength up to 20 times higher than fasteners with threads rolled prior to heat-treatment.

Heat-treating is critically important in obtaining the correct tensile strength. Fasteners are placed in special vertical racks to ensure complete 360° penetration.

A bank of CNC machining centers are employed at ARP to perform specialty operations.

State-of-the-art EDM technology is used to perform special operations, such as hex-broaching head studs.

Also on the premises is a fully-equipped lab for R&D and quality control. It has everything required to ensure that ARP products measure up to the company's ultra high standards. Some of the tests that ARP personnel perform on a daily basis include proof loading (using a 120,000 lb. capability tensile machine), fatigue cycle (Amsler) and hardness (Rockwell). Visual inspections include use of an optical comparator (to check thread root contour, etc.), fixtured micrometers and microscopic grain flow analysis. The computer-controlled fatigue cycle testers allow ARP to take fasteners to a failure point in millions of cycles – as opposed to the aerospace norm of 65,000 average to 130,000 cycles maximum. This allows ARP engineers to verify the design specifications of each fastener, and prove its ability to provide superior long-term service.

Finished products are packaged and warehoused in ARP's Ventura facility, which is also home to the firm's customer service, technical and sales office.

Fasteners are shot-peened after heat-treatment to improve overall external integrity.

The finishing touch for most chrome moly fasteners is the black oxiding operation. Fasteners go through a series of "baths."

Behind The Scenes

There are a number of important elements in the production of specialty fasteners, not the least of which are materials, design and manufacturing. As you read further into this catalog, you will get a better idea of the extraordinary steps taken by ARP to produce the very finest products of their kind on the market today. The key to success in all areas is personnel. And here's where ARP's cadre of highly qualified and dedicated specialists shines brightly.

Two valuable resources in the design of ARP products are Russell Sherman, P.E., and up until 2014, Dr. Kenneth Foster. Both men have extensive backgrounds in mechanical engineering, metallurgy and stress analysis. Mr. Sherman's academic credentials are substantial, and real world experience equally impressive. Mr. Sherman has been awarded a fellowship from A.S.M. International, a technical achievement award from Fastener Technology International, and holds a number of fastener patents. (Dr. Foster passed away in 2014. Please read about his contribution to ARP on page 12 – "ARP Foundations" – with tributes to three important members of the ARP team who are no longer with us.)

Russell Sherman, P.E.
Consulting Engineer

Robert Logsdon
Q.C. Consultant

Some of the most valuable work done by Foster and Sherman includes analyzing various aspects of engine, chassis and driveline structural loads, and coming up with solutions to the problems at hand. In this manner, the ARP Research Team is able to continually expand the company's product line.

ARP has added Robert Logsdon to its cadre of consultants. He comes to ARP with vast experience in the area of Metrology, Quality Control, Manufacturing, Acquisition and Configuration Management. Logsdon is a graduate of the U.S. Naval Academy of Metrology Engineering, the Defense Management College

High powered magnifiers are used to carefully inspect critical components. ARP's quality control team is relentless!

A series of special checking devices are employed to monitor the quality of threads. For every thread size, there is a checking device.

Two computer-controlled Instron tensile machines are used to determine the ultimate tensile strength of studs and bolts.

ARP has two highly sophisticated Amsler fatigue machines, which test fasteners through millions of cycles.

and U.S. Air Force Institute of Technology. Additionally, ARP has one of the industry's most complete in-house R&D/QC facilities and a wide variety of testing equipment.

ARP also enjoys a solid working relationship with many of the most respected professional engine builders and race teams from the world over – including those involved in Formula 1, IndyCar, IMSA TUDOR, NASCAR, NHRA, IHRA, World of Outlaws and a host of others. Constant interaction with these racing experts to provide fasteners for a wide variety of competition applications enables ARP to stay on the cutting edge of fastener technology development.

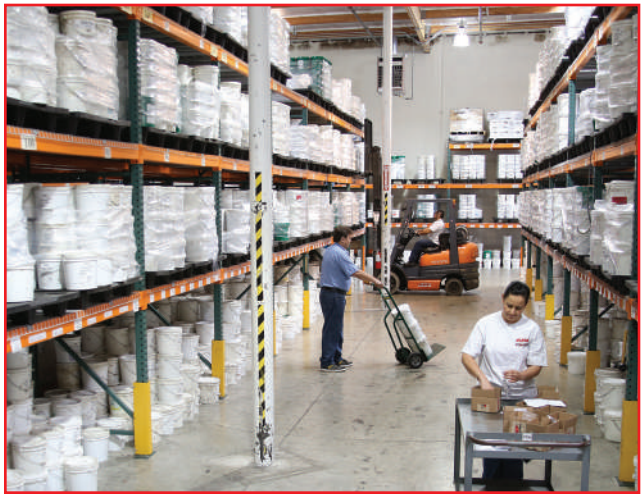
You will find ARP fasteners sold by leading performance retailers and professional engine builders from coast to coast. These firms know that ARP fasteners are the standard of the industry, and smart consumers will accept no substitutions. As you can see, all ARP fasteners are proudly made in the USA to the industry's highest standards. ARP also supports racers through generous contingency awards programs with many racing programs. ARP is a long-time NHRA Major Sponsor.

What ARP Can Do For You

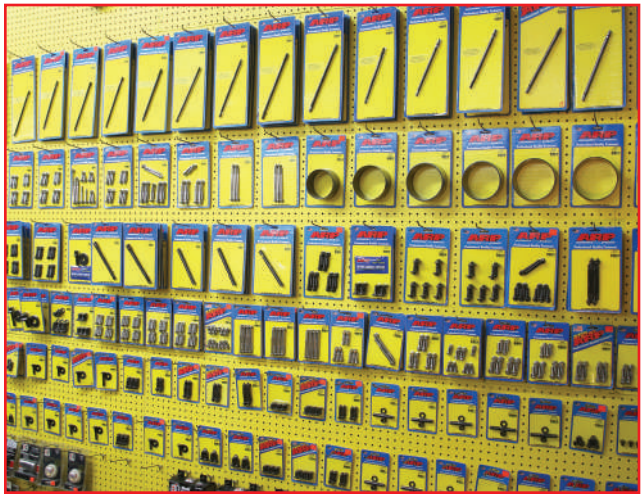
In addition to manufacturing a comprehensive array of cataloged fasteners for automotive and aerospace applications, ARP thrives on the challenges of developing fasteners to solve unique problems. Racers, Pro Street enthusiasts and street rodders have, over the years, approached ARP about manufacturing special fasteners for unique applications, and the company has responded with innovative solutions.

ARP can provide complete R&D services, including metallurgical research, product design, prototype machining and extensive laboratory testing. Moreover, ARP has experience manufacturing fasteners from a wide variety of materials. All work can be performed under the strictest confidence. ARP is well versed in facilitating proprietary research and custom manufacturing for corporations the world over.

It is for good reason that ARP is recognized as "The World Leader In Fastener Technology!"



The finished goods are given a protective coating and stored in sealed containers, awaiting packaging. Millions are in stock!



ARP fasteners are prominently featured at leading performance retailers worldwide.

After final packaging the kits are placed in storage racks and are ready for order fulfillment. Thousands of SKU's are warehoused.

Components for each kit are placed on the appropriate display cards, sealed and labeled. Through-put has been significantly increased.

THE "AEROSPACE QUALITY" MYTH

In areas from hose ends to engine fasteners the terms "Aerospace material and Aerospace Quality" have become buzz words implying the very best in design, materials and quality control.

"It isn't necessarily so", says Gary Holzapfel, founder and CEO of Santa Paula, California based ARP, Inc. ARP (Automotive Racing Products) supplies extremely high strength and fatigue resistant threaded engine fasteners to NASCAR, IndyCar, NHRA, IMSA TUDOR and Formula 1 engine builders and manufacturers. Holzapfel explained his reasons in an interview with Carroll Smith.

Smith: "Gary, do you believe that the term "aerospace quality" is over rated in the specialty fastener industry?"

"Yes I do. First of all, the term is meaningless. Any AMS (Aerospace Material Specification) material must be matched to the specific application. As an example, some airframe bolts (AN3-20) are legitimate "aerospace parts" and are very well suited for the low stress applications for which they were designed. But with a minimum ultimate tensile strength of 125,000 psi, and a relatively low temperature limit, they would be completely unsuitable for use in a racing engine.

We started out in the aerospace fastener business and we understand it. That's why we're not in it any longer. What is not generally understood about aerospace fasteners is that the fastener manufacturers do not design the product. The nuts, bolts and studs are spec'd by the airframe or engine designers and put out for bid. As long as the supplier certifies that the product meets the minimum requirement of the specification and it passes the customer's inspection procedures, low bid wins."

Smith: "Are you implying that the aerospace fastener manufacturers cut corners in order to win contracts?"

"No, it's a matter of manufacturing goals and simple economics. The aerospace market is price dominated. In order to get the contract, the fastener manufacturer's goal is to meet the specification at the least cost, not to produce the best possible part.

This means that they are going to use the least expensive steel and manufacturing processes that will meet the specification. There is nothing wrong with this approach.

It certainly does not mean that certified aerospace fasteners are unsafe in any aspect. They will do the job for which they were designed.

There is another factor. Airframe and aircraft engine manufacturers design their components to a very high margin of safety. Further, aerospace structures are designed to be "fail safe." There is a back up or second line of defense for virtually every structural component so that an isolated failure will not lead to disaster. They are also subjected to frequent and rigorous inspections."

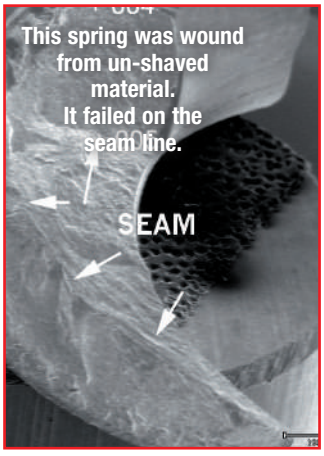
Smith: "What's different about motor racing?"

"Quite a lot, really. While the demands for strength, fatigue resistance and quality control can be similar, and the assembly and inspection procedures in racing can be as rigorous as aerospace, in professional racing very few parts are over designed and there are no fail safe features.

There are no back up provisions for component failure. A failed (or even loosened) nut or bolt in a racing engine means disaster – instant catastrophic failure. An expensive engine is destroyed and a race is lost.

That is why random failures are unacceptable in motor racing, and why aerospace standards should be only a starting point. This means that a specialist in the production of high performance engine fasteners must design and manufacture the very best fasteners that can be produced."

Smith: "So where does the production for a new racing fastener begin?"



"The design process begins with the customer's requirements the operating conditions and loads to be expected, the packaging constraints and the weight and cost targets. This allows us to select the optimum material for the part, and to do the initial mechanical design.

There is more to material selection than simply choosing the best alloy. It means using only the cleanest and purest steel available, which, in turn, means researching to identify the best and most modern steel mills. It means working closely with the mills both to insure consistent quality and to develop new and better alloys.

There are not only a myriad of alloys to choose from; but for each alloy there are several grades of "aircraft specification" steel wire from which fasteners can be made. We believe that only the top (and most expensive) grade – shaved-seamless, guaranteed defect-free – is suitable for racing engine applications.

We also believe that samples from each batch should be subjected to complete metallurgical inspection."

Smith: "How many alloys do you work with?"

"We are currently producing fasteners from at least 10 different steel alloys from 8740 chrome moly to the very high strength chromium-cobalt-nickel alloys such as Custom Age 625+. We also use stainless steel and titanium. With UTSs (Ultimate Tensile Strength) from 180,000 to 270,000 psi, we can suit the material to the job and the customer's cost restraints. We are continually researching and experimenting with new alloys and manufacturing processes – some with all around better strength and fatigue properties."

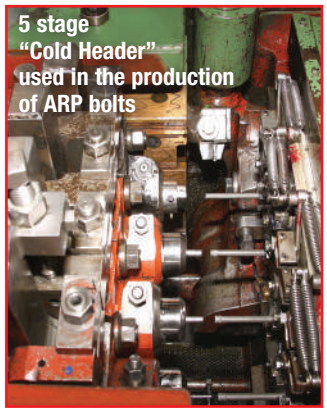
Smith: "Once the design work is done and material has been selected, what's next?"

"Next comes the actual process of manufacturing. It goes without saying that all high strength bolts must have rolled rather than cut threads, and that the threads must be rolled after heat-treatment.

But there is more to it. The old saying to the effect of, "If you are doing something in a particular way because that's the way it has always been done, the chances are that you are doing it wrong," holds true in fastener technology.

Technology advances, and we have to advance with it. All of the manufacturing processes should be subject to continuous experimentation and development. As an example, with some alloys, cold heading produces a better product than hot heading, and vice versa. The number and force of the blows of the cold heading machine can make a significant difference in the quality of the end product. Excessive numbers of blows can lead to voids in the bolt head. ARP, in fact, holds significant patents on cold heading procedures for the higher nickel and cobalt based alloys. In a typical aerospace manufacturing process, these alloys are hot headed from bars, reduced in diameter from 48 to 50% by cold drawing, resulting in a hardness of about Rockwell C46 which is too hard for cold heading. So, the blanks are locally induction heated in a very narrow temperature envelope and hot headed.

If care is not taken the process can reduce the hardness of the bolt head and the area immediately under it as much as 3 to 5


5 stage "Cold Header" used in the production of ARP bolts

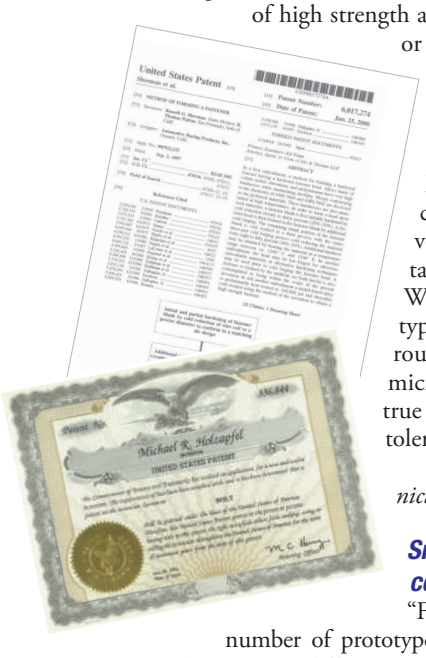
points on the Rockwell C scale. Subsequent heat-treatment does not restore this partially annealed area to full hardness and strength. Therefore, the final result can be a relatively soft headed bolt. This process is not preferred by ARP.

Our patented process begins with a softer wire that can be cold forged. The process work hardens the head and the under head area to the desired hardness. We then power extrude the front end to achieve the reduction and hardness in the shank resulting in a bolt with even strength and hardness from end to end.

The same is true of thread rolling. Temperature and die speed must be controlled and changed for different alloys. Many bolt manufacturers who meet the Aerospace Specifications don't come close to meeting our standards. We consistently go beyond standard aerospace specs.

Our concern with the manufacturing processes extends to the details of heat-treating, shot-peening, fillet rolling and grinding – down to the frequency of dressing the grinding wheels. In the arena where aerospace standards are a starting point and random failures are unacceptable, I feel ARP stands alone as a primary engineering and manufacturing source for specialty and custom fasteners for use in motorsports.

It is important to realize that simply quoting an AMS (Aerospace Material Specification) number without strength and percentage of elongation numbers is meaningless. Statements that the use of a particular material will, in itself, result in extreme strength and resistance to fatigue can be misleading. In the world of high strength alloys, whether they are used for bolts or for landing gears, the manufacturing processes are at least as important as the material specification.



Some in our industry claim to inspect materials at the "molecular" level. In metallurgical terms, molecules are not necessarily part of the vocabulary. Our engineers tell us that talking about molecules is misleading. When reference is made to metal, it is typically in terms of atom structures. We routinely check metallurgical features microscopically. By the way, the same is true for claims of manufacturing to "zero tolerance."

"Our engineers tell us that this is technically unrealistic."

Smith: "How does the actual process work at ARP?"

"For each new design, we produce a number of prototype parts using different design aspects and sometimes different methods.

We inspect and test after each process, choose the best design and method of manufacture, and then freeze the design and write the manufacturing specification."

Smith: "You have mentioned the importance of fatigue resistance. Is there a difference in the procedures for strength and fatigue testing between aerospace and the specialty racing industry?"

"Yes. While the ultimate tensile strength testing is the same, fatigue testing is different. Aerospace fasteners are fatigue tested to the relevant specification of fluctuating tension load and number of cycles typically 130,000 cycles with the high tension load at 50% of the UTS and the low load at 10% of the high load. If all of the test samples last 85,000 cycles (per AMS 5842-D), the lot is accepted.

Even though racing fasteners are not continuously subjected to their maximum design load, at 18,000 rpm, 100,000 cycles takes just 5 minutes, thirty-four seconds. Except for drag racing, measured in seconds, no race lasts just 5 minutes. Therefore we consider this Aerospace Standard to be inadequate. At ARP, we fatigue test to elevated loads (10% above aerospace requirements) and to a minimum cycle life that exceeds 350,000 cycles. The majority of samples are routinely tested to one million cycles. During material development...and in the case of extremely critical new designs, we test to destruction.


Fatigue, tensile strength and Rockwell tetsing are all key parts of our material quality control process.

Thread rolling is the last mechanical operation in our manufacturing process. For each production run the thread rolling machine is shut down after a few parts. These parts are inspected for dimensional accuracy and thread quality, and are physically tested for both strength and fatigue before the run is continued. Random samples are inspected and tested throughout the run. Extremely critical components are individually inspected for dimensional integrity."

Smith: "What about out-sourcing?"

"Economics often dictate that many processes in the manufacture of aerospace fasteners are farmed out. In the early days, ARP began as an out-source thread rolling shop.

Over the years, however, we have found, through experience, that the only way to maintain the quality we require is to keep everything in-house. From heading through machining, grinding, heat-treat, thread rolling, and shot-peening to black oxide treatment we perform every operation in house on our own equipment with our own employees."

Smith: "Gary, One of the things that I am hearing is that every aspect of the manufacture of racing engine fasteners is more expensive than that of similar aerospace items."

"True, but the bottom line is that we have to look at the cost aspect of the very best fastener versus the cost aspect of a blown engine and a lost race. In the end, the manufacturing of fasteners for racing comes down to a matter of attitude; a refusal to accept published standards and procedures as the best that can be done and most of all a determination to learn and to make still better products."

A TRIBUTE TO ARP'S FOUNDATIONS

During the past 47 years, ARP has relied on the expertise of three individuals who contributed to our strong technological foundations. Their experience and knowledge covered three core areas that have been critical to ARP's success at designing and manufacturing the best fasteners in the industry: fastener stresses and engineering, practical use of chassis fasteners and pushing engine fasteners to their limits. We feel it is important to acknowledge these individuals who left their imprints on ARP – everyone who uses our fasteners benefits from the knowledge and experience they imparted before they left us. – Mike Holzapfel

Kenneth Foster

Dr. Foster had a Ph.D. in Engineering Mechanics from Cornell University and taught at several colleges. He was formerly the head of Stress & Dynamics at Hughes Aircraft, Space Systems division. He also worked on numerous projects with NASA.

Once he began working for ARP, Ken brought all those experiences to bear on the challenges of designing and engineering racing fasteners. Over the years, he was involved in examining all aspects of high-strength fasteners, always figuring out the balance between high-strength, ductility, fatigue and notch sensitivity. Ken was a huge asset to ARP and a friend to all of us here who worked with him.

Ken enjoyed a dynamic career as a consulting engineer and valued the relationships he created with colleagues and clients. Ken took great pride in his work and enjoyed sharing his knowledge and expertise with others. A teacher at heart, Ken showed great patience – whether explaining a complicated analytical process to another professional or tutoring neighborhood kids in basic algebra. Ken loved his work and his family, including his beloved wife Connie and their children and grandchildren. Active into his 80's, Ken was known as the Silver Streak at the high school track. An active community member, Ken was the leader of a prostate cancer support group, offering education and support to numerous men around the world.

Ken Foster, PhD, 1932-2014.

Consulting Engineer Ken Foster

Carroll Smith

Carroll Smith was a design and development engineer, a team manager, driver coach and all-around racing guru. And before that, he was known for his 30+ years of racing experience, driving in SCCA events, as well as on circuits in Europe including the Targa Florio and Le Mans.

Among his peers at the Society of Automotive Engineers, he served as a judge for the Formula SAE competition. One of his proudest honors was the Society's Excellence in Engineering Education award.

Carroll Smith was a race engineer and special motorsports consultant with Automotive Racing Products for more than decade. The pages of our catalog bear the mark of his enormous contributions to our efforts.

Here at ARP, as elsewhere, Carroll Smith's mission was simple. He was determined to impart the encyclopedic knowledge of racing and the machinery of racing that he learned during those decades on the world's racetracks, around those shops and among his engineering peers.

He left us at ARP with a significant engineering inheritance. Much of what we now know from Carroll will ensure we remain the world leader in the field of racing fasteners.

Carroll Smith passed away at his California home on May 16, 2003, from pancreatic cancer.

Legendary Race Engineer Carroll Smith

Smokey Yunick

For many years "Smokey" Yunick served as a valued tech consultant and spokesman for ARP. He was a popular host of our Tech Seminars at trade shows, and his knowledge of fasteners was truly astounding. Smokey passed away in 2001, but his wit and wisdom will live on.

Smokey never did anything related to racing halfway – he was constantly exploring and learning his entire life. He was fully involved in racing from the mid 40's through the late 70's. After that, he worked in his shop everyday, creating new engine designs and solving problems. We chose Smokey to be a spokesman and technical consultant for ARP because of his decades as one of the world's most innovative and prolific engine builders – and his ability to tell it straight.

During his racing years, fastener technology followed the "cut and try method." He tried going one size larger, he tried aerospace fasteners and he tried fasteners from various companies who claimed expertise. Through those learning experiences, he found that there were no solid solutions.

From the day Smokey visited our facilities and talked to our engineers, he realized that he had found what he was looking for: a company that was focused on building the best racing fasteners, with the engineering expertise, raw materials, manufacturing processes and quality control.

Smokey was a valued consultant and spokesman until his passing in 2001.

Hall of Fame Mechanic "Smokey" Yunick

There are literally hundreds of standards and specifications – for all types of applications, from bridges to rockets. None are as critical as those required for real-world motorsports applications. In an environment where lighter is faster there is clearly no room for redundant fasteners, like those found in military and aerospace applications. The mere nature of Motorsports requires designers to produce fasteners that are light; yet tough, fatigue-resistant and reliable beyond other acknowledged application standards. The design and production of fasteners, exclusively for racing, clearly involves many complex factors. Some are so unique and complex that no standards or design criteria exist. This means that everyone at ARP is entirely dedicated to the development and analysis of appropriate bolt designs exclusively for special applications. Our designs take into account the special loads that must be carried, the material selection, the manufacturing processes and the methods of installation required to deliver ARP quality and reliability.

"MOTORSPORTS FASTENER ENGINEERING for the NON-ENGINEER."

It is hoped that by providing an overview of the engineering, design and production techniques ARP applies daily, you – as the end user – will be better equipped to evaluate your initial fastener requirements, effectiveness and performance.

DESIGN PROCEDURES for AUTOMOTIVE BOLTS

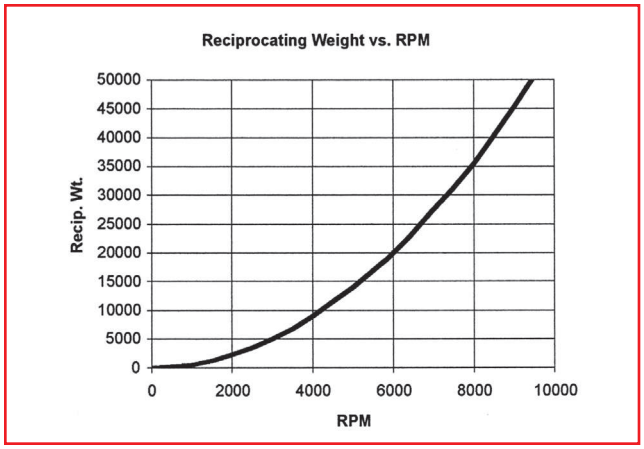
Presented by Dr. Kenneth Foster, PhD

The design of automotive bolts is a complex process, involving a multitude of factors. These include the determination of operating loads and the establishment of geometric configuration. The process for connecting rod bolts is described in the following paragraphs as an example.

The first step in the process of designing a connecting rod bolt is to determine the load that it must carry. This is accomplished by calculating the dynamic force caused by the oscillating piston and connecting rod. This force is determined from the classical concept that force equals mass times acceleration. The mass includes the mass of the piston plus a portion of the mass of the rod. This mass undergoes oscillating motion as the crankshaft rotates. The resulting acceleration, which is at its maximum value when the piston is at top dead center and bottom dead center, is proportional to the stroke and the square of the engine speed. The oscillating force is sometimes called the reciprocating weight. Its numerical value is proportional to:

$$\left(\text{Piston Weight} + \frac{\text{Rod Weight}}{3}\right) \times \text{Stroke} \times (\text{RPM})^2$$

It is seen that the design load, the reciprocating weight, depends on the square of the RPM speed. This means that if the speed is doubled, for example, the design load is increased by a factor of 4. This relationship is shown graphically below for one particular rod and piston.



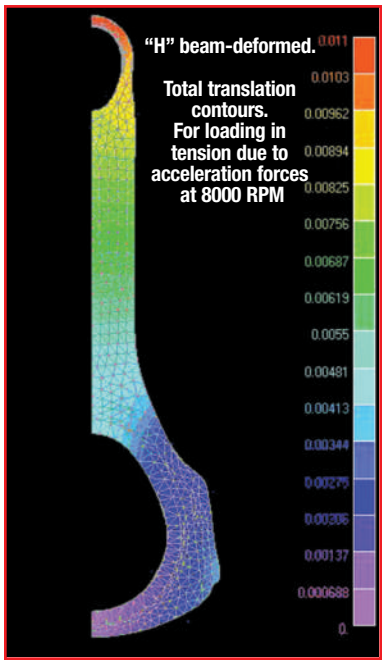
A typical value for this reciprocating weight is in the vicinity of 20,000 lbs. For purposes of bolt design, a "rule of thumb" is to size the bolts and select the material for this application such that each of the 2 rod bolts has a strength of approximately 20,000 lbs. (corresponding to the total reciprocating weight). This essentially builds in a nominal safety factor of 2. The stress is calculated according to the following formula:

$$\text{Stress} = \frac{\text{Force}}{\text{Area}} = \frac{\text{Recip.Wt.}}{\frac{\pi}{4}D^2}$$

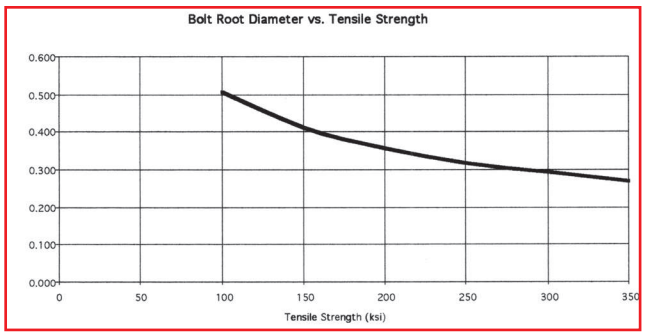
so that the root diameter of the thread can be calculated from the formula:

$$D = \sqrt{\frac{4 \times \text{Recip.Wt.}}{\pi \times \text{Allowable Stress}}}$$

This formula shows that the thread size can be smaller if a stronger material is used. Or, for a given thread size, a stronger material will permit a greater reciprocating weight. The graph *(see page 14)* shows the relationship between thread size and material strength.



It must be realized that the direct reciprocating load is not the only source of stresses in bolts. A secondary effect arises because of the flexibility of the journal end of the connecting rod. The reciprocating load causes bending deformation of the bolted joint (yes, even steel deforms under load). This deformation causes bending stresses in the bolt as well as in the rod itself. These bending stresses fluctuate



from zero to their maximum level during each revolution of the crankshaft.

The next step is to establish the details of the geometric configuration. Here the major consideration is fatigue, the fracture that could occur due to frequent repetition of high stresses, such as the bending stresses described above. Several factors must be considered in preventing fatigue; attention to design details is essential.

Fatigue failure is frequently caused by localized stress risers, such as sharp corners. In bolts, this would correspond to the notch effect associated with the thread form. It is well known that the maximum stress in an engaged bolt occurs in the last engaged thread. By removing the remaining, non-engaged threads, the local notch effect can be reduced. This leads to the standard configuration used in most ARP rod bolts: a reduced diameter shank and full engagement for the remaining threads. Providing a local fillet radius at the location of the maximum stress further reduces the local notch effect. Thus this configuration represents the optimum with respect to fatigue strength.

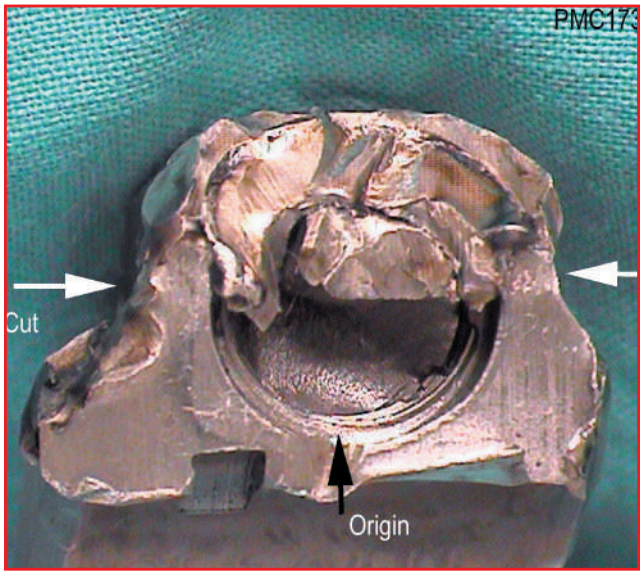
The reduced diameter shank is helpful in another sense. It reduces the bending stiffness of the bolt. Therefore, when the bolt bends due to deformation of the connecting rod, the bending stresses are reduced below what they would otherwise be. This further increases the fatigue resistance of the bolt. A typical bolt configuration is shown below.

Once the bolt configuration has been established, the manufacturing process comes into play. This involves many facets, which are discussed in detail elsewhere. Here, however, one process is of primary interest. With respect to bolt fatigue strength, thread rolling is a major consideration. Threads are rolled after heat treating. This process, which deforms the metal, produces a beneficial compressive stress in the root of the thread. It is beneficial because it counteracts the fluctuating tensile stresses that can cause fatigue cracking. If heat-treatment were to occur after rolling, the compressive stresses would be eliminated. This would therefore reduce the fatigue resistance of the bolt.

An additional factor must be taken into account in defining the bolt configuration: the length of engaged thread. If too few threads are engaged, the threads will shear at loads that are lower than the strength of the bolt. As a practical matter, the thread length is always selected so that the thread shear strength is significantly greater than the bolt tension strength.

This problem is especially important in bolts used in aluminum rods because of the fact that the shear strength of aluminum is much lower than the shear strength of steel.

Finally, although not a design parameter, the subject of bolt installation clamp load must be addressed. It is a fundamental engineering concept that the force in a bolt in an ideal preloaded joint will remain equal to the clamp load until the externally applied force exceeds the clamp load. Then the force in the bolt will be equal to the external force. This means that fluctuating external forces will not cause fluctuating forces in a preloaded bolt as long as the clamp load exceeds the external force. The result is that fatigue failure will not occur. In a non-ideal joint, such as in a connecting rod, the bolt will feel fluctuating stresses due to fluctuating rod distortions. These are additive to the clamp load, so that fatigue could result. In connecting rods, precise clamp loads are required because if they are too low, the external forces



(the reciprocating weights) will exceed the clamp load, thus causing fatigue. If they are too high, they provide a high mean stress that combines with the fluctuating stresses due to rod distortion. Again, fatigue is promoted. The objective, then, is to preload a bolt so that it just exceeds the external load, and no higher. To sum up: both insufficient and excessive clamp loads can lead to fatigue failures.

Appropriate clamp loads are specified for each ARP bolt. These clamp loads can be attained in a connecting rod by applying proper torque using a torque wrench or by measuring the amount of stretch in the bolt using a stretch gauge (it is known that a bolt stretches in proportion to the tension in it). The torque method is sometimes inaccurate because of the uncertainty in the coefficient of friction at the interface between the bolt and the rod. This inaccuracy can be minimized by using the lubricant supplied by ARP.

Other factors, equally as important as design, include material selection, verification testing, processing, and quality control. These aspects of bolt manufacturing are discussed elsewhere in this document.

The foregoing discussion concentrated on the design of bolts. The same considerations apply in the design of studs.

Recognizing Common Failures

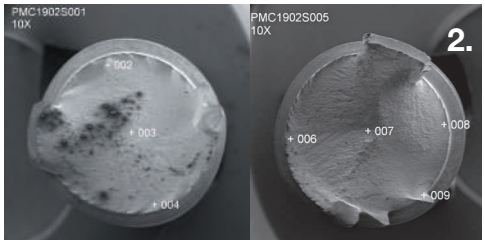
There are six types of metallurgical failures that affect fasteners. Each type has unique identifying physical characteristics. The following chart is designed to be used like a spark plug reading chart to help analyze fastener failures. While few of us have access to sophisticated analysis equipment, a standard Bausch and Lomb three lens magnifying glass will generally show 98% of what we want to see. Several of the photos below have been taken utilizing a Scanning Electron Microscope (SEM) and are presented to simply illustrate typical grain configurations after failure.

1. Typical Tensile Overload

In a tensile overload failure the bolt will stretch and "neck down" prior to rupture. One of the fracture faces will form a cup and the other a cone. This type of failure indicates that either the bolt was inadequate for the installation or it was preloaded beyond the material's yield point.

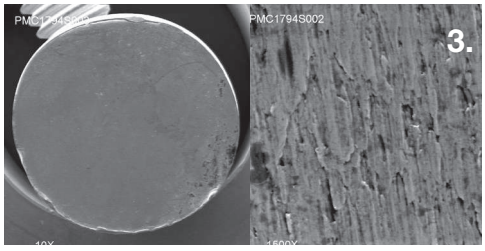
2. Torsional Shear (twisting)

Fasteners are not normally subjected to torsional stress. This sort of failure is usually seen in drive shafts, input shafts and output shafts. However we have seen torsional shear failure when galling takes place between the male and female threads (always due to using the wrong lubricant or no lubricant) or when the male fastener is misaligned with the female thread. The direction of failure is obvious and, in most cases, failure occurs on disassembly.



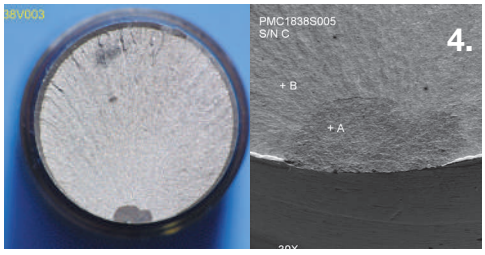
3. Impact Shear

Fracture from impact shear is similar in appearance to torsional shear failure with flat failure faces and obvious directional traces. Failures due to impact shear occur in bolts loaded in single shear, like flywheel and ring gear bolts. Usually the failed bolts were called upon to locate the device as well as to clamp it and, almost always, the bolts were insufficiently preloaded on installation. Fasteners are designed to clamp parts together, not to locate them. Location is the function of dowels. Another area where impact failures are common is in connecting rod bolts, when a catastrophic failure, elsewhere in the engine (debris from failing camshaft or crankshaft) impacts the connecting rod.



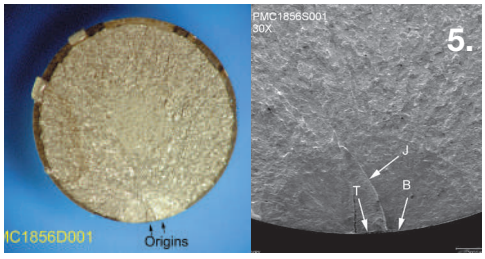
4. Cyclic fatigue failure originated by hydrogen embrittlement.

L-19, H-11, 300M, Aeromet 100 and other similar high strength "quench and temper" steel alloys, popular in drag racing, are particularly susceptible to "hydrogen embrittlement." Extreme care must be exercised when handling these materials, and kept well oiled at all times to prevent hydrogen gas and moisture from accumulating and attacking the metal. This type of failure is easily mistaken with Stress Corrosion. The spot on the first photo is the origin of the crack and the original stress riser. The second photo is a SEM photo at 30X magnification.



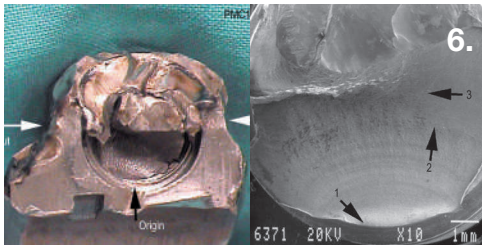
5. Cyclic fatigue cracks propagated from a rust pit (stress corrosion)

Again, L-19, H-11, 300M and Aeromet 100, are particularly susceptible to stress corrosion, while 8740 and ARP2000 alloys are less susceptible to stress corrosion. These materials must be kept well oiled at all times and never exposed to moisture including sweat. The photos illustrate such a failure. The first picture is a digital photo with an arrow pointing to the double origin of the fatigue cracks. The second photograph at 30X magnification shows a third arrow pointing to the juncture of the cracks propagating from the rust pits. Inconel 718, ARP 3.5 and Custom age 625+ are immune to both hydrogen embrittlement and stress corrosion.



6. Cyclic fatigue cracks initiated by improper installation clamp load

Many connecting rod bolt failures are caused by insufficient clamp load. When a fastener is insufficiently preloaded during installation the dynamic load may exceed the clamping load resulting in cyclic tensile stress and eventual failure. The first picture is a digital photo of such a failure with the bolt still in the rod. The white arrows indicate the location of a cut made to free the bolt and the black arrow shows the origin of the fatigue crack. In the second picture – an SEM photo at 30X magnification clearly shows (1). The origin of the failure and the telltale "thumbprint" or "beach mark" (2). Tracks of the outwardly propagating fatigue cracks and (3). The point where the bolt (unable to carry any further load) breaks-away.



The following material is intended to provide a brief overview of the metallurgical considerations that, daily, influence the design and production of the most reliable fasteners in motorsports. It is hoped that a simple understanding of the knowledge and commitment required to produce this reliability will make your future fastener decisions much, much easier.

Metallurgy for the Non-Engineer

By Russell Sherman, PE

1. What is grain size and how important is it?

Metals freeze from the liquid state during melting from many origins and each one of these origins grows until it bumps into another during freezing. Each of these is a grain and in castings, they are fairly large. Grains can be refined (made smaller); by first cold working and then by recrystallizing at high temperature. Alloy steels, like chrome moly, do not need any cold work; to do this – reheat treatment will refine the grain size. But austenitic steels and aluminum require cold work first. Grain size is very important for mechanical properties. High temperature creep properties are enhanced by large grains but good toughness and fatigue require fine grain size – the finer the better. All ARP bolts and studs are fine grain – usually ASTM 8 or finer. With 10 being the finest.

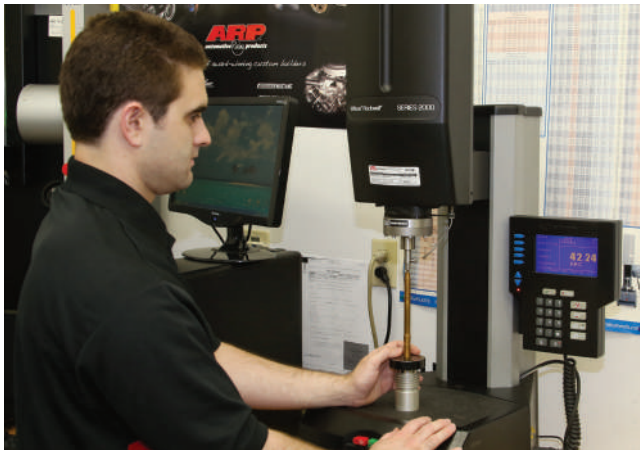
2. How do you get toughness vs. brittleness?

With steels, as the strength goes up, the toughness decreases. At too high a strength, the metal tends to be brittle. And threads accentuate the brittleness. A tool steel which can be heat-treated to 350,000 psi, would be a disaster as a bolt because of the threads.

ARP engineers use "Scanning Electron Microscopic" inspection capable of detecting all elements in the periodic table with atomic numbers greater than 5 – permitting the acquisition of high resolution imaging.

3. Define Rockwell as we use it. Why do we use the C scale?

A man named Rockwell developed a means of measuring hardness of metals which was superior to other methods. A Rockwell hardness tester measures the depth of penetration into the metal when a load is applied. For hard materials, a diamond penetrator is used. For soft material, small balls are used – 1/16″ or 1/8″ diameter-and the machine measures the depth. We use the C scale for the 120,000 psi strength level and above. The C scale uses the greatest load – 150 Kg. The A scale uses only a 60 Kg. load but can be correlated with C. It is necessary to use the A scale for thin sheets because using the 150 Kg load would cause the diamond to penetrate almost all the way through.



4. What is "micro hardness?"

Some parts are too small to be Rockwell hardness tested. They are placed in hard plastic and a microscope is used to place a small indenter into the metal. Using the microscope the length of the impression is measured.

5. How does modulus of elasticity refer to our products?

The modulus of elasticity of all alloy steels is exactly the same – 30,000,000 psi. This is true whether it is heat-treated or not – whether it is 100,000 psi strength level or 300,000 psi. Metals are like a spring – put a load on them and they will stretch – double the load and they will stretch double. This is important in connecting rod bolts because by measuring the stretch we really are measuring the load. Load is what is important and measuring stretch of a given size and configuration bolt will indicate how much load is stretching the bolt.

6. What are metal carbides and what is their significance?

The strength of all alloy and carbon steels is derived from the metal carbides formed during heat treat. The carbon in steels combines with iron, vanadium and with chromium, as well as many other metal alloy additions to form compounds, which are a very hard phase within the iron matrix. Tool steels generally have high carbon content (above .8%) and can be made very hard – but brittle.

7. What exactly is chrome?

Chrome is the metal chromium and is typically used for plating because it is shiny. It is also used as an alloy addition to iron to form a stainless steel. A stainless steel must contain at least 12% chromium, but these lean chromium steels can still show some rust on the surface. Using 18% chromium will make a more rust resisting stainless. Exposing any stainless to oxygen at temperatures above 1200˚F will cause the chromium to join the oxygen and therefore leave the surface depleted in chromium. If it falls below 12% the surface will show rust.

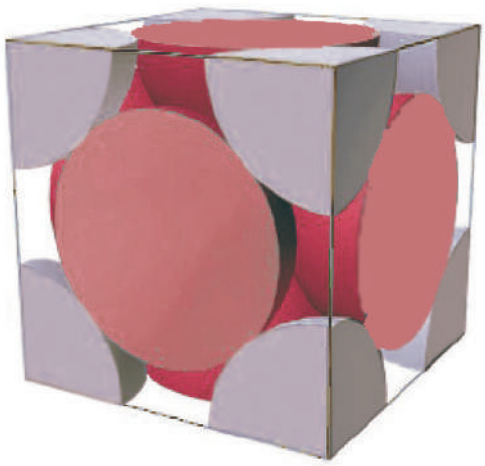
8. What does it mean when a broken part looks crystallized?

When the fracture face has a rocky appearance it is because the material had a very large grain structure. Basically the grain grew during manufacturing due to poor technique and handling. A properly processed part will have a silky smooth appearance which is an indication of fine grain size. So crystallization does not occur as a result of load or fatigue – it was present in the material at the time of manufacture.

9. Define "precipitation hardening" and "phase change."

The precipitation hardening comes from microscopic precipitation of hard phases which serve to keep rows of atoms from moving under stress. Some metals undergo a change in atomic structure at high temperature. Alloy steels, which are bcc at room temperature, become fcc at temperatures above 1400°F. This switch over is called a phase change. When cooled down they revert back to the bcc structure. Management of this phase is extremely critical and ARP maintains a complete in-house heat-treatment facility. It's the only way we can assure material integrity.

10. What does a "face centered cubic" (fcc) atom arrangement look like? How many atoms?

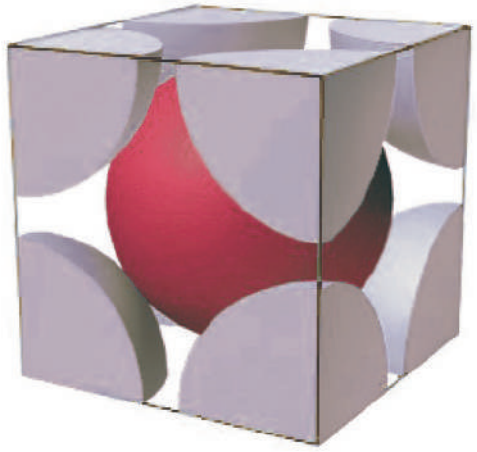


A face centered cubic arrangement of atoms (austenitic) looks like a Las Vegas die with a five showing on all six faces. This can't be seen visually by any type of microscope.

The number of atoms in any one cubic cell would be 14 – these do not stand alone but are attached to other cells which share some of the atoms.

11. How does a "body center cubic" (bcc) atom look? How many atoms?

The body center cubic structure would look like a die with a four on all faces and one atom in the center of the cube. The atomic arrangment of pure iron is bcc at room temperature and does not change until the temperature reaches 1674˚F. At this temperature it changes to austenite which is face center cubic (fcc). The addition of carbon to the iron lowers this transition temperature. This is the basis for heat treatment of steel. If the iron carbon alloy (steel) is quenched from the fcc field, the structure becomes martensite, a very hard strong condition.



12. What does a "stainless steel" atom arrangement look like?

The 300 Series stainless steels are face-centered cubic and are not heat-treatable. Heavy reduction (power dumping), in the cross section, during forging causes a dramatic increase in strength. This is the process ARP uses to make 304 Stainless reach 170,000-190,000 psi UTS.

13. How do the space lattice or crystal structures appear?

All grains or crystals are composed of atoms bound together in a definite pattern. These structures are called space lattice or crystal structures. At a fixed temperature, the atoms in an array are spaced a definite distance from one another, although they vibrate about their mean position. Even though atoms are actually not held together in this manner, it is helpful to picture the crystals as a 3-dimensional latticework connected by imaginary lines. Metallurgists who primarily study ferrous metal are interested in only two basic crystal structures: bcc (body-centered cubic) and fcc (face-centered cubic).

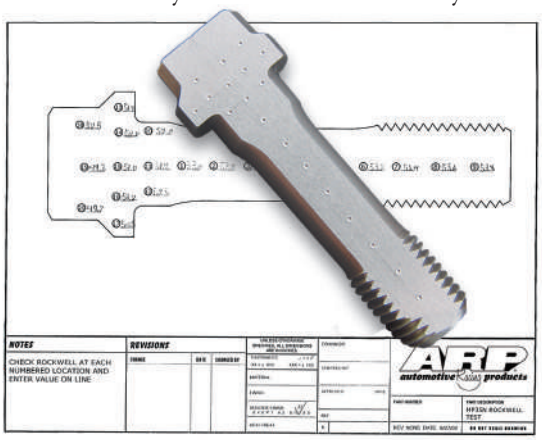
14. What are the metallurgical ramifications of "cold heading" vs. "hot heading?"

Cold heading is a more efficient process and allows the part to be cold worked. The temperatures used for hot forging will reduce the effect of work hardening. This is important for metals which derive much of their strength from the cold work. Cold heading produces a better product than hot heading. The number and force of the blows of the cold heading machine can make a significant difference in the quality of the end product. Excessive numbers of blows can lead to voids in the bolt head. ARP, in fact, holds significant patents on cold

heading procedures for the higher nickel and cobalt based alloys.

Our patented process begins with a cold drawn wire that can be cold forged. The process work hardens the head and the under head area to the desired hardness. We then power extrude the front end to achieve the reduction and hardness in the shank resulting in a bolt with even strength and hardness from end to end.

In a typical aerospace manufacturing process, these alloys are hot headed from bars, reduced in diameter from 48 to 50% by cold drawing, resulting in a hardness of about Rockwell C46 which is too hard for cold heading. So, the blanks are locally induction heated in a very narrow temperature envelope and hot headed. The process reduces the hardness immediately in the area under the head approximately 3 to 5 points on the Rockwell C scale. Subsequent heat treatment does not restore this partially annealed area to full hardness and strength. The final result is a relatively soft-headed bolt. Therefore, this process is not used by ARP.



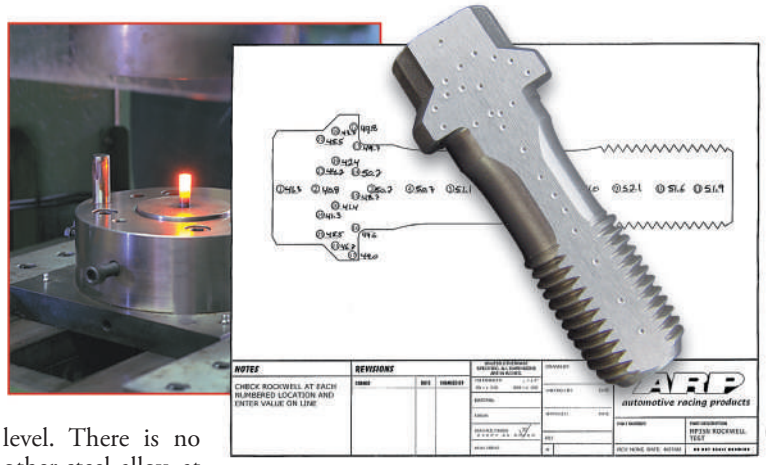
15. What is the difference between the usage of "bar" material vs. "wire?"

Bars produced by the mill in straight sections are normally shipped in 12 foot lengths. Wire is supplied in continuous coil form and is hundreds of feet in length. Bars are cut to length and the bolts are hot forged from these lengths. Wire on the other hand is fed into a cold header in a continuous manner.

16. What exactly is A286? And to what is it compared?

A286 is a 25% nickel and 18% chromium alloy with smaller amounts of titanium and aluminum, which precipitate during aging – after solution treatment. It is a true stainless steel due to the high chromium and it is austenitic due to the high nickel. A286 was developed as a high temperature alloy for use in pre-jet aircraft engines. The strength level was only 140,000 psi, but it had good high temperature strength and exceptional toughness, making it an excellent fastener alloy.

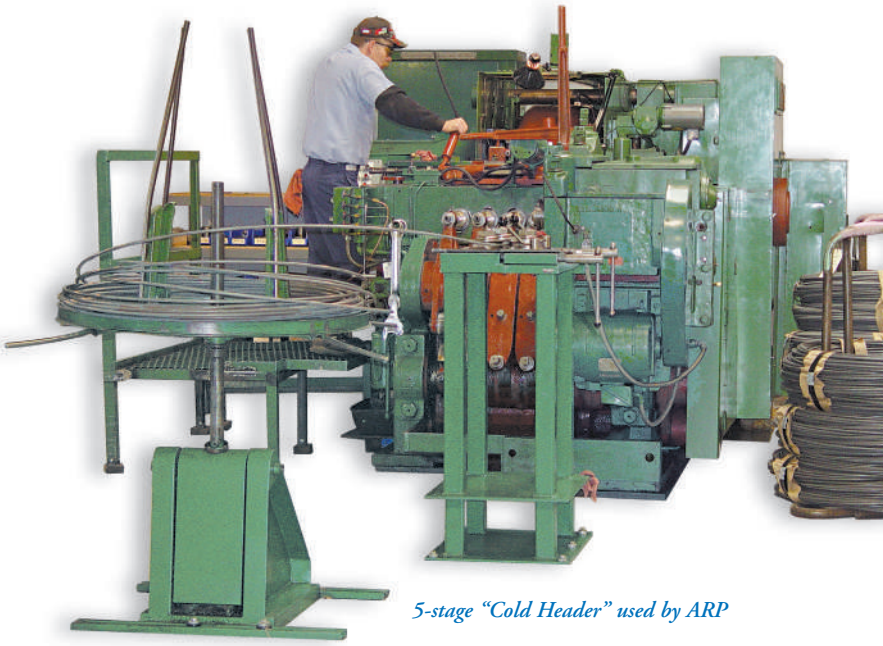
Rocketdyne became interested in it for rocket engines being developed in the early 60's. But they required higher strength. We were part of the team that developed a thermo-mechanical method to produce a strength level of 200,000 psi. This involved severe cold reduction after solution treatment and before aging. An aerospace material spec (AMS) was then written requiring this treatment for 200,000 psi strength



level. There is no other steel alloy, at this level, which can match A286 for corrosion resistance, toughness or bolt fatigue strength.

17. Define "Power Dump."

This is a term used to define the heavy extrusion of the fastener body during forging. The part is forced into a die much smaller than the blank thereby causing a severe reduction in cross section area. This reduction of the cross sectional area is accompanied by an increase in length because metals



5-stage "Cold Header" used by ARP

can't be compressed. However, power dumping or reduction, delivers a significant increase in strength properties and is part of the patented process we use to produce fasteners from 304 stainless steel with 170,000-190,000 psi UTS and AMS 5844 (ARP 3.5) with ultimate tensile strengths in the 260,000-280,000 psi UTS range with outstanding fatigue.

18. What is the difference between 4130 and 8740 chrome moly?

Both are alloy steels with similar chemistry. The 4130 has only .3% carbon and can't be hardened as high as 8740, which has .4% carbon. Also, 8740 has about .45% nickel and 4130 has none. Both have moly (most alloy steels have moly). The chromium content of 4130 is slightly higher, .95% instead of .55%. However, 8740 is generally considered to have slightly better toughness due to the nickel.

19. What exactly is ARP2000 and how does it compare to 8740 and 4340?

ARP2000 is a heavily alloyed martensitic quench and temper steel. It has excellent stability at high temperatures. But most important, ARP research discovered that in addition to temperature stability it has excellent notch toughness in the higher strength ranges and is alloyed to be tempered to Rockwell C45/47. 8740 and 4340 can be tempered to the same hardness. But, the tempering temperature would yield material in the "temper brittle zone" (between 500° and 700°F), producing significant notch sensitivity. ARP2000 is tempered above that temperature range and has a strength between 200,000 and 220,000 psi.

20. How does L19 compare to ARP2000?

L19 differs from ARP2000 in that it is a vacuum melted alloyed steel with sufficient chromium and carbon to achieve high hardness (but below the level of a stainless steel). L19 is air-cooled from the hardening temperature in a way that does not require an oil quench to achieve full hardness and is tempered to assure full conversion to martensite between 1025°F and 1075°F. L19 is a proprietary material capable of achieving strengths of 220,000/230,000 or 260,000/270,000 psi as may be required. Both L19 and ARP2000 steels are modified bcc (martensite) at room temperature. L19 has the same advantage as ARP2000 in that a high strength is obtained at a high tempering temperature. This alloy is easily contaminated and requires special handling.

21. What is AMS5844? And how does it compare to AMS5842E?

Both of these alloys are considered multiphase, non-steel, austenitic materials. Both derive their strength (260,000 psi) from severe cold work (48/50%) which raises the hardness from Rockwell C 46 up to 49/50. The AMS5842 (for MP159) was developed much later than AMS5844 (for MP35) in order to increase the usable service temperature by about 100° so it could be used in hotter sections of jet engines.

22. Provide a brief overview of the metallurgy required to produce AN, AMS & other Aerospace type fasteners.

All alloy steel fasteners are essentially manufactured by the same process. Incoming steel from the mill is forged to specification, then heat treated and thread rolled. Regular AN bolts are forged to size and are normally not precision ground. They may even have threads on them when heat treated.

Expensive aerospace fasteners are more likely suited for some motorsport applications. These fasteners require precision forging, careful heat treatment and then precision grinding, fillet rolling under the head and a great deal of skill in thread rolling.

23. What is moisture tolerance and how or where is it important?

Non-stainless steels have low moisture tolerances because the water attacks the steel by forming iron oxide (rust). Therefore none of these have a high tolerance for moisture and the surface must be protected by oil or plating. ARP maintains an in-house plating facility to assure all non-stainless product is delivered 100% corrosion free.

24. What metallurgical issues cause common failures?

The most common cause of failure of connecting rod bolts (and wheel bolts) is too little induced load (stretch) during installation. This allows the alternating load to impose cyclic loading on the bolt. Over tightening is also another cause, because the induced stress is too close to the yield point.

25. How do the various standards compare to each other with regard to fasteners? Where are the standards?

A standard fastener is one that can be referenced from a nationally or internationally recognized standards document and may be produced by any interested manufacturer.

In all fastener categories the custodian of each group (MS-AN-NAS) has tried to standardize the processing of specifications such as heat-treating per MIL-H-6875, cadmium plating per AMS QQ-P-416, passivation per AMS QQ-P-35 and testing, per MIL.-Std 1312, among others.

ASTM stands for the American Society for Testing Materials, a large industry funded group used to write standards for many materials and testing procedures. It compares directly to **AMS (Aerospace Material Standard)**.

In the case of ARP, 100% raw material is purchased to AMS specification – with the exception of special alloys used in proprietary products. All materials are carefully examined for proper chemistry – and finally, periodic examination by an independent laboratory. ARP consistently strives to exceed industry specifications for quality and product management.

MS (Military Standards): MS bolt specifications cover a wide range of fastener hardware, high strength bolts, nuts and washers with spec's for materials and processing. MS fasteners have various tensile strengths.

AN (Army-Navy) Specifications: Generally lower strength bolts and studs primarily in the 125,000 psi UTS range. AN also covers a wide range of nuts, washers and other hardware.

NAS (National Aerospace Standard): These specifications cover fasteners in the strength ranges 160,000/180,000/200,000 psi UTS.

ISO (International Standards Organization):

ISO 9001-94: is a quality control system designed for manufacturers with design control.

ISO 9002-94: is a quality control system designed for manufacturers who build parts to customer specifications, and do not have design control.

ISO 9001:2015: is current ISO system well suited for manufacturers with engineering design functions, drawing control and statistical techniques to achieve demanding quality requirements.

AS (Aerospace Standard):

AS9100:2016: is an Aerospace Quality Management System that includes and expands on all ISO requirements with focus to further improve product quality and meet or exceed customer requirements.

MATERIAL SPECIFICATIONS

ARP manufactures fasteners from a wide assortment of materials ranging from popular stainless steel and 8740 chrome moly to exotic alloys that have been developed to handle space travel. You should also know that there are grades within specific alloys. For example, 8740 is available in four grades: 1. SDF (guaranteed seamless and defect free). 2 CHQ (cold head quality). 3. Aircraft. 4. Commercial. ARP uses only the first two (SDF and CHQ), even though they cost more than double "Aircraft" quality.

STAINLESS STEEL: Ideally suited for many automotive and marine applications because stainless is tolerant of heat and virtually impervious to rust and corrosion. ARP "Stainless 300" and Custom 450 materials are specially alloyed for extra durability. Both are polished using a proprietary process to produce a beautiful finish. Tensile strength is typically rated at 170,000-190,000 psi.

8740 CHROME MOLY: Until the development of today's modern alloys, chrome moly was popularly considered a high strength material. Now viewed as only moderate strength, 8740 chrome moly is seen as a good tough steel, with adequate fatigue properties for most racing applications, but only if the threads are rolled after heat-treatment, as is the standard ARP production practice. Typically, chrome moly is classified as a quench and temper steel, that can be heat-treated to deliver tensile strengths between 180,000 and 210,000 psi.

ARP2000®: ARP2000 is an alloy steel that can be safely heat treated to a higher level, producing a greater strength material than 8740. While 8740 and ARP2000 share similar characteristics – ARP2000 is capable of achieving a clamp load at 220,000 psi. ARP2000 is used widely in short track and drag racing as an up-grade from 8740 chrome moly in both steel and aluminum rods. Stress corrosion and hydrogen embrittlement are typically not a problem, providing care is taken to protect the parts from moisture and the parts are kept well-oiled.

L19®: This is a premium steel that is processed to deliver superior strength and fatigue properties. L19 is a very high strength material compared to 8740 and ARP2000 and is capable of delivering a clamp load at 260,000 psi. It is primarily used in short track and drag racing applications where inertia loads exceed the clamping capability of ARP2000. Like most high strength, quench and temper steels – L19 requires special care to avoid hydrogen embrittlement. This material is easily contaminated and subject to stress corrosion. It must be kept well-oiled and not exposed to moisture.

AERMET®: With a typical tensile strength of 290,000-310,000 psi, Aermet is a new martensitic super-alloy that is stronger and less expensive than the super-alloy austenitic materials that follow. Because it is capable of achieving incredibly high clamping loads, it is ideal for short but extreme environments like top fuel, funny car and some short track applications. Although Aermet is a maraging steel that is far superior to other high strength steels in its resistance to stress corrosion, it must be kept well-oiled and not exposed to moisture.

INCONEL 718: A nickel based material that is in the high temperature, super-alloy class, it is found to be equally suitable in lower temperature applications. This material delivers tensile strengths in the 210,000-230,000 psi range and exhibits improved fatigue properties. Best of all, Inconel 718 is completely immune to hydrogen embrittlement and corrosion.

ARP3.5® (AMS5844): While similar to Inconel 718, these super-alloys are found in many jet engine and aerospace applications where heat and stress attack the life of critical components. The high cobalt content of this alloy, while expensive, delivers a material with superior fatigue characteristics and typically tensile strength in the 260,000-280,000 psi range. The immunity to hydrogen embrittlement and corrosion of these materials is a significant design consideration. These materials are primarily used in connecting rods where extremely high loads, high RPM and endurance are important factors – Formula 1, NASCAR and IRL applications.

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 to soon replace MP-35 as the material of choice in the high strength, super-alloy field. Typical tensile strength is 260,000-280,000 psi.

TITANIUM: ARP now offers special order fasteners made of an alloy (Ti6Al-4V) that is specially heat-treated (a process developed by ARP's own Russ Sherman) and provides superior strength to other titanium alloys employed in racing and aerospace. The material has a nominal tensile strength of 180,000 psi, and is very corrosion resistant. The main advantage of titanium, of course, is its weight – which is about 40% lighter than a comparable fastener made of steel. Head studs and accessory bolts are ideal applications for this lightweight material.

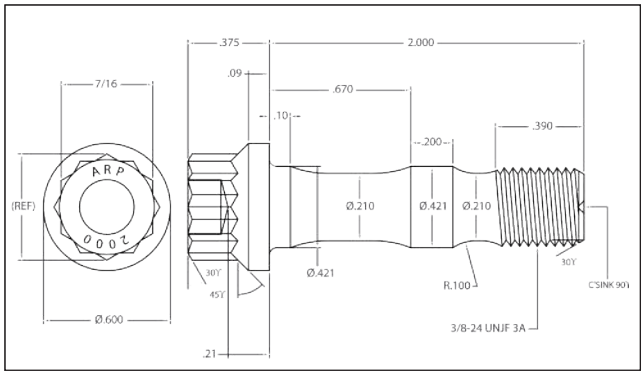
QUICK REFERENCE GUIDE TO MATERIALS USED IN FASTENERS

MATERIAL	USE?	YIELD STRENGTH	TENSILE STRENGTH	USED FOR
Grade 5	**No**	90,000 psi	120,000 psi	Accessory bolts & studs
Grade 8	**No**	120,000 psi	150,000 psi	Accessory bolts & studs
"Stainless 300"	Yes	140,000 psi	170-190,000 psi	Accessory bolts & studs
Custom 450®	Yes	150,000 psi	170-190,000 psi	Accessory bolts & studs, head bolts
8740 chrome moly	Yes	180,000 psi	190,000 psi	Rod bolts, head & main studs & bolts
A286	Yes	170,000 psi	200,000 psi	Head bolts, accessory bolts
ARP2000®	Yes	200,000 psi	220,000 psi	Rod bolts, head & main studs
L19®	Yes	200-230,000 psi	260,000 psi	Connecting rod bolts
Inconel 718	Yes	190-210,000 psi	210-230,000 psi	head bolts, case studs & bolts
Custom Age 625+	Yes	235-255,000 psi	260-280,000 psi	Head studs, connecting rod bolts
ARP 3.5®	Yes	220-250,000 psi	260-280,000 psi	Connecting rod bolts
AerMet®	Yes	260,000 psi	290-310,000 psi	Special products
Titanium	Yes	160,000 psi	180,000 psi	Head studs, accessory bolts

YOU CAN GET ARP FASTENERS MADE TO YOUR REQUIREMENTS!

The following pages in this catalog detail the vast number of "off the shelf" fasteners available from ARP. However, it's important for you to know that a significant amount of ARP's business comes from the development and manufacture of custom fasteners. For example, many top Formula 1 and IndyCar builders and race teams have come to rely on ARP for a myriad of special purpose fasteners. Many of these have been developed on a proprietary basis, and we cannot go into details about "what" is being manufactured for "whom" by ARP. But suffice to say that ARP has established a reputation within the racing industry for doing cutting edge R&D and following it up with fasteners made to the most stringent quality control standards on the planet. ARP also "private labels" a number of special fasteners for various manufacturers in the performance industry.

8740 ARP2000 L19



ARP can custom manufacture fasteners from nearly a dozen different materials, with tensile strengths ranging from 170,000 PSI to 310,000 psi. By way of example, we have made cylinder head studs for the same application from 8740 chrome moly, our own ARP2000 and L19.

ARP's in-house R&D and manufacturing capabilities allow for the design and manufacturing of custom fasteners to your specific application. Serious inquiries from members of the high performance industry are always welcome. Look to ARP to provide effective solutions to all your fastener needs!

Custom-Made ARP Titanium Studs & Bolts

One of ARP's best-kept "secrets" is the company's deep involvement in the manufacture of titanium fasteners. As a matter of fact, ARP's metallurgist, Russ Sherman, literally "wrote the book" when he developed the original procedures for the heat treatment of the most popular titanium alloy in use today (Ti6Al-4V), and presented the research data to the American Society for Metals. Sherman's procedure of solution-treating, warm processing and aging brings the titanium to strength levels never before achieved, and has also been instrumental in setting new standards for the aerospace industry.

This particular titanium alloy and process lends itself well to a number of racing applications, including head studs and accessory fasteners. Of course, the primary advantage of using titanium instead of steel is weight; titanium is about 40% lighter. The material ARP uses has a tensile strength of 180,000 psi, comparable to heat-treated chrome moly – but about half the weight.

ARP stands ready to manufacture titanium fasteners cus-tom-made to your specifications.

Head Fastener Measurement Sheet

Today, there are literally dozens of different cylinder head and engine block combinations for the more popular applications, and new offerings coming out all the time. It is virtually impossible for ARP's engineering staff to obtain detailed information from all of these various sources, so it may be necessary for customers to calculate exactly what they have so the correct cylinder head studs or bolts are used. Whether it's a Chevrolet Small Block or a Honda VTEC, the procedure remains the same.

The illustration below shows the variables that come into play when determining the proper fastener for a particular application. Some cylinder heads have different column heights and additional variables come into play when using aftermarket engine blocks. It is therefore critical that you determine exactly how many different bolt/hole combinations exist for the cylinder head installation.

RECOMMENDED TOOLS

1) a properly calibrated caliper that will measure internal and external diameters, as well as depth.

2) Some modern heads have recessed spot faces and may require extended tip internal calipers for B and D.

3) an SAE or metric thread gage.

HINTS

At least one head should be removed from the engine and placed on a flat surface.

Repeat to ensure accurate measurements.

All holes should be checked to determine if all are the same. Use separate copies of this sheet as needed.

List all inch measurements to 3 decimal places (X.XXX) and all mm measurements to 1 decimal place (YYY.Y)

Total Hole Count _____ Holes with these dims _____

Sheet _____ of _____ for this engine

Head Counterbore Depth

A

use depth gauge

Stud/Bolt Hole Depth

C

from bottom of counterbore to bottom of head - use depth gauge with head on a flat, solid surface

Thread Start Depth

F

from deck to start of threads - use the depth rod to measure to the top of threads

Thread Stop Depth

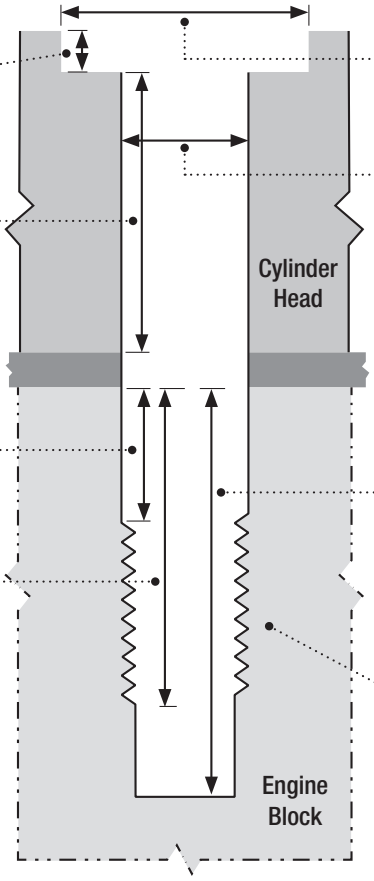
G

from deck to bottom of threads - use the depth bar to extend to the bottom of the threads

Calculated Thread Length

J

subtract F from G



Head Counterbore/Spot Face Width

B

Stud/Bolt Hole Diameter

D

use an internal or extended tip internal calipers

Head Gasket Thickness

E

measure the thickness of the gasket

Block Hole Depth

from deck to bottom of hole

H

clean any debris from bottom of hole, use the depth rod to extend to the bottom of the hole, take several measurements

Thread Size & Pitch

I

use an SAE or metric thread gauge on the bolt threads if you do not have extended thread gauges

Original Bolt Info optional

Underhead Length

Head Height

Collar Diameter

Are there any clearance issues around the bolt head?
(use another sheet to explain or sketch)

ARP Head Stud Measurement Sheet - rev 07/2019

GLOSSARY OF TECH TERMS

Austenitic: Refers to the atomic arrangement of some metals, such as nickel based alloys, and some steels with about 18% chromium. This atomic arrangement is called "face centered cubic." Austenitic steels can not be heat treated, but can be strengthened by cold working.

CHQ: A term used to grade heading wire and stands for "cold heading quality." This grade is superior to both Commercial and Aircraft quality.

Clamp Load: The tensile load a fastener generates when torque is applied. Also referred to as preload.

Torque Cycle or Pull: A torque cycle or pull is described as one tightening and one loosening (ON/OFF) process of a fastener and is the same as one installation and one removal of a fastener.

Fatigue: The process by which failure is caused after many repetitions of loads smaller than the ultimate strength of the material.

Ferritic: Refers to steels with an atomic arrangement different from austenite and martensite. These steels are not strong and the widest use is in steam power plants and accessory fasteners made by some companies, because they are able to withstand wet environments. Newer steels such as ARP300 and A286 are far superior.

Hydrogen Embrittlement: This condition results from the accumulation of hydrogen gas in the atomic structure of the metal. This gas flows to the point of high stress (stress risers) and causes microscopic cracks. The hydrogen then flows to the "new" crack tip and causes it to crack further. In this way the crack moves across the part, because the crack-tip IS the stress riser. Finally the crack gets so large that the section is not large enough to support the load. No hydrogen embrittlement can take place without tensile stress. ARP employs a baking process that purges all hydrogen gas from the steel.

Knurling: A process of creating serrations in a part by rolling a die, under pressure, against the part. Normally these serrations are very sharp and can create cracks and ARE stress risers. The process is used on knobs so the user can get a firm grip. But in the case of fasteners, the body can be knurled so the part can be forced into and retained in an irregular hole – stress risers and all.

Maraging: Refers to steels that are a low carbon version of martensitic steels, specially alloyed so that the martensite is not hard. These steels can be worked in the quenched condition and then be hardened by low temperature aging. The strength comes from the formation of complex metal carbides.

Martensitic: Refers to atomic arrangement and in the case of steels, is a modified body centered cubic structure. These steels can be heat-treated because martensite is iron carbide, which is very hard. However, these steels can be hydrogen embrittled and will rust. Generally, martensite normally refers to metal structures which are formed by quenching from high temperature.

MS21250: A military specification for a 12-point, 180,000 psi bolt which specifies the fatigue load required for testing every size.

Notch Sensitivity: Refers to the ability of a metal to withstand the increased stress at a notch. Some materials, such as glass, crack very easily if notched. While others, such as soft gold or tin stretch out under stress – even with a notch. Normally, the stronger the steel, the more likely it is to break quickly at the notch. "Toughness" is wanted because this is associated with opposite of notch sensitivity. Austenitic metals are usually less notch sensitive than martensitic steels of the same strength levels.

OAL: Means "Over All Length."

Clamp Load Scatter: A term used to describe the variation in clamp load a fastener generates due to fluctuating levels of friction from one torque cycle to subsequent cycles. Clamp load scatter generally reduces after multiple cycles because the friction levels out and becomes more consistent.

Qualified Products List: A government requirement that simply mandates that bolts be manufactured only by companies which have qualified by making bolts that have been submitted for testing and approval to a government agency. ARP has qualified for this list.

Quench & Temper: A method of heat-treating martensitic steels. The parts are heated into the austenitic range (usually above 1450˚F) then quenched into water or oil. This leaves the part in a very hard martensitic condition which then must be tempered by heating at lower temperatures (between 350˚F and 1200˚F), depending upon the steel and strength desired.

Reciprocating Load: The acceleration force exerted on a connecting rod due to the up and down motion of the piston and its associated mass ie; wrist pin, rings, small end of the rod.

Stretch: The increase in length of a bolt when installed with a preload.

Stress: The load applied to a part divided by the cross-sectional area of the part, usually expressed in pounds per square inch (psi).

Stress Corrosion: This is a special form of hydrogen embrittlement in which the metal is attacked while under stress. Without the stress the crack will not move. But under stress the crack moves and corrosion takes place at the freshly opened crack face.

Stress Ratio: The ratio of the minimum stress to the maximum stress in a structure which is subject to fluctuating loads.

Stress Riser: You have a notch, ding or some change in section size, so now the stress at these points is increased above nominal stress. Compare this kind of stress to the flow of water in a river. When the river hits a narrow point it flows faster. Perhaps there is a rock in the middle – the river flows faster around the rock. The stress at these points can be so high that the part will fail – even though the average stress on the part never exceeded the tensile strength of the part.

S.D.F.: Seam and defect free. A designation for premium steel. This is typically the highest grade available, and is the only steel used by ARP.

Thread Engagement: This refers to the number of threads engaged in a nut or threaded hole. Full engagement, meaning all the female threads are engaged, is a desirable configuration to maximize fatigue strength.

Ultimate Tensile Strength: The maximum stress that a particular material can support without breaking. It is expressed in terms of lbs. per square inch, and is measured by means of a tensile test. The maximum force (lbs.) that a test specimen can support is divided by the cross-sectional area (square inches) of the specimen, the result is ultimate tensile strength in psi.

Torque Angle: A method of tightening a fastener relative to the amount of degrees turned once the underside of the bolt head or nut face contacts the work surface. This procedure is suitable for engine assembly only when the installation has been calibrated in terms of bolt stretch relative to the exact application (the amount of compression of the clamped components is critical).

UHL: Means "Under Head Length." The distance as measured from tip of the fastener to a place directly at the base of the head.

Yield Strength: The stress at which a given material or component exhibits a permanent deformation (i.e. "takes a set"). When the load that caused the stress is removed, the part will not return to its original dimensions. If you exceed the yield strength of a fastener, the fastener is ruined and must be replaced.

GENERAL TORQUE RECOMMENDATIONS

Listed here are the general torque recommendations for most ARP fasteners. Recommended torque is equal 75% of the fastener's yield strength. Simply read down to the correct fastener size, then across to find the torque value for your application. ALWAYS LUBRICATE THE FASTENERS PRIOR TO APPLYING TORQUE TO ENSURE ACCURATE READINGS.

Note 1. The torque values represented here are intended for general information only and bulk fasteners, not for specific installations.

Note 2. On specific installations, where the supplied instructions deviate from the torque values listed here, always follow the specific instructions packaged with each kit.

Recommended Torque to Achieve Optimum Clamping Force Using ARP Lubricants - Torque (ft./lbs.) - Clamp Load (lbs.)

Note: For those using Newton/meters as a torquing reference, you must multiply the appropriate ft./lbs. factor by 1.356.

Fastener Diameter	Fastener Tensile Strength (PSI)					
	180,000 (1,241 N/mm²)		190,000 (1,310 N/mm²)		220,000 (1,516 N/mm²)	
	Torque w/ARP lube	Clamp Load	Torque w/ARP lube	Clamp Load	Torque w/ARP lube	Clamp Load
1/4″	12	3,492	14	3,967	16	4,442
5/16″	24	5,805	28	6,588	32	7,371
3/8″	45	8,622	50	9,782	55	10,942
7/16″	70	11,880	80	13,470	90	15,060
1/2″	110	16,391	125	18,515	140	20,639
9/16″	160	21,220	180	23,944	200	26,668
5/8″	210	26,372	240	29,756	270	33,140
M6	11	3,359	13	3,814	15	4,269
M8	24	5,801	28	6,581	32	7,361
M10	54	9,970	62	11,305	70	12,640
M11	72	12,184	82	13,961	92	15,738
M12	98	14,472	112	16,949	125	19,425
M14	N/A	N/A	184	22,771	205	25,730
M16	N/A	N/A	244	29,664	272	33,519

ROD BOLT STRETCH & TORQUE SPECS

Make	Part No.	Stretch *(in.)*	ARP Ultra-Torque*
ALFA ROMEO	126-6101	.0075 - .0080	45
AMC	112-6001	.0060 - .0065	40
	114-6001	.0060 - .0065	40
	114-6002	.0070 - .0075	50
	114-6004	.0060 - .0065	50
BMC/TRIUMPH	206-6001	.0065 - .0070	55
	206-6002	.0065 - .0070	35
	206-6003	.0065 - .0070	45
	206-6004	.0065 - .0070	45
	206-6005	.0065 - .0070	45
	206-6006	.0065 - .0070	55
	206-6007	.0045 - .0050	30
	206-6009	.0065 - .0070	32
BMW	201-6001	.0075 - .0080	60
	201-6102	.0065 - .0070	50
	201-6103	.0075 - .0080	70
	201-6104	.0065 - .0070	70
	201-6201	.0070 - .0075	40
	201-6202	.0055 - .0060	32
	201-6301	.0080 - .0085	36
	201-6302	.0080 - .0085	36
	201-6303	.0070 - .0075	36
	201-6304	.0075 - .0080	50
	201-6305	.0055 - .0060	19
	206-6008	.0055 - .0060	25
BUICK	123-6001	.0060 - .0065	55
	123-6002	.0065 - .0070	55
	124-6001	.0050 - .0055	45
	124-6002	.0040 - .0045	45
	124-6003	.0040 - .0045	45
	125-6001	.0055 - .0060	50
CADILLAC	117-6001	.0060 - .0065	55
	135-6003	.0060 - .0065	50
	217-6301	.0075 - .0080	50
CHEVROLET	131-6001	.0055 - .0060	45
	132-6001	.0055 - .0060	45
	132-6002	.0050 - .0055	30

Make	Part No.	Stretch *(in.)*	ARP Ultra-Torque*
CHEVROLET	133-6001	.0060 - .0065	55
	133-6002	.0060 - .0065	45
	134-6001	.0055 - .0060	45
	134-6002	.0050 - .0055	55
	134-6003	.0055 - .0060	55
	134-6004	.0075 - .0080	75
	134-6005	.0060 - .0065	55
	134-6006	.0055 - .0060	40
	134-6027	.0060 - .0065	55
	134-6401	.0055 - .0060	45
	134-6402	.0050 - .0055	55
	134-6403	.0055 - .0060	55
	135-6001	.0060 - .0065	80
	135-6002	.0055 - .0060	55
	135-6401	.0060 - .0065	80
	135-6402	.0055 - .0060	55
	230-6301	.0070 - .0075	95
	234-6301	.0065 - .0070	45
	234-6302	.0060 - .0065	45
	234-6401	.0065 - .0070	45
	234-6402	.0055 - .0060	55
	234-6403	.0065 - .0070	55
	235-6401	.0070 - .0075	85
	235-6402	.0065 - .0070	55
	235-6403	.0070 - .0075	85
	235-6404	.0080 - .0085	65
CHRYSLER	141-6001	.0060 - .0065	50
	141-6401	.0060 - .0065	50
	142-6001	.0055 - .0060	50
	142-6002	.0060 - .0065	50
	144-6001	.0060 - .0065	50
	144-6401	.0060 - .0065	50
	145-6001	.0070 - .0075	75
	145-6002	.0060 - .0065	50
	145-6402	.0060 - .0065	50
	244-6401	.0070 - .0075	55
	245-6402	.0070 - .0075	55

*Torque in ft-lbs

ROD BOLT STRETCH & TORQUE SPECS

Make	Part No.	Stretch *(in.)*	ARP Ultra-Torque*
CHRYSLER	247-6301	.0065 - .0070	45
	247-6302	.0075 - .0080	65
	247-6303	.0095 - .0100	95
FORD	150-6004	.0060 - .0065	50
	150-6005	.0060 - .0065	50
	150-6404	.0060 - .0065	50
	151-6001	.0060 - .0065	40
	151-6002	.0060 - .0065	40
	151-6003	.0050 - .0055	25
	151-6004	.0055 - .0060	25
	151-6005	.0045 - .0050	36
	152-6001	.0060 - .0065	50
	152-6002	.0060 - .0065	50
	153-6001	.0060 - .0065	35
	153-6002	.0060 - .0065	40
	154-6001	.0060 - .0065	50
	154-6002	.0060 - .0065	35
	154-6003	.0060 - .0065	50
	154-6004	.0050 - .0055	50
	154-6005	.0060 - .0065	50
	154-6006	.0060 - .0065	50
	154-6401	.0060 - .0065	50
	154-6402	.0060 - .0065	35
	154-6403	.0060 - .0065	50
	155-6001	.0060 - .0065	50
	155-6002	.0060 - .0065	50
	155-6003	.0060 - .0065	50
	200-6001	.0045 - .0050	60
	250-6301	.0075 - .0080	55
	250-6302	.0095 - .0100	95
	250-6303	.0085 - .0090	85
	250-6404	.0070 - .0075	55
	251-6201	.0050 - .0055	25
	251-6202	.0065 - .0070	45
	251-6203	.0085 - .0090	50
	251-6301	.0065 - .0070	45
	251-6402	.0065 - .0070	45

Make	Part No.	Stretch *(in.)*	ARP Ultra-Torque*
FORD (cont.)	254-6402	.0070 - .0075	30
	254-6403	.0070 - .0075	55
	255-6402	.0070 - .0075	55
	256-6301	.0065 - .0070	42
HOLDEN	205-6001	.0055 - .0060	55
	205-6002	.0055 - .0060	45
	205-6003	.0050 - .0055	26
HONDA/ACURA	208-6001	.0050 - .0055	26
	208-6002	.0055 - .0060	45
	208-6003	.0080 - .0085	50
	208-6004	.0080 - .0085	37
	208-6005	.0080 - .0085	26
	208-6301	.0055 - .0060	14
	208-6401	.0070 - .0075	50
JEEP	146-6001	.0065 - .0070	45
LANCIA	275-6001	.0075 - .0080	70
MAZDA	118-6401	.0060 - .0065	38
MITSUBISHI	107-6001	.0055 - .0060	40
	107-6002	.0060 - .0065	26
	107-6003	.0065 - .0070	40
	107-6004	.0065 - .0070	40
	207-6002	.0065 - .0070	30
NISSAN/DATSUN	102-6001	.0060 - .0065	26
	102-6002	.0050 - .0055	26
	102-6003	.0060 - .0065	45
	202-6001	.0060 - .0065	45
	202-6002	.0060 - .0065	26
	202-6003	.0060 - .0065	45
	202-6004	.0070 - .0075	45
	202-6005	.0065 - .0070	45
	202-6006	.0065 - .0070	30
	202-6007	.0075 - .0080	45
	202-6008	.0070 - .0075	45
	202-6101	.0090 - .0095	60
OLDSMOBILE	181-6001	.0055 - .0060	40
	184-6001	.0060 - .0065	50
	185-6001	.0055 - .0060	50

*Torque in ft-lbs

Make	Part No.	Stretch *(in.)*	ARP Ultra-Torque*
OPEL/VAUXHALL	109-6001	.0055 - .0060	32
	109-6002	.0050 - .0055	24
	109-6003	.0050 - .0055	32
	209-6003	.0065 - .0070	38
PEUGEOT	117-6101	.0070 - .0075	45
PONTIAC	190-6001	.0060 - .0065	50
	190-6002	.0060 - .0065	50
	190-6003	.0075 - .0080	75
	190-6004	.0055 - .0060	75
	191-6001	.0055 - .0060	45
	194-6001	.0055 - .0060	45
PORSCHE	104-6006	.0055 - .0060	40
	204-6001	.0095 - .0100	50
	204-6002	.0105 - .0110	55
	204-6003	.0090 - .0095	50
	204-6004	.0095 - .0100	50
	204-6005	.0100 - .0105	40
PORSCHE	204-6301	.0095 - .0100	45
RENAULT	116-6001	.0045 - .0050	36
	216-6301	.0065 - .0070	42
	216-6302	.0065 - .0070	42
SEA-DOO	168-6001	.0070 - .0075	60
SUBARU	260-6301	.0070 - .0075	42
	260-6302	.0070 - .0075	42
	260-6303	.0065 - .0070	60
SUZUKI	271-6301	.0050 - .0055	45
TOYOTA	203-6001	.0050 - .0055	40
	203-6002	.0060 - .0065	50
	203-6003	.0050 - .0055	40
	203-6004	.0060 - .0065	50
	203-6005	.0075 - .0080	65
	203-6301	.0075 - .0080	65
	203-6302	.0065 - .0070	60
VOLVO	219-6201	.0085 - .0090	50
VOLKSWAGEN/ AUDI	104-6001	.0055 - .0060	40
	104-6002	.0065 - .0070	40
	104-6003	.0075 - .0080	40
	104-6004	.0085 - .0090	35
	104-6005	.0050 - .0055	40

Make	Part No.	Stretch *(in.)*	ARP Ultra-Torque*
VOLKSWAGEN/ AUDI	104-6007	.0085 - .0090	35
	204-6006	.0075 - .0080	40
	204-6201	.0075 - .0080	30
	204-6302	.0070 - .0075	30
	204-6303	.0070 - .0075	39
GENERAL REPLACEMENT	200-6002	.0055 - .0060	75
	200-6003	.0055 - .0060	75
	200-6004	.0045 - .0050	75
	200-6006	.0050 - .0055	75
	200-6201	.0065 - .0070	80
	200-6202	.0065 - .0070	80
	200-6203	.0065 - .0070	80
	200-6204	.0065 - .0070	80
	200-6205	.0065 - .0070	80
	200-6206	.0065 - .0070	75
	200-6207	.0055 - .0060	55
	200-6208	.0065 - .0070	55
	200-6209	.0055 - .0060	55
	200-6210	.0050 - .0055	30
	200-6506	.0065 - .0070	70
	300-6601	.0065 - .0070	85
	300-6602	.0055 - .0060	55
	300-6603	.0055 - .0060	55
	300-6608	.0055 - .0060	32
	300-6609	.0045 - .0050	15
	300-6701	.0065 - .0070	85
	300-6702	.0065 - .0070	60
	300-6703	.0065 - .0070	60
	300-6704	.0060 - .0065	60
	300-6706	.0060 - .0065	75
	300-6708	.0055 - .0060	32
	300-6709	.0050 - .0055	15

PROPER FASTENER RETENTION

The importance of tightening fasteners to their required clamp load cannot be emphasized enough. If a fastener is not tightened properly, the fastener will not apply the required clamp load on the application it is being used for and may become susceptible to failure. Conversely, if a fastener is overtightened and stretched too much, it becomes susceptible to failure by exceeding the yield point.

There are three generally accepted methods employed to determine how much tension is exerted on a fastener:

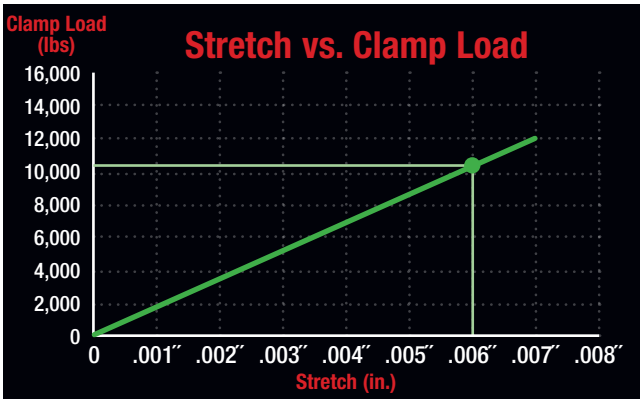
A. Using a torque wrench
B. Measuring the amount of stretch
C. Torque angle: rotating the fastener a predetermined amount

Of these methods, measuring the amount of stretch of a fastener has been proven to be the most accurate. However, since stretch can only be measured with the use of specialty type gauges or expensive ultra-sonic measuring equipment, it is only practical for measuring the stretch on connecting rod bolts and other fasteners, where it is possible to monitor the overall length of a fastener, as it is being tightened. Since most fasteners are installed in blind holes and can't be accessed from both ends to monitor stretch, one will most likely use a torque wrench or torque angle monitoring device for the majority of assembly work.

The Stretch Factor

To obtain the correct amount of clamping force a fastener should actually be stretched a measured amount. A properly used fastener works like a spring!

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. If you were to simply finger-tighten a bolt there would be no clamp load. However, when you apply torque or rotate a fastener a specific amount and stretch it, you will be applying clamping force. The amount of clamp load a fastener will generate depends on the thread diameter, fastener material and the material's mechanical properties, such as tensile strength and ductility. When a fastener is torqued or stretched beyond its capability the fastener material will yield. The yield point or yield strength of a fastener is the point at which the fastener has been overtightened and stretched too much, and will not return to its original manufactured length. As a rule of thumb, if you measure a fastener and it is .001″ or more, longer than its original length it has been compromised and must be replaced.

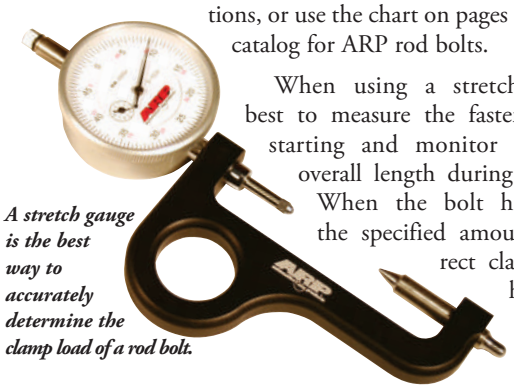


This graph shows the direct relationship between stretch and clamp load on a typical 3/8" diameter 8740 chrome moly rod bolt.

Another factor that must be considered is heat! Heat, primarily in aluminum, is another problem area. Because the thermal expansion rate of aluminum is far greater than that of steel it is possible to stretch a fastener beyond yield as the aluminum expands under heat. Thermal expansion can be offset by designing a fastener that is more flexible and installing the fastener at a safe percentage of yield.

The Stretch Gauge

We highly recommend using a stretch gauge when installing rod bolts and other fasteners, where it is possible to measure the length of the fastener. It is the most accurate way of measuring clamp load of any bolt. Simply follow manufacturer's instructions, or use the chart on pages 25-27 of this catalog for ARP rod bolts.

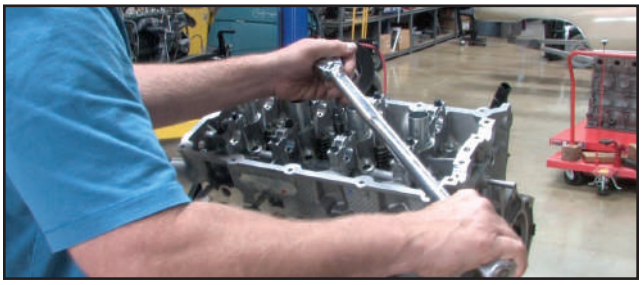


A stretch gauge is the best way to accurately determine the clamp load of a rod bolt.

When using a stretch gauge it's best to measure the fastener prior to starting and monitor the fastener overall length during installation. When the bolt has stretched the specified amount, the correct clamping force has been achieved. We recommend that you maintain a chart of all rod bolts and make a note of the fastener length prior to installation and after any disassembly. If there is a permanent increase of .001″ or more in length, there is a deformation and the bolt should be replaced. A sample stretch monitoring chart is located on page 30.

Using A Torque Wrench

There are a number of things to consider when using a torque wrench. The "friction factor" changes from one cycle to the next. That is, friction is at its highest value when the fastener is first tightened. Each subsequent time the fastener is torqued and loosened, the amount of friction reduces. Eventually the friction levels out and becomes fairly consistent for all following repetitions.



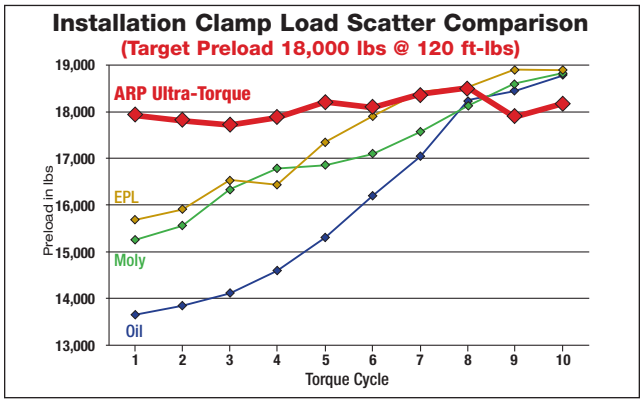
Three basic elements that contribute to the friction factor:

1. Most importantly - the fastener assembly lubricant
2. The condition of the threads
3. The surface finish of the fastener

Because of these variables, a phenomenon known as clamp load scatter occurs. Clamp load scatter is the variation in clamp load a fastener generates due to fluctuating levels of friction from one torque cycle to subsequent cycles. It's not uncommon to see clamp load scatter in the range of 4,000-8,000 pounds between the first and tenth pull on a new fastener depending on the lubricant used.

The Lubricant Is The Key

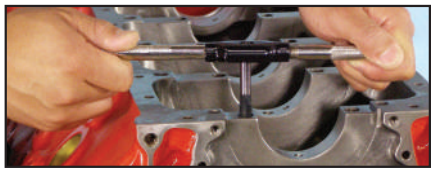
A major factor that influences friction in a fastener is the lubricant used, and therefore influences the torque required for a particular installation. One of the most overlooked aspects of choosing a fastener assembly lubricant is…the lubricant's ability to stabilize friction inherent in all high performance engine fasteners. As discussed earlier, friction is at its highest point when a new fastener is first tightened. This friction inhibits the fasteners ability to achieve the required clamp load on the first several cycles. In fact, ARP's in-house Research and Development department has proven that new fasteners using motor oil and other commonly used lubricants such as Moly and EPL typically require 5-7 cycles before final torquing to level out the initial friction and achieve the required clamp load. Slicker lubricants may reduce the required torque by as much as 20-30% to achieve the desired clamp load, but compromise in areas of major importance such as repeatability, and may yield the fastener prematurely. Typically, the slicker the lubricant, the greater the clamp load scatter will be during installation.



The bottom line: clamp load repeatability and consistency from a fastener to fastener perspective, should be the number one consideration when choosing a fastener assembly lubricant. Remember even the best fastener is only as good as its installation. Clamp load repeatability is the foundation for maintaining round housing bores, and consistency ensures the same clamp load from one fastener to another across a large area, such as the deck surface of a cylinder block. These two fundamentals are the cornerstone of every successful fastener installation and that's why ARP's engineering team set out to develop the "ultimate" fastener lubricant. The result of several years of extensive R&D is a remarkable assembly lube called ARP Ultra-Torque®. As shown in the graph above, ARP Ultra-Torque® clearly provides the clamp load repeatability and consistency that no other fastener assembly lubricant on the market today can provide.

ARP's computer-controlled torque-tension machine can apply a given torque or torque-angle to a fastener and measure the clamp load. Through test cycles, it is possible to chart the clamp load scatter with various fasteners and lubricants.

Fastener Surface Finish and Condition of Threads



In addition to the lubricant used, friction is affected by the surface finish of the fastener itself and the condition of the threads. For example, black oxide behaves differently than a polished fastener so it's important to follow the torque recommendations with each fastener kit. Then there's the very real problem of burrs and debris in the bolt holes that can significantly affect the amount of torque required to achieve the recommended clamp load. All bolt holes should be thoroughly cleaned using thread chasers to clean the threads before installation. ARP offers these special cleaning chaser taps on page 136.

Torque Wrench Accuracy

It is possible for even the most expensive torque wrenches to lose accuracy over time. Rough use or repeated loosening of fasteners using your torque wrench as a "breaker bar" will exacerbate the loss of accuracy. In fact, ARP field technicians have seen a wide range of torque wrench reading errors as much as 15-30%. This just emphasizes the importance of treating torque wrenches with the utmost of respect and having them checked periodically for accuracy.

The Torque Angle Method

Since the amount that a bolt or nut advances on the thread per degree of rotation is determined by the thread pitch, it would appear that any amount of stretch in a given bolt or stud can be accurately predicted by measuring the degrees of turn from the point where the underside of the bolt head or nut face contacts the work surface. Termed the "torque angle" method, this procedure has long been the standard of civil engineering. It has been suggested that torque angle is a relatively simple and valid procedure to use in blind hole installations—where it is not possible to physically measure the actual bolt stretch.

ARP has conducted extensive evaluations of the torque angle method, and concluded that – for high performance engine applications – it is suitable only when calibrated for each installation.

Our investigation has proven that installed stretch is dependent not only on the pitch of the thread and the degree of rotation, but also on the amount of compression of the clamped components, the type of lubrication, the length of the male fastener, and the amount of engaged thread. It's important to note that for the same degree of rotation, the amount of bolt stretch will differ from aluminum to cast iron cylinder heads, or when installing a steel main cap on a cast iron or aluminum block. Furthermore, each length fastener requires a unique torque-angle to obtain the correct stretch for that fastener. The torque angle method can be accurate – but only if each individual application has been calibrated by direct measurement of bolt stretch. If you do employ the torque angle method, it's best to begin calibrating rotation from some small measured torque rather than the first point of contact with the work face. To achieve optimum accuracy, always use ARP Ultra-Torque® fastener assembly lubricant whenever possible.

THE IMPORTANCE OF PROPER ROD BOLT STRETCH/TORQUE...

Whether measured by stretch or by torque, properly installing a rod bolt is essential for trouble-free performance. If a bolt is installed without sufficient clamp load, every revolution of the crankshaft will cause a separation between the connecting rod and rod cap. This imposes additional stretch in the bolt. The stretch disappears when the load is removed on each revolution, or cycle. Over time, this cycle stretching and relaxing can cause the bolt to fail due to fatigue, just like a paper clip that is bent back and forth by hand. To prevent this condition, the bolt's clamp load must be greater than the load caused by rotating assembly reaching top dead center.

A properly installed rod bolt remains stretched by its clamp load and is not subjected to 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.

You can measure the actual stretch of rod bolts through use of a stretch gauge, or a micrometer for that matter. Prior to installing the rod, measure the length of the bolt in an untorqued state. Write this length down. You can make a chart similar to the one shown on this page to keep track of the data. When you tear the engine down for maintenance, again measure the length of each rod bolt – being careful to keep everything in the proper order. If any of the rod bolts have taken a permanent set and have stretched by .001″ or longer you should replace the fastener IMMEDIATELY! The stretching is a sure indicator that the bolt has been compromised and taken past its yield point.

In other types of bolted joints, this careful attention to tightening 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 connecting rod bolts is so important. *See pages 25-27 for recommended stretch and torque values.*

Friction is a challenging problem because it varies so much, and is extremely difficult to control with most commonly known lubricants. The best way to avoid the pitfalls of friction and the known variables associated with different lubricants is by using the stretch method. By using the stretch method and removing the friction variable, clamp load can be controlled and repeated. Each time a new bolt is torqued and loosened, the friction factor gets smaller. Eventually the friction levels out and becomes constant for all following repetitions, making it necessary to tighten and loosen a new bolt several times before final installation, when the stretch method cannot be used. The number of cycles depends on the lubricant. Most lubricants require, 5-7 tightening and loosening cycles to level out the friction before final installation. However, with the introduction of ARP's new Ultra-Torque fastener assembly lubricant, cycling a new fastener before final installation becomes a "thing of the past." *See page 134 for more information on ARP Ultra-Torque® fastener assembly lubricant.*

A rod bolt stretch gauge is one of the most important tools a serious engine builder can own. It's valuable in properly setting up a rod for resizing, obtaining the proper clamp load when installed. *See page 135 for more information.*

Rod Bolt Length Monitoring Chart

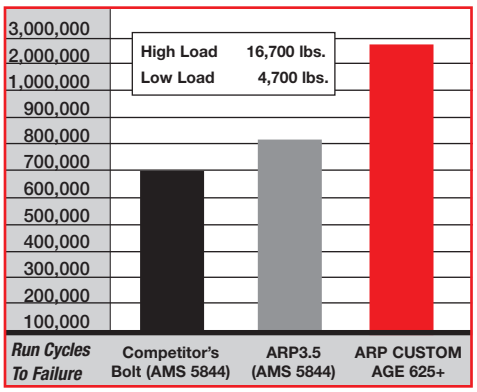
Rod #1		Rod #2		Rod #3		Rod #4	
Inside Bolt		Inside Bolt		Inside Bolt		Inside Bolt	
In	Out	In	Out	In	Out	In	Out
Outside Bolt		Outside Bolt		Outside Bolt`		Outside Bolt	
In	Out	In	Out	In	Out	In	Out
Rod #5		**Rod #6**		**Rod #7**		**Rod #8**	
Inside Bolt		Inside Bolt		Inside Bolt		Inside Bolt	
In	Out	In	Out	In	Out	In	Out
Outside Bolt		Outside Bolt		Outside Bolt		Outside Bolt	
In	Out	In	Out	In	Out	In	Out

PRO SERIES CONNECTING ROD BOLTS

A large number of connecting rod manufacturers have chosen ARP bolts as standard equipment. They're proud to advertise their products as being equipped with ARP rod bolts. And for good reason. The "weak link" in a connecting rod has always been the bolt, and racers know that nobody builds a better bolt than ARP. However, it is critically important to monitor the stretch of each bolt and replace it when it has permanently elongated by .001". Below you will find an extensive listing of aftermarket connecting rods and replacement bolt specifications.

In some instances, you may want to go to an ARP rod bolt made from a better grade of material. This will provide you with improved reliability. However, please understand that when you want bolts made from exotic, super high strength materials, the cost will increase significantly. If you're on a budget, it's best to go with the most cost-effective solution. This is typically defined by the loads that are carried by the bolts in terms of piston/rod weight and the rotational speed of the engine. The most cost effective design is the one in which the bolt strength is just great enough to handle its anticipated load – plus a safety margin for the occasional overloads. Using a material which has far more strength than required is not as cost effective – but will definitely give you an extra margin of safety and longer service life.

You should also know that ARP rod bolts are superior to those from other manufacturers. Especially in the area of fatigue strength. Testing has shown ARP rod bolts to have twenty times the fatigue strength of other bolts. In the chart below, you'll find a bar chart that graphically shows the difference between ARP Pro Series rod bolts and the fastener made by a leading competitor. It's easy to see why ARP bolts are superior. As such, it makes good sense to rely on ARP for optimum connecting rod service and reliability. Make the most of your racing budget and rely on ARP rod bolts. You'll find the ARP name proudly stamped on each bolt as your assurance of quality.



Red part numbers indicate new items

- *Forged in-house at ARP using only the finest quality materials*
- *Heat-treated using special vertical racks to assure complete 360° penetration*
- *Threads rolled after heat-treat to provide up to 10-times longer fatigue strength*
- *Precision CNC-machined to exacting specifications*
- *Specially designed for optimum reliability in each application*

ARP connecting rod bolts are used in everything from exotic 18,000 rpm Formula 1 engines to 10,000 horsepower nitro-burning Top Fuel engines

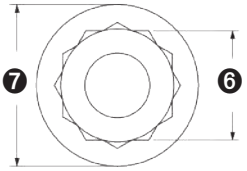
It's important to note that a number of premium quality connecting rods come from their respective manufacturers with ARP rod bolts as standard equipment. We are pleased to consider these key firms our "Performance Partners" and embarked upon a program to recognize this alliance. ARP also manufactures replacement connecting rod bolts for products from other firms. We feel that our fasteners are substantially better than those OEM offerings, and they will serve to increase the durability and service life of these rods. For information pertaining to obtaining replacement bolts for these rods, contact our tech department.

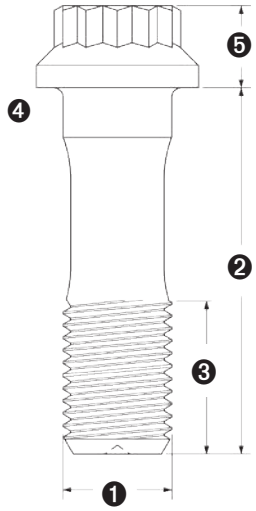
GENERAL REPLACEMENT ROD BOLT KITS

Please contact the rod manufacturer for the appropriate stretch/torque values and installation instructions.

❶ Thread Size (in.)	❷ UHL (in.)	❸ Thread Length (in.)	❹ Grip Length* (in.)	❺ Head Height (in.)	❻ Wrench Size (in.)	❼ Collar Diameter (in.)	Material	Set Qty	Complete Set	2-Piece Pack
1/4	1.400	0.530	0.225	0.325	5/16	0.433	ARP3.5	8	300-6609 ●	300-6629 ●
	1.400	0.530	0.225	0.325	5/16	0.433	Custom Age 625+	8	300-6709 ●	300-6729 ●
5/16	1.500	0.550	0.150	0.348	3/8	0.526	ARP2000	8	200-6210 ●	200-6220 ●
	1.500	0.550	0.150	0.348	3/8	0.526	ARP3.5	8	300-6608 ●	300-6628 ●
	1.500	0.550	0.150	0.348	3/8	0.526	Custom Age 625+	8	300-6708 ●	300-6728 ●
3/8	1.500	0.550	0.100	0.388	7/16	0.555	ARP2000	8	200-6207 ▲	200-6227 ▲
	1.500	0.550	0.145	0.388	7/16	0.555	Custom Age 625+	8	300-6704 ●	300-6724 ●
	1.600	0.600	0.145	0.388	7/16	0.555	ARP2000	8	200-6209 ▲	200-6219 ▲
	1.600	0.600	0.145	0.365	7/16	0.565	ARP3.5	16	300-6602 ▲	300-6622 ▲
	1.600	0.600	0.145	0.365	7/16	0.565	Custom Age 625+	16	300-6702 ▲	300-6722 ▲
	1.600	0.600	0.145	0.365	7/16	0.565	ARP3.5	8	300-6603 ▲	300-6623 ▲
	1.600	0.600	0.145	0.365	7/16	0.565	Custom Age 625+	8	300-6703 ▲	300-6723 ▲
	1.750	0.560	0.150	0.388	7/16	0.555	ARP2000	8	200-6208 ▲	200-6228 ▲
7/16	1.600	0.600	0.200	0.388	7/16	0.644	8740	16	200-6006 ●	200-6026 ●
	1.725	0.650	0.300	0.380	1/2	0.655	L19	16	200-6203 ●	200-6223 ●
	1.725	0.650	0.300	0.388	1/2	0.655	ARP2000	16	200-6205 ●	200-6225 ●
	1.750	0.660	0.350	0.360	1/2	0.635	Custom Age 625+	16	300-6701 ●	300-6721 ●
	1.750	0.660	0.350	0.435	1/2	0.745	ARP3.5	16	300-6601 ●	300-6621 ●
	1.800	1.050	0.750	0.388	7/16	0.644	8740	16	200-6001 ●	200-6021 ●
	1.800	1.000	0.300	0.360	7/16	0.644	8740	16	200-6002 ●	200-6022 ●
	1.800	0.700	0.200	0.388	7/16	0.644	8740	16	200-6003 ●	200-6023 ●
	1.800	0.800	0.300	0.380	1/2	0.655	ARP2000	16	200-6202 ●	200-6222 ●
	1.800	0.800	0.300	0.380	1/2	0.655	ARP2000	16	200-6204 ●	200-6224 ●
	1.850	0.740	0.200	0.388	7/16	0.644	ARP2000	16	200-6201 ●	200-6221 ●
	2.000	1.000	0.300	0.435	1/2	0.745	ARP2000	16	200-6206 ●	200-6226 ●
	2.000	1.000	0.300	0.435	1/2	0.745	L19	16	200-6506 ●	200-6526 ●
	2.000	1.000	0.300	0.435	1/2	0.745	Custom Age 625+	16	300-6706 ●	300-6726 ●
	2.000	1.250	0.750	0.388	7/16	0.644	8740	16	200-6004 ●	200-6024 ●

***NOTE:** the **Grip Length** in undercut bolts is the distance from the head to the start of the undercut.





MATERIALS USED IN THE MANUFACTURE OF CAP SCREW TYPE CONNECTING ROD BOLTS

8740 CHROME MOLY: Until the development of today's modern alloys, chrome moly was popularly considered a high strength material. Now viewed as only moderate strength, 8740 chrome moly is seen as a good tough steel, with adequate fatigue properties for most racing applications, but only if the threads are rolled after heat-treatment, as is the standard ARP production practice. Typically, chrome moly is classified as a quench and temper steel, that can be heat-treated to deliver tensile strengths between 180,000 and 200,000 psi.

ARP2000®: ARP2000 is an alloy steel that can be safely heat treated to a higher level, producing a greater strength material than 8740. While 8740 and ARP2000 share similar characteristics – ARP2000 is capable of achieving a clamp load at 220,000 psi. ARP2000 is used widely in short track and drag racing as an up-grade from 8740 chrome moly in both steel and aluminum rods. Stress corrosion and hydrogen embrittlement are typically not a problem, providing care is taken to keep the parts well-oiled and not exposed to moisture.

L19®: This is a premium steel that is processed to deliver superior strength and fatigue properties. L19 is a very high strength material compared to 8740 and ARP2000 and is capable of delivering a clamp load at 260,000 psi. It is primarily used in short track and drag racing applications where inertia loads exceed the clamping capability of ARP2000. Like most high strength, quench and temper steels – L19 requires special care to avoid hydrogen embrittlement. This material is easily contaminated and subject to stress corrosion. It must be kept well-oiled and not exposed to moisture.

ARP3.5® (AMS5844): While similar to Inconel 718, these super-alloys are found in many jet engine and aerospace applications where heat and stress attack the life of critical components. The high cobalt content of this alloy, while expensive, delivers a material with superior fatigue characteristics and typically tensile strength in the 260,000-280,000 psi range. The immunity to hydrogen embrittlement and corrosion of these materials is a significant design consideration. These materials are primarily used in connecting rods where extremely high loads, high RPM and endurance are important factors – Formula 1, NASCAR and IRL applications.

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 to soon replace MP-35 as the material of choice in the high strength, super-alloy field. Typical tensile strength is 260,000-280,000 psi.

Red part numbers indicate new items

HOW TO: INSTALL CAP-STYLE ROD BOLTS

Replace your original connecting rod cap screws with these ARP products for enhanced durability and improved strength. Use whenever cap screw-style bolts are used for rod cap retention.

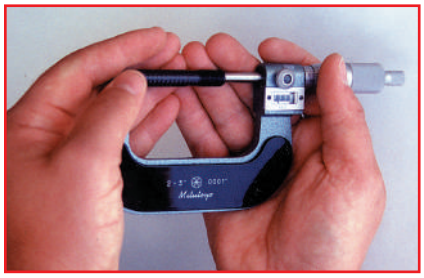
TECH TIP

Be sure the torque spec used when *re-sizing* a rod **and** final engine *assembly* are the **same**. Communicate with your machinist! Use a stretch gauge for both functions, if possible.

NOTE: One way to know if a bolt is ready to fail is if it has permanently yielded .001" or more. *See page 28.*

1. Clean and inspect all hardware for obvious damage. If necessary, chase or re-tap con rod threads to ensure proper thread engagement and accurate torque readings.

2. Position the washer with the chamfer facing the bolt head to ensure it clears the underhead radius. NOTE: Improper installation will cause premature bolt failure.



3. Measure pre-torqued bolt length. Always keep a log of the original free standing length. *A sample is on page 29.* Assemble cap to rod, then lubricate the bolt threads and washer with ARP Ultra-Torque lubricant. Install bolt & washer.

4. Using a stretch gauge or micrometer to measure fastener stretch, torque rod bolt until recommended bolt stretch is achieved. *A rod bolt stretch and torque table is located on pages 25-27.*

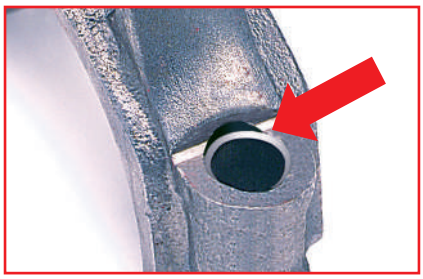
5. Once properly preloaded, have the rods resized before assembling them to the pistons, then install in engine using the prescribed bolt-stretch method.

HOW TO: INSTALL OEM-STYLE ROD BOLTS

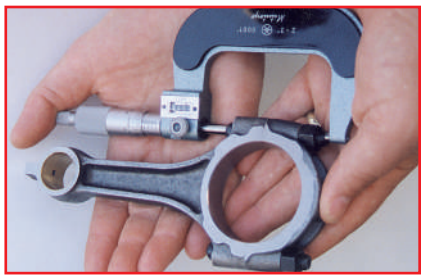
Improved reliability and optimum strength are the main attributes of ARP's replacement rod bolts. These are the finest fasteners available today, and are recommended for all high performance applications.

TECH TIP

Be sure the torque spec used when *re-sizing* a rod **and** final engine *assembly* are the **same**. Communicate with your machinist! Use a stretch gauge for both functions, if possible.

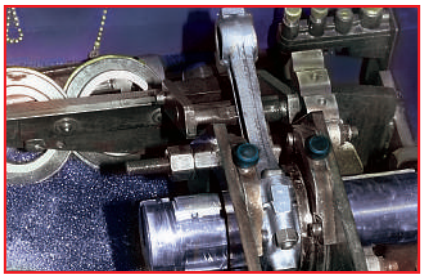


1. Inspect rods to ensure there is adequate chamfer to clear radius under heads, then install bolts after inspecting for damaged hardware.



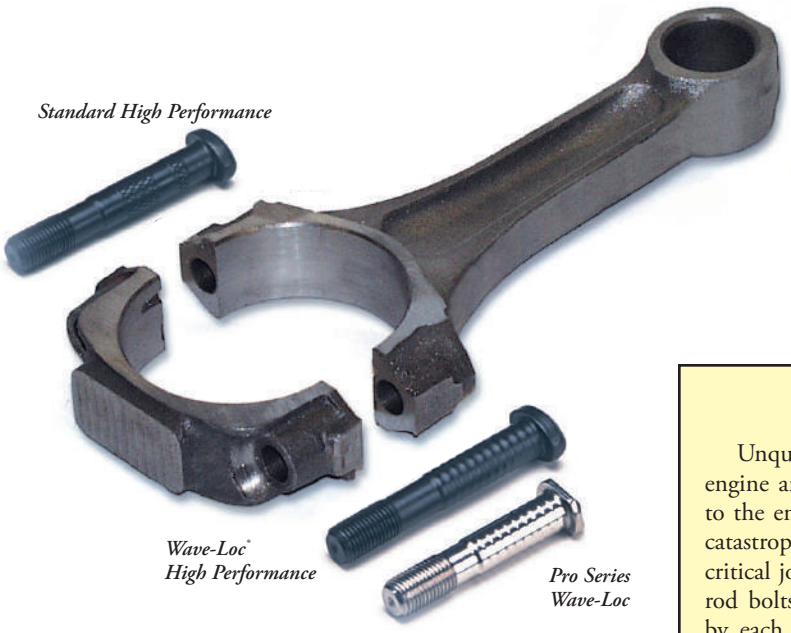
2. Reinstall the rod cap, then measure bolt length using a micrometer (free standing length).

3. Lubricate the bolt threads and the face of the nuts with ARP Ultra-Torque lubricant, tighten nuts to achieve recommended bolt stretch. *A rod bolt stretch and torque table is located on pages 25-27.*



4. With proper preload applied, have rods resized. This procedure is recommended any time rod bolts are replaced.

5. Install rod and piston assemblies in engine using the prescribed bolt stretch method or by following recommended torque values.



REPLACEMENT CONNECTING ROD BOLTS

TECH NOTE: ROD BOLTS

Unquestionably the most important fasteners in any engine are the connecting rod bolts, as they hold the key to the entire rotating assembly. A broken bolt will lead to catastrophic engine failure. As you can imagine, the most critical joint is where the connecting rod halves mate. The rod bolts must support the primary tension loads caused by each rotation (or cycle) of the crankshaft. When the crank rotates, the big end of the connecting rod essentially becomes oval-shaped and the rod bolts bend. As the crankshaft continues to rotate, the rod becomes round again. With alternating tension loads and cyclic bending of the bolts, it is very important to install fasteners that are able to exert a clamping force greater than the load imposed upon the joint (tension).

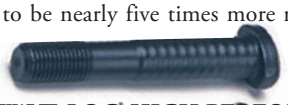
In addition to utilizing a rod bolt with sufficient strength to withstand the tremendous cyclical strains placed upon it, it is absolutely imperative that the bolts be properly tightened. The preferred method of monitoring the correct amount of tension is through use of a stretch gauge. This is far more accurate than using a torque wrench. Moreover, through subsequently checking the rod bolts length at teardowns, it is possible to determine if it has been stressed beyond safe limits and must be replaced.

Choose From Three ARP Replacement Rod Bolts:

Because factory connecting rods (or aftermarket versions of OEM rods) are used in a variety of applications from rebuilt stock motors to modified powerplants used in circle track, marine and drag racing engines – including those with superchargers and/or nitrous oxide injection systems – ARP offers replacement rod bolts in three different models. All of them are substantially better than the stock OEM and most aftermarket bolts.

GOOD: STANDARD HIGH PERFORMANCE BOLTS

A premium grade 8740 alloy chrome moly steel is used to manufacture ARP High Performance connecting rod bolts. This material is heat-treated to provide a tensile strength in the 200,000 psi range, which is substantially stronger than the OEM bolts. Cycle testing shows ARP High Performance rod bolts to be nearly five times more reliable than stock bolts.



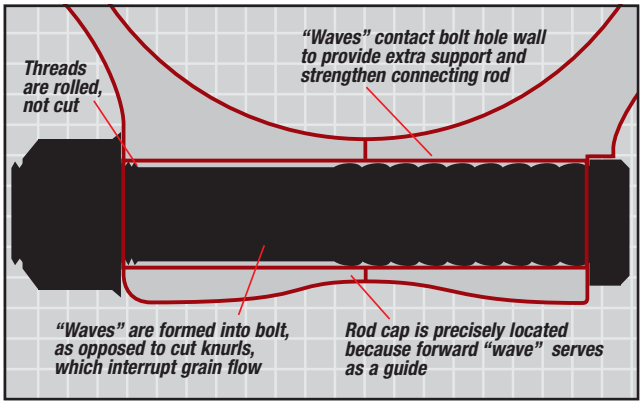
BETTER: WAVE-LOC® HIGH PERFORMANCE BOLTS

The same heat-treated 8740 chrome moly steel is used to make these rod bolts as ARP's standard High Performance rod bolts. The big difference is in the shank design, with ARP's exclusive (and patented) Wave-Loc technology providing substantial benefits. Because there are fairly wide tolerances in factory bolt holes, the bolt must be able to fit snugly and a knurl is applied. Unfortunately, these knurls cut deep into the bolt material, leaving sharp edges and enormous "stress risers" that promote failure. That's why ARP developed the Wave-Loc design that features symmetrical waves and has an effective interference range of .001″ to .005″ for proper cap alignment.

BEST: "PRO" SERIES WAVE-LOC BOLTS

For the most severe applications, in conjunction with aftermarket I-beam rods, ARP has developed the "Pro" Series Wave-Loc bolts. These ultra heavy-duty rod bolts are made from a special material designated ARP2000. It has approximately 200% the fatigue life of 8740 chrome moly steel and has a tensile strength of 220,000 psi, and is capable of more than 12,000 lbs. clamping force.

ADVANTAGES OF WAVE-LOC ROD BOLTS:



- Wave-Loc surface contacts the rod and cap for optimum alignment and reduction of fluctuating stress – which strengthens the rod itself!
- Provides snug fit for all OEM connecting rods (interference range of .001″ to .005″), despite wide range of factory rod bolt hole tolerances.
- Available for most applications.
- Superior material grain flow because of patented Wave-Loc surface design as compared to knurled bolts that have sharp edges and "built-in" stress risers.
- Galling and scoring of the rod is virtually eliminated because there is only smooth contact and absolutely no "digging."

Application Note: Please verify rod bolt head style against the photos labeled A-AF when replacing rod bolts	Head Style	Hi-Perf 8740 (complete)	Hi-Perf 8740 (2-PC)	HP Wave 8740 (complete)	HP Wave 8740 (2-PC)	Pro Wave ARP2000 (complete)	Pro Wave ARP2000 (2-PC)	Pro Series ARP2000 (complete)	Pro Series ARP2000 (2-PC)
ALFA ROMEO									
2.0L GTV	P	126-6101							
AMC									
258 cid inline 6	D	112-6001							
290-304-343-360 cid 11/32″	D	114-6001							
390 cid (1968-69)	R	114-6004							
390-401 cid (1970 & later) 3/8″	R	114-6002							
AUDI - SEE VOLKSWAGEN, PAGE 40									
BMC/TRIUMPH/ROVER									
A Series 3/8″	J	206-6001	206-6021						
A & B Series 11/32″	C	206-6002							
B Series (1964-68) 18GB & 18GF 3/8″	E	206-6003							
Bonneville 650cc motorcycle (1956-72)	K	206-6009							
K Series	E	206-6007							
1.3L & 1.5L Spitfire	E							206-6004	
2.0L GT6 & 2.5L TR6	E							206-6005	
2.0L SOHC TR7	AB	206-6006							
BMW									
S1000RR Motorcycle	E							201-6202	
1.5L & 2.0L (M10) 4-cylinder	X							201-6304	
2.3L (S14) M11 x 41mm UHL	E							201-6104	
2.5L (M50/M50TU) inline 6 M9 x 53mm UHL	E							201-6301	
2.8L (M52EURO), 3.0L (S50US) & 3.2L (S52US) inline 6 M9 x 44mm UHL	E							201-6201	
2.8L (M52/M52TU) & 3.0L (M54) inline 6 M9 x 47mm UHL	E							201-6303	
3.0L (S50 EURO) inline 6 M10 x 45mm UHL	E							201-6102	
3.2L (S54) inline 6 M11 x 47mm UHL	E							201-6103	
4.0L (S65) V8 M9 x 45mm UHL Custom Age 625+	E							201-6001	201-6021
4.4L (M62/M62TU) V8 M9 x 53mm UHL	E							201-6302	
BUICK									
90° V6 (cap screw type) 1.500″ UHL	E							123-6001	123-6021
90° V6 (cap screw type) 1.700″ UHL, fits Grand National	E							123-6002	123-6022
215 cid aluminum V8	D	124-6001							
350 cid (1968-73) standard 11/32″	N	124-6002							
350 cid (1968-73) .015 in. oversize 11/32″	N	124-6003							
400-401-425-430-455 cid	AE	125-6001							

Application Note: Please verify rod bolt head style against the photos labeled A-AF when replacing rod bolts	Head Style	Hi-Perf 8740 (complete)	Hi-Perf 8740 (2-PC)	HP Wave 8740 (complete)	HP Wave 8740 (2-PC)	Pro Wave ARP2000 (complete)	Pro Wave ARP2000 (2-PC)	Pro Series ARP2000 (complete)	Pro Series ARP2000 (2-PC)
CADILLAC									
4.6L Northstar	E							217-6301	
331-365-390 V8	AH	117-6001							
472-500 cid with 12 pt nuts	B	135-6003							
CHEVROLET, SMALL BLOCK									
265-283-327 cid (small journal) 11/32″	D	134-6001	134-6021	134-6401	134-6411	234-6401	234-6421		
305-307-327-350 cid (large journal) 3/8″	B	134-6003	134-6023	134-6403	134-6423	234-6403	234-6423		
350 cid PM Rod (1992-97) LT1/LT4	B	134-6005							
383 Stroker w/ 350 rod (extra head clearance)	F	134-6027							
400 cid	F	134-6002	134-6022	134-6402	134-6422	234-6402	234-6422		
7/16″ "K" rod with 12 pt nuts	T	134-6004							
Gen III/IV LS Series small block & 6.2L LT1 (except LS7 & LS9) "Cracked Cap Design"	E	134-6006	134-6026					234-6301	234-6321
Gen IV LS7 & LS9 small block (titanium rod)	E							234-6302	
CHEVROLET, BIG BLOCK									
396-402-427-454 cid 3/8″	A	135-6002	135-6022	135-6402	135-6422	235-6402	235-6422		
409 cid	B	134-6003	134-6023	134-6403	134-6423	234-6403	234-6423		
454-502 cid 7/16″	T	135-6001	135-6021	135-6401	135-6421	235-6401	235-6421		
454-502 cid 7/16″ with 12 pt nuts	T					235-6403	235-6423		
Chevy 8.1	V					235-6404	235-6424		
CHEVROLET, 4 AND 6-CYLINDER									
140-145-164 cid Corvair 5/16″	D			132-6002	132-6022				
194-230-250 cid inline 6	D	132-6001	132-6021						
120-140 cid 4-cylinder Vega	D	131-6001	131-6021						
2.8L 60° V6	R	133-6002	133-6022						
4.3L 90° V6	F	133-6001	133-6021						
CHRYSLER									
2.2L & 2.5L 4-cylinder	R	141-6001	141-6021	141-6401					
170-225 cid Slant Six (1976 & earlier)	F	142-6001							
225 cid Slant Six (1977 & later)	R	142-6002							
318-340-360 Wedge & 318-360 Magnum	R	144-6001	144-6021	144-6401	144-6421	244-6401	244-6421		
5.7L Gen III Hemi	E							247-6301	
6.1L & 6.4L Gen III Hemi	E							247-6302	
383-400-413-440 Wedge & 354-392 Hemi	R	145-6002	145-6022	145-6402		245-6402	245-6422		
426 factory Hemi & 426-472-528-572 Gen II Hemi 7/16″	AC	145-6001	145-6021						
DATSUN - SEE NISSAN, PAGE 38									

R S T U V W X Y Z AA AB AC AD AE AF AG AH

Red part numbers indicate new items

Application Note: Please verify rod bolt head style against the photos labeled A-AF when replacing rod bolts	Head Style	Hi-Perf 8740 (complete)	Hi-Perf 8740 (2-PC)	HP Wave 8740 (complete)	HP Wave 8740 (2-PC)	Pro Wave ARP2000 (complete)	Pro Wave ARP2000 (2-PC)	Pro Series ARP2000 (complete)	Pro Series ARP2000 (2-PC)
DIESEL									
Chevy/GM 6.6L Duramax	E							230-6301	
Cummins 3.9L (4BT) 4-cylinder	E							247-6304	
Dodge/Cummins 5.9L 12V/24V	E							247-6303	
Ford 6.0L & 6.4L Power Stroke	E							250-6301	
Ford 7.3L Power Stroke PM rod (2001-03)	E							250-6302	
Ford 7.3L Power Stroke forged rod (1994-00)	AG							250-6303	
Nissan 2.5L (YD25) 4-cylinder diesel 11/32″	C							202-6008	
FORD, SMALL BLOCK									
239-256-272-292 Y block (rod marked EBU)	M	154-6005							
239-256-272-292 Y block (rod marked ECZ)	F	154-6004	154-6024						
289-302 cid standard 5/16″	AD	154-6002	154-6022	154-6402	154-6422	254-6402	254-6422		
302 cid Sportsman SVO 3/8″	M	150-6005	150-6025						
312 cid	F	154-6004	154-6024						
351 Cleveland	C	154-6003	154-6023	154-6403	154-6423	254-6403	254-6423		
351-400M	C	154-6001	154-6021	154-6401	154-6421				
Boss 302 & 351W	C	150-6004	150-6024	150-6404	150-6424	250-6404	250-6424		
351W with square head rod bolt	AC	154-6006							
FORD, BIG BLOCK									
390-406-410-427-428 cid FE Series	G	155-6002	155-6022			255-6402	255-6422		
427 LeMans	E	200-6001	200-6021						
428 Cobra Jet (replacement for 13/32″ bolt)	A	155-6001	155-6021						
429-460 cid	AC	155-6003	155-6023						
Boss 429-460	C	150-6004	150-6024	150-6404	150-6424	250-6404	250-6424		
FORD, MODULAR									
4.6L & 5.4L	E							256-6301	
FORD, 4, 5 AND 6-CYLINDER									
1.6L CVH M8	E	151-6004							
1.6L Zetec E M8	E	151-6003	151-6023						
1.8L Duratec	E							251-6202	
2.0L DOHC Cosworth Sierra/Escort	E							251-6301	
2.0L RS 2000 M8	E							251-6201	251-6222
2.0L Zetec M9	E	151-6005							
2000cc Pinto	D	151-6001	151-6021						
2300cc Pinto	A	151-6002	151-6022			251-6402	251-6422		
2.5L (B5254) DOHC 5-cylinder	E							251-6203	
2.8L & 2.9L V6	AD	153-6001							

Application Note: Please verify rod bolt head style against the photos labeled A-AF when replacing rod bolts	Head Style	Hi-Perf 8740 (complete)	Hi-Perf 8740 (2-PC)	HP Wave 8740 (complete)	HP Wave 8740 (2-PC)	Pro Wave ARP2000 (complete)	Pro Wave ARP2000 (2-PC)	Pro Series ARP2000 (complete)	Pro Series ARP2000 (2-PC)
FORD, 4, 5 AND 6-CYLINDER (CONTINUED)									
3.8L V6 Super Coupe T-bird	C	153-6002	153-6022						
240-300 cid inline 6	G	152-6001							
4.9L inline 6	M	152-6002							
HOLDEN									
11/32″	C	205-6002							
3/8″	J	205-6001							
HONDA/ACURA									
1.2L, 1.6L & 1.8L M8	F	208-6001							
1.5L (L15)	E							208-6301	
1.6L & 1.8L M9	Y							208-6401	
2.0L (F20C) & 2.2L (F22C) S2000	E							208-6002	
2.0L (K20A)	E							208-6003	
3.0L (C30A) V6 Acura NSX M9	AF							208-6004	
3.2L (C32B) V6 Acura NSX M8	AF							208-6005	
JEEP									
4.0L inline 6	D							146-6001	
LANCIA									
2.0L SOHC 8V & DOHC 16V Turbo	E							275-6001	
MAZDA									
1.6L (B6) & 1.8L (BP) DOHC Miata M9	W	118-6401							
MINI									
1.6L (W10, W11) Mini – supercharged & non-supercharged (2002-08 Chrysler engine) M8 x 43mm UHL	E	206-6008							
1.6L (N12/N14/N16/N18) Mini – turbo-charged & non-turbocharged (2007-15 Peugeot engine) M7 x 45mm UHL	E							201-6305	
MITSUBISHI									
2.0L (4B11) DOHC (2008 & later)	E							207-6002	
2.0L (4G63) DOHC (1993 & earlier) M9	AC	107-6001	107-6021						
2.0L (4G63) DOHC (1994-07) M8	S	107-6002	107-6022						
2.6L (G54B)	C	107-6003	107-6023						
3.0L (6G72) & 3.5L (6G74) V6	C	107-6004	107-6024						
NISSAN/DATSUN									
A Series (A12-A12A-A13-A14-A15)	F	102-6002							
L16 Series M8	C	102-6001							
L20 Series 4-cylinder & 2.2L (Z22) M9	C	202-6001							
L24 Series (early) inline 6 M8	C	202-6002							
L24 (late), L26 & L28 Series inline 6 M9	C	202-6003							

R S T U V W X Y Z AA AB AC AD AE AF AG AH

Red part numbers indicate new items

Application Note: Please verify rod bolt head style against the photos labeled A-AF when replacing rod bolts	Head Style	Hi-Perf 8740 (complete)	Hi-Perf 8740 (2-PC)	HP Wave 8740 (complete)	HP Wave 8740 (2-PC)	Pro Wave ARP2000 (complete)	Pro Wave ARP2000 (2-PC)	Pro Series ARP2000 (complete)	Pro Series ARP2000 (2-PC)
NISSAN/DATSUN (CONTINUED)									
2.0L (SR20DE/DET) 11/32″	C	202-6005							
2.4L (KA24DE) 11/32″	C	102-6003							
2.5L (YD25) 4-cylinder diesel 11/32″	C							202-6008	
2.6L (RB26DET/DETT) Inline 6 11/32″	AA							202-6007	
3.0L (VG30E/ET) SOHC V6 M9	C	202-6003							
3.0L (VG30D/DET/DETT) DOHC V6 11/32″	C	202-6004							
3.5L (VQ35) DOHC V6 M8	E							202-6006	
3.8L (VR38DETT) DOHC V6 Custom Age 625+	E							202-6101	
OLDSMOBILE									
2.3L & 2.4L Quad 4	T	181-6001							
307-350-403-425 cid	U	184-6001	184-6021						
455 cid	F	185-6001	185-6021						
OPEL/VAUXHALL									
1.4L & 1.6L 8V M8	E	109-6002							
1.4L 16V M9	E	109-6003							
2.0L 16V M9	E	109-6001						209-6003	
PEUGEOT									
205 & 306	AC	117-6101							
PONTIAC									
151 cid (Iron Duke) 4-cylinder 11/32″	D	191-6001							
3800 V6 (cap screw type) 1.700″ UHL	E							123-6002	123-6022
301 cid	D	194-6001							
287-317-347-370-389 cid (1955-62)	R	190-6002	190-6022						
326-389-400-455 cid (1963 & later) 3/8″	F	190-6001	190-6021						
455 Super Duty 7/16″	AC	190-6003	190-6023						
455 Super Duty (cap screw type) 7/16-24	E	190-6004							
PORSCHE									
RSR Ti rod	E					204-6004			
1.7L & 2.0L Type IV	K	104-6006							
2.0L 911S (1969)	H					204-6003			
911/930 Turbo & 933 M9	H					204-6005			
911 M10	H					204-6001			
944	Z					204-6002			
986/987/996 & 997 (cap screw type) M9	E							204-6301	
RENAULT									
Clio (F4R) 16V M9	E							216-6301	

A B C D E F G H I J K L M N O P Q

Application Note: Please verify rod bolt head style against the photos labeled A-AF when replacing rod bolts	Head Style	Hi-Perf 8740 (complete)	Hi-Perf 8740 (2-PC)	HP Wave 8740 (complete)	HP Wave 8740 (2-PC)	Pro Wave ARP2000 (complete)	Pro Wave ARP2000 (2-PC)	Pro Series ARP2000 (complete)	Pro Series ARP2000 (2-PC)
RENAULT (CONTINUED)									
R5 Turbo (Mid-Engine)	E							216-6302	
R12 Gordini/Alpine (807g)	E	116-6001							
ROVER - SEE BMC, PAGE 34									
SEA-DOO									
Rotax RXP-X255	E							168-6001	
SUBARU									
1.8L (EJ18) & 2.2L (EJ22) SOHC, 2.5L (EJ25) SOHC/DOHC Non Turbo & 2.0L (EJ20) DOHC Turbo	Q					260-6301			
Subaru 2.0L 4-cylinder FA20	E							260-6303	
2.5L (EJ25) DOHC Turbo	E							260-6302	
SUZUKI									
GSX 1300 Hayabusa	E							271-6301	
M16A		171-6001							
TOYOTA									
1.6L (4AGE) DOHC & 1.6L (4ALC) SOHC M9	F	203-6001							
1.6L (2TC/2TG) & 1.8L (3TC)	F	203-6003							
1.8L (2ZZGE)	E							203-6301	
2.0L (3SGTE) & 2.4L (22R)	A	203-6002							
2.0L 4-cylinder 4U-GSE	E							203-6302	
3.0L (7MGTE) inline 6 (1986-92) Supra	O	203-6004							
3.0L (2JZGE/GTE) inline 6 (1993-98) Supra	E							203-6005	
TRIUMPH - SEE BMC, PAGE 35									
VOLKSWAGEN/AUDI									
Audi 5-cylinder	L							104-6007	
Formula Vee (cap screw type) M9	E	104-6005	104-6025						
Super Vee (cap screw type) Audi-style rod	E							104-6003	104-6023
1600cc air-cooled	K	104-6001							
Air-cooled early & late 40HP and 1500cc M9	E	104-6008	104-6028						
1600cc water-cooled Rabbit & Corrado G60	K	104-6002							
1.8L & 2.0L water cooled	L							104-6004	104-6024
2.0L (FSI/TFSI) DOHC 4-cylinder, M8	E							204-6302	
2.0L (FSI/TFSI) DOHC 4-cylinder, M9	E	204-6303							
2.7L (APB/BEL) Turbo & 2.8L (AFC/ACK/AHA/ATQ) Non Turbo V6	E							204-6201	
2.8L & 2.9L VR6	E							204-6006	
VAUXHALL - SEE OPEL, PAGE 39									
VOLVO									
2.5L (B5254) DOHC 5-cylinder	E							219-6201	

R S T U V W X Y Z AA AB AC AD AE AF AG AH

Red part numbers indicate new items

CYLINDER HEAD STUDS

It is for good reason that virtually every top professional engine builder relies on ARP Pro Series head studs for their all-out competition powerplants. Simply stated, there's not a better stud setup on the market today.

For openers, ARP only uses premium grade 8740 alloy and a proprietary ARP2000® alloy that are rated far superior to "aircraft" quality alloy steels. Secondly, each stud is placed vertically into special racks and precisely heat-treated to 190,000 psi for the 8740 material and 220,000 psi for the ARP2000® material. This procedure ensures complete heat penetration and the results are far superior to those lesser quality studs from other manufacturers who just dump pieces in a basket and hope for the best.

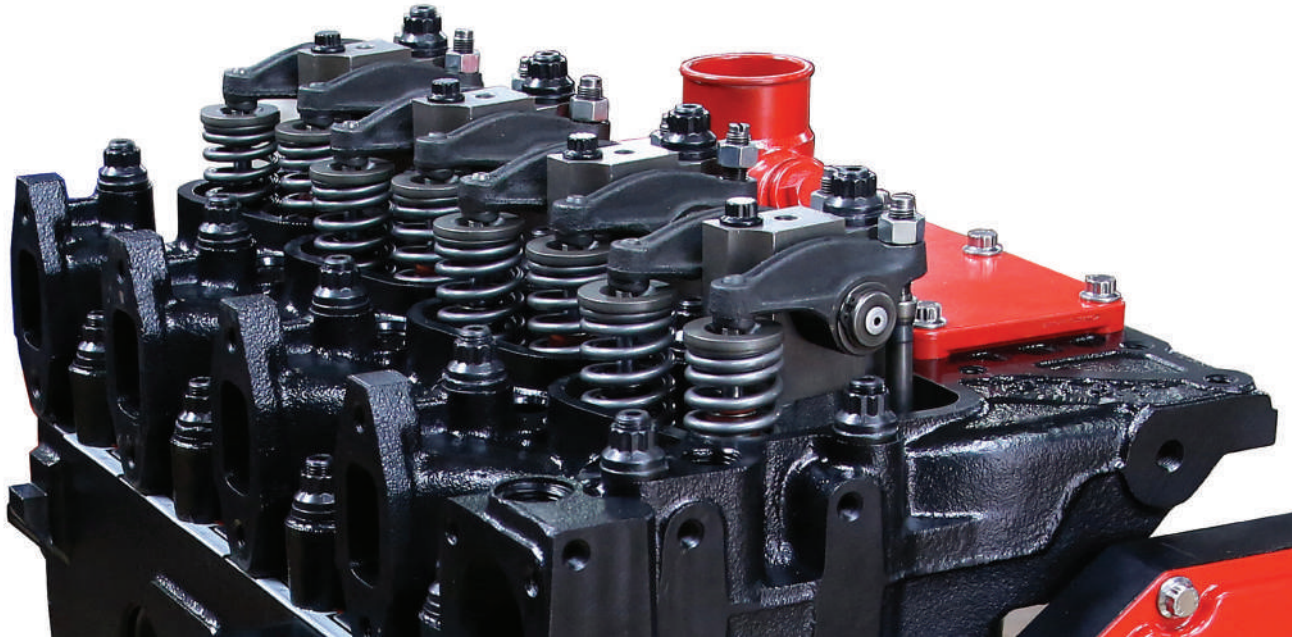
Following heat-treat, each stud is centerless ground to make it as close to perfectly concentric as possible. This procedure involves about ten very slight cuts and results in an exceptionally straight part. It's important to note that lesser quality studs are not even centerless ground – the material is thread rolled in bar stock form (mostly before heat-treat, when the material is easier to machine). Because ARP studs are manufactured to such exacting tolerances, you will note that gaskets and cylinder heads literally glide into position and are perfectly aligned – something that won't happen with inferior quality head studs.

ARP studs are thread rolled after heat-treat, which gives them about 2000% (that's twenty times) better fatigue strength than those studs that are threaded prior to heat-treat (a very common industry practice). It costs a lot more to do it this way, because it's tough on tooling, but the results are well worth the extra effort.

You will also note that ARP offers specially undercut studs for several engines. This procedure (done only to the shorter studs) more equalizes the "stretch" of both studs, which makes for a more consistent clamping force – and one that compensates for head gasket compression when the cylinder heads are installed. This helps prevent blown head gaskets, and assures optimum engine sealing!

Premium quality 8740 and ARP2000® head stud kits are available for most domestic and import applications. You won't find a better quality stud on the market from any other source. Look for ARP stamped on each stud as your assurance of quality.

Clearly, they are the best on the market today, and the favorite of leading professional engine builders in all forms of racing.



HEAD STUDS vs. BOLTS...A TECHNICAL DISCUSSION

ARP's factory Tech Representatives are often asked which is better, cylinder head studs or bolts. The answer, invariably, depends on the installation. On many street-driven vehicles, where master cylinders and other items protrude into the engine compartment, it's probably necessary to use head bolts so that the cylinder heads can be removed with the engine in the car.

For most applications, however, studs are recommended. And for good reason. Using studs will make it much easier to assemble an engine (especially a racing powerplant which must be serviced frequently and quickly!) with the cylinder head and gasket assured of proper alignment.

Studs also provide more accurate and consistent torque loading. Here's why. When you use bolts to secure the head, the fastener is actually being "twisted" while it's being torqued to the proper reading. Accordingly, the bolt is reacting to two different forces simultaneously. A stud should be installed in a "relaxed" mode – never crank it in tightly using a jammed nut.

If everything is right, the stud should be installed hand tight. Then, when applying torque to the nut, the stud will stretch only on the vertical axis. Remember, an undercut shorter stud will have a rate similar to a longer, standard shank stud. This provides a more even clamping force on the head.

Because the head gasket may compress, check with your gasket manufacturer to see if retorquing is required.

Application	Hex Nuts	Hex Nuts U/C Studs	12-Point Nuts	12-Point Nuts U/C Studs
ACURA - SEE HONDA/ACURA, PAGE 50				
AMC				
258 cid inline 6, early 1970's, 1/2˝ all same length studs	112-4001 ▲			
290-343-390 cid (1969 & earlier) 7/16"	114-4001 ▲		114-4201 ▲	
304-360-390-401 cid (1970 & later) 1/2"	114-4002 ▲		114-4202 ▲	
401 cid with Indy heads			114-4203 ▲	
BMC/TRIUMPH				
A Series, 9 studs			206-4201 ▲	
A Series, 11 studs			206-4204 ▲	
A Series, 11 studs, shaved head			206-4206 ▲	
B Series			206-4202 ▲	
1.3L & 1.5L Spitfire			206-4203 ▲	
2.0L GT6 & 2.5L TR6			206-4205 ▲	
2.0L SOHC TR7				206-4208 ▲
2.1L TR4			206-4207 ▲	
BMW				
S1000RR Motorcycle			201-4306 ▲	
1.5L-2.0L (M10) 4-cylinder (2002 Coupe, 318i, 320i)				201-4601 ▲
1.6L (W10, W11) Mini – supercharged & non-supercharged (2002-08 Chrysler engine) 8740			201-4301 ▲	
1.6L (N12/N14/N16/N18) Mini – turbocharged & non-turbocharged (2007-15 Peugeot engine) ARP2000			201-4304 ▲	
2.3L (S14) 4-cylinder				201-4605 ▲
2.5L (M20) SOHC inline 6			201-4305 ▲	
2.5L (M50), 3.0L (S50US) & 3.2L (S52US) inline 6 ARP2000			201-4302 ▲	
3.0L & 3.4L (M30) SOHC inline 6 (530, 535, 635, 735)				201-4602 ▲
3.2L (S54) inline 6 ARP2000			201-4303 ▲	
4.0L (S65) V8 ARP2000			201-4307 ▲	
BUICK				
V6 Stage I (1977-85)	123-4001 ▲		123-4201 ▲	
V6 Grand National and T-Type (1986-87)	123-4003 ▲		123-4203 ▲	
V6 with 1986-87' block and GN1 Champion heads			223-4204 ▲	
V6 Stage II	223-4002 ▲		223-4202 ▲	
V6 Stage II with Champion heads			223-4203 ▲	
215 cid	124-4002 ▲		124-4202 ▲	
215 cid, Rover V8	124-4003 ▲			
350 cid	124-4001 ▲		124-4201 ▲	
401-425 cid, nail head	124-4004 ▲		124-4204 ▲	
455 cid	125-4001 ▲		125-4201 ▲	

Red part numbers indicate new items

Application	Hex Nuts	Hex Nuts U/C Studs	12-Point Nuts	12-Point Nuts U/C Studs
CATERPILLAR - SEE DIESEL, PAGE 47				
CADILLAC				
472-500 cid with 6 & 12 pt nuts for clearance	135-4007 ▲			
CHEVROLET, SMALL BLOCK				
23° OEM cast iron and aluminum Chevrolet, Gen III Vortec/Truck; LT1 Airflow Research, Brownfield; Brodix -8,-10,-11, Track I, Dart Sportsman and Dart II, most Edelbrock, Trick Flow & most World Products iron and aluminum heads	134-4001 ▲	234-4401 ▲	234-4301 ▲	234-4601 ▲
18° standard port	234-4107 ▲	234-4507 ▲	234-4307 ▲	234-4707 ▲
18° raised port	234-4108 ▲	234-4508 ▲	234-4308 ▲	234-4708 ▲
18° Bowtie heads with 3/8"raised intake #10134363/364			234-4321 ▲	234-4721 ▲
18° with 3/8˝ holes			234-4322 ▲	
18° Chevy heads w/ Brodix, Rodeck aluminum block			234-4710 ▲	
7/16˝-3/8˝ stepped	234-4015 ▲		234-4315 ▲	
Aluminum Block with Brodix -12 & 12x heads	234-4123 ▲			
Aluminum Bowtie splayed bolt head			234-4213 ▲	
Brodix -12, and Brodix 18°	234-4103 ▲	234-4503 ▲	234-4303 ▲	234-4703 ▲
Brodix -12 rollover (angle mill)			234-4311 ▲	
Brodix 18° rollover			234-4310 ▲	
Brodix -18c,-18x with 3/8" step stud			234-4727 ▲	
Brodix -18c "AP"				234-4728 ▲
Brodix canted valve			234-4312 ▲	
Brodix-Pontiac raised port	234-4106 ▲	234-4506 ▲	234-4306 ▲	234-4706 ▲
Brodix-Pontiac standard port	234-4105 ▲	234-4505 ▲	234-4305 ▲	234-4705 ▲
Brodix-Rodeck aluminum block w/ -8, 10, 11, 11x, & Track 1 Brodix heads			134-4301 ▲	
Brodix-Rodeck aluminum block w/ 12x, 12RP/GB2000 heads			134-4302 ▲	
Brodix-Rodeck aluminum block w/ 23° aftermarket style heads (3/8 & 7/16 studs)			134-4303 ▲	
Brodix-Rodeck aluminum block w/ Brodix Weld-Tech Jones GB2200 heads			134-4304 ▲	
Brodix-Rodeck aluminum block w/ BD1010 & BD2000 heads			134-4305 ▲	
Brodix-Rodeck aluminum block w/ All Pro heads			134-4306 ▲	
Brodix-Rodeck aluminum block w/ 12/18° WT/Clone Brodix head 3/8 ctr bolt holes			134-4307 ▲	
Brodix-Rodeck aluminum block w 12/18° Brodix head, 7/16˝ studs			134-4308 ▲	
Brodix-Rodeck aluminum block w/ Weld-Tech Jones GB2300 heads			134-4309 ▲	
Brodix-Rodeck aluminum block w/ 16° Brodix heads				234-4726 ▲
Brodix-Rodeck aluminum block w/ canted valve Brodix heads			234-4711 ▲	
Bowtie Block with Pro Action 14° head			234-4725 ▲	
Bowtie cast iron and aluminum block with Brodix Weld-Tech Jones -12 & 12x heads				234-4723 ▲
Bowtie cast iron and aluminum block with standard Chevy heads (.950 coarse thread)			234-4320 ▲	234-4720 ▲
Carl Foltz 15° heads			234-4338 ▲	
Dart II, Brodix Track I, 23° Pro Action, Iron Eagle II, iron block	234-4109 ▲	234-4509 ▲	234-4309 ▲	234-4709 ▲

Application	Hex Nuts	Hex Nuts U/C Studs	12-Point Nuts	12-Point Nuts U/C Studs
CHEVROLET, SMALL BLOCK (CONTINUED)				
Dart 13° heads			234-4337 ▲	
Dart 18° heads			234-4323 ▲	
Dart 18° heads w/ II Generation steel block	234-4036 ▲		234-4336 ▲	
Dart, Buick	234-4102 ▲	234-4502 ▲	234-4302 ▲	234-4702 ▲
Dart w/ Oldsmobile 14° heads	234-4104 ▲	234-4504 ▲	234-4304 ▲	234-4704 ▲
Dart Sportsman, .950, coarse thread	134-4002 ▲	234-4402 ▲	234-4332 ▲	234-4602 ▲
Pro Action 14° heads			234-4334 ▲	
Pro Action 14° heads w/ Tall Deck block			234-4335 ▲	
Pro Action 23° heads			234-4333 ▲	234-4433 ▲
SBC w/ -12 aluminum block			234-4324 ▲	
SB2				234-4722 ▲
SB2 w/ Brodix, Rodeck aluminum block			134-4310 ▲	
SB2-2 7/16˝ block w/ 220 ksi ARP2000			234-4724 ▲	
SB2-2 3/8˝ block w/ 220 ksi ARP2000			300-4202 ▲	
SB2-2 3/8˝ block w/ 260 ksi Custom Age 625+			300-4201 ▲	
World - Motown iron block w/ standard SBC heads			134-4201 ▲	
World - Motown aluminum block w/ standard SBC heads			134-4311 ▲	
CHEVROLET, SMALL BLOCK - LS SERIES				
Gen III LS Series small block (2003 & earlier), 4 short, 16 long	234-4110 ▲		234-4316 ▲	
Gen III LS Series small block (2003 & earlier), 4 short, 16 long ARP2000			234-4344 ▲	
Gen III LS Series small block (2003 & earlier), 4 short, 16 long Custom Age 625+			234-4313 ▲	
Gen III/IV LS Series small block (2004 & later) w/ all same length studs			234-4317 ▲	
Gen III/IV LS Series small block (2004 & later) w/ all same length studs ARP2000			234-4345 ▲	
Gen III/IV LS Series small block (2004 & later) w/ all same length studs Custom Age 625+			234-4314 ▲	
Gen III/IV LSX small block ARP2000			234-4319 ▲	
LSA ARP2000			234-4346 ▲	
Dart LS Next iron block with 15 bolt head 7/16˝			234-4340 ▲	
Dart LS Next iron block with 23 bolt head 7/16˝			234-4341 ▲	
RHS - aluminum block w/ RHS LS7 head			234-4339 ▲	
World - Warhawk aluminum block w/ standard LS heads or Warhawk 15° heads				134-4701 ▲
World - 9.240 deck - Warhawk aluminum block w/ Warhawk 12° LS7 heads				134-4702 ▲
World - 9.800 deck - Warhawk aluminum block w/ Warhawk 12° LS7 heads				134-4703 ▲
CHEVROLET, SMALL BLOCK - LT SERIES				
6.2L Gen V (LT1/LT4) ARP2000 without M8 corner bolts			234-4342 ▲	
6.2L Gen V (LT1/LT4) ARP2000 with M8 corner bolts			234-4343 ▲	
6.2L Gen V (LT1/LT4) Custom Age 625+ with M8 corner bolts			234-4347 ▲	

Red part numbers indicate new items

Application	Hex Nuts	Hex Nuts U/C Studs	12-Point Nuts	12-Point Nuts U/C Studs
CHEVROLET, BIG BLOCK				
348-409 cid	135-4002 ▲		235-4202 ▲	
396-402-427-454 Cast iron OEM, Mark IV w/ aluminum factory heads and early Bowtie	135-4001 ▲	235-4401 ▲	235-4201 ▲	235-4601 ▲
396-402-427-454 Cast iron OEM, Mark IV w/ Edelbrock Performer RPM or Pro Top Line heads	235-4018 ▲	235-4518 ▲	235-4318 ▲	235-4718 ▲
396-402-427-454 Cast iron OEM, Mark IV w/ Edelbrock Victor heads	235-4019 ▲	235-4519 ▲	235-4319 ▲	235-4719 ▲
396-402-427-454 Cast iron OEM, Mark IV w/ World Products Merlin heads - 8 long, 2 short exhaust studs	235-4016 ▲	235-4516 ▲	235-4316 ▲	235-4716 ▲
396-402-427-454 Cast iron OEM, Mark IV w/ World Products Merlin heads - 10 long exhaust studs	235-4025 ▲	235-4525 ▲	235-4325 ▲	235-4725 ▲
427 ZL1 Limited Edition, block #12370850, head #12363390/392/399			235-4321 ▲	
454-502 cast iron OEM, Mark V or Mark VI w/ Brodix/Canfield heads	235-4114 ▲	235-4514 ▲	235-4314 ▲	235-4714 ▲
454-502 cast iron OEM, Mark V or Mark VI crate w/ Dart, AFR or World Products Merlin heads	235-4113 ▲	235-4513 ▲	235-4313 ▲	235-4713 ▲
454-502 cast iron OEM, Mark V with Mark V heads or Edelbrock heads	235-4108 ▲	235-4508 ▲	235-4308 ▲	235-4708 ▲
8.1L (496 cid) M10 ARP2000			235-4203 ▲	
AirFlow Research 18° heads	135-4008 ▲		135-4305 ▲	
Bowtie	235-4110 ▲		235-4310 ▲	
Late Bowtie, Dart Merlin, iron and aluminum Dart 360, Edelbrock, Dart Pro 1, AFR, Profiler 24° .750 coarse thread - OEM wet deck block & Gen VI dry deck block	235-4103 ▲	235-4503 ▲	235-4303 ▲	235-4703 ▲
long exhaust studs, ONLY 8 pieces (1.000 coarse thread with nuts and washers)	235-4106 ▲		235-4306 ▲	
Late Bowtie, Dart Merlin, iron and aluminum Dart 360, Edelbrock, Dart Pro 1 (mfg. before 1/1/15, use 235-4118 after 1/1/15), AFR, Profiler 24° 1.000 coarse thread - aftermarket dry deck block	235-4117 ▲		235-4317 ▲	
Brodix, -2, -4, 2x, 3x, Canfield, Holley, Big Duke	235-4102 ▲	235-4502 ▲	235-4302 ▲	235-4702 ▲
Brodix, Sonny Leonard 4.5° Pro Stock heads or Brodix PB1200 heads, w/ cast iron block			235-4320 ▲	
Brodix, Sonny Leonard 14.5° Pro Stock heads or Brodix PB1200 heads, w/ Brodix aluminum block			135-4301 ▲	
Brodix, SR20 heads w/cast iron block			235-4323 ▲	
Brodix, fits BB1 OEFI, 2, 2t, 2x, 2extra, 3, 4, 4extra, 5 heads, w/ Brodix aluminum block			135-4302 ▲	
Brodix, w/ Dart Pro 1 or 360 heads, Pro Top Line, w/ Brodix aluminum block			135-4303 ▲	
Brodix, w/ Big Duke/Big Chief/Edelbrock Victor heads, w/ Brodix aluminum block			135-4304 ▲	
Brodix, w/ Pontiac Pro Stock heads	235-4107 ▲	235-4507 ▲	235-4307 ▲	235-4707 ▲
Dart Big Chief	235-4112 ▲	235-4512 ▲	235-4312 ▲	235-4712 ▲
Dart Pro 1 20° heads (manufactured afterJanuary 2015) 1.000 coarse thread - w/ aftermarket dry deck block	235-4118 ▲			
Dart Pro 1 440 heads- 1.000 coarse thread w/ aftermarket dry deck block		235-4324 ▲		
Edelbrock BV3			135-4306 ▲	
Oldsmobile DRCE	235-4109 ▲	235-4509 ▲	235-4309 ▲	235-4709 ▲
Profiler - Hitman 12° heads			235-4315 ▲	
Symmetrical-spread port Chevy	235-4104 ▲	235-4504 ▲	235-4304 ▲	235-4704 ▲
With GM aluminum block, 7/16˝ diameter	135-4005 ▲	235-4505 ▲	135-4205 ▲	235-4705 ▲
With GM aluminum block, 1/2˝ diameter	135-4006 ▲	235-4506 ▲	135-4206 ▲	235-4706 ▲
World - Merlin aluminum block w/ Merlin Grumpy Jenkins or Dart aluminum heads			135-4207 ▲	
World - Merlin aluminum block w/ Merlin II/III iron and aluminum heads			135-4208 ▲	
World - Merlin III block with Brodix BB3XTRA heads, ARP2000			235-4326 ▲	

Application	Hex Nuts	Hex Nuts U/C Studs	12-Point Nuts	12-Point Nuts U/C Studs
CHEVROLET, 4 AND 6-CYLINDER				
GM 2.2L Ecotec				231-4701 ▲
GMC Vega 140	131-4002 ▲			
Inline 4-cylinder (1962 & later)	131-4001 ▲		131-4201 ▲	
Inline 6-cylinder (1962 & later)	132-4001 ▲		132-4201 ▲	
2.8L 60° V6 M11	233-4003 ▲		233-4303 ▲	
4.3L 90° V6	233-4001 ▲	233-4401 ▲	233-4301 ▲	233-4601 ▲
4.3L 90° V6 with 18° raised port	233-4108 ▲	233-4508 ▲	233-4308 ▲	233-4708 ▲
4.3L 90° V6 with 18° standard port	233-4107 ▲	233-4507 ▲	233-4307 ▲	233-4707 ▲
4.3L 90° V6 with Oldsmobile 14° heads	233-4104 ▲	233-4504 ▲	233-4304 ▲	233-4704 ▲
4.3L 90° V6 with Pontiac raised runner	233-4102 ▲	233-4502 ▲	233-4302 ▲	233-4702 ▲
CHRYSLER, SMALL BLOCK				
273-318-340-360 Wedge	144-4001 ▲		144-4201 ▲	
318-340-360 Wedge with W2 or W-2 Econo heads	144-4002 ▲		144-4202 ▲	
318-340-360 Wedge with W5-W7 heads & 318-360 Magnum with factory or Edelbrock Magnum heads	144-4003 ▲		144-4203 ▲	
318-340-360 Wedge with Edelbrock RPM heads	144-4005 ▲			
318-340-360 Wedge with B1-BS heads	144-4004 ▲		144-4204 ▲	
5.7L, 6.1L & 6.4L Gen III Hemi			244-4300 ▲	
CHRYSLER, BIG BLOCK				
383-400-413-426-440 with Edelbrock Victor heads (77919, 77929)	145-4014 ▲		145-4301 ▲	
383-400-413-426-440 Wedge with factory heads or Edelbrock RPM heads	145-4006 ▲		145-4206 ▲	
383-400-413-426-440 Wedge with Koffel B-1 or Brodix B1 MO/MC heads	145-4007 ▲		245-4307 ▲	
383-400-413-426-440 Wedge with Koffel BTS full or Brodix B1-BS heads	145-4012 ▲			
383-400-413-426-440 Wedge with Indy 440 heads	145-4011 ▲		245-4311 ▲	
331-354-392 factory Hemi & Edelbrock RPM heads	145-4001 ▲		145-4201 ▲	
426 factory Hemi & 426-472-528 Hemi Crate Motor 7/16″	145-4003 ▲		245-4203 ▲	
426 factory Hemi (modified for 1/2")	145-4002 ▲		246-4202 ▲	
Indy Max block w/standard Hemi heads or Indy hemi heads (stud kit w/inner valley bolts)	145-4008 ▲			
KB Hemi - inner valley studs			245-4306 ▲	
KB Hemi (short deck) 1/2″			245-4308 ▲	
CHRYSLER, 4 AND 6-CYLINDER				
KB Hemi (standard deck) 1/2″	245-4005 ▲		245-4305 ▲	
KB Hemi (long deck) 1/2″			245-4309 ▲	
KB Hemi (standard deck) 9/16″			245-4310 ▲	245-4710 ▲
World - Hemi iron & aluminum blocks w/standard Hemi heads or Indy hemi heads	145-4005 ▲			
World - Hemi iron & aluminum blocks - inner valley studs			245-4312 ▲	
2.2L & 2.5L SOHC 4 cylinder M11 ARP2000	241-4501 ▲		241-4701 ▲	

Red part numbers indicate new items

Application	Hex Nuts	Hex Nuts U/C Studs	12-Point Nuts	12-Point Nuts U/C Studs
CHRYSLER, 4 AND 6-CYLINDER (CONTINUED)				
170-225 cid Slant Six	142-4001 ▲			
CUMMINS - SEE DIESEL, BELOW				
DATSUN - SEE NISSAN, PAGE 50				
DIESEL				
Caterpillar C15 ARP2000			238-4201 ▲	
Chevy GMC 6.2L M12	130-4062 ▲			
Chevy Duramax 2.8L ARP2000			230-4203 ▲	
Chevy Duramax 6.6L (2001-2016) (LB7/LLY/LBZ/LMM) ARP2000			230-4201 ▲	
Chevy Duramax 6.6L (2001-2016) (LB7/LLY/LBZ/LMM) Custom Age 625+			230-4202 ▲	
Chevy Duramax 6.6L (2017-2019) (L5P) ARP2000			230-4301 ▲	
Chevy Duramax 6.6L (2017-2019) (L5P) Custom Age 625+			230-4302 ▲	
Cummins 3.9L (4BT) ARP2000			247-4206 ▲	
Cummins 3.9L (4BT) Custom Age 625+			247-4207 ▲	
Dodge/Cummins 5.9L 12V (1989-98) ARP2000			247-4203 ▲	
Dodge/Cummins 5.9L 12V (1989-98) Custom Age 625+			247-4205 ▲	
Dodge/Cummins 5.9L & 6.7L 24V (1998 & later) ARP2000			247-4202 ▲	
Dodge/Cummins 5.9L & 6.7L 24V (1998 & later) Custom Age 625+			247-4204 ▲	
Cummins C8.3 ARP2000			247-4209 ▲	
Cummins ISL 12V ARP2000			247-4210 ▲	
Cummins ISL 24V ARP2000			247-4211 ▲	
Cummins ISV5.0 ARP2000			247-4302 ▲	
Ford 6.0L Power Stroke ARP2000 - Inner row M8 head bolts sold separately			250-4202 ▲	
Ford 6.0L Power Stroke - Inner row M8 head bolts			250-4206 ▲	
Ford 6.0L Power Stroke Custom Age 625+ - Inner row M8 head bolts included			250-4205 ▲	
Ford 6.4L Power Stroke ARP2000 - Inner row M8 head bolts included			250-4203 ▲	
Ford 6.7L Power Stroke ARP2000			250-4301 ▲	
Ford 6.7L Power Stroke Custom Age 625+			250-4302 ▲	
Ford 6.9L International	150-4069 ▲			
Ford 7.3L International (1988-94) ARP2000			250-4204 ▲	
Ford 7.3L Power Stroke (1993-03) ARP2000			250-4201 ▲	
Nissan 2.5L (YD25) 4-cylinder ARP2000			202-4306 ▲	
Oldsmobile 5.7L , 350 cid	184-4003 ▲			
VW/Audi 1.6L & 1.9L Turbo & Non-Turbo (1982-02) ARP2000				204-4706 ▲
DODGE				
2.0L SOHC Neon, block #4667642, head #4556737			141-4203 ▲	
2.0L DOHC Neon, block #4667642, head #4667086			141-4202 ▲	

Application	Hex Nuts	Hex Nuts U/C Studs	12-Point Nuts	12-Point Nuts U/C Studs
DODGE (CONTINUED)				
2.4L DOHC, block #4621443/445, head #4667086			141-4204 ▲	
3.0L (6G72) DOHC V6 ARP2000				207-4205 ▲
Viper Gen II & III (1996-06) ARP2000			247-4201 ▲	
Viper SRT-10, 2008-10, M11 ARP2000			247-4301 ▲	
FORD, SMALL BLOCK				
289-302, 5.0L with factory heads or AFR 185 with 7/16˝ holes	154-4001 ▲	254-4401 ▲	154-4201 ▲	254-4701 ▲
289-302, 5.0L with 351 Windsor head, 7/16˝-14 cylinder block thread M-6049-J302, SVO high port & M-6049-L302, AFR 185 with 1/2" holes Edelbrock aluminum , GT-40 style with insert "T" washer	154-4005 ▲	254-4405 ▲	154-4205 ▲	254-4705 ▲
Boss 302 (1969-70) 7/16-14 cylinder block threads	154-4002 ▲		154-4202 ▲	
Boss 302 (M6010) Ford Racing block with 351C iron heads - 1/2-13 cylinder block threads	154-4207 ▲		154-4206 ▲	
351 Windsor with factory heads, M-6049-J302, SVO high port and M-6049-L302 GT-40 style, Edelbrock aluminum and Iron Dart with 1/2-13 cylinder block threads	154-4003 ▲	254-4503 ▲	154-4203 ▲	254-4703 ▲
351 Cleveland, 351-400M	154-4004 ▲		154-4204 ▲	
351 SVO Yates design	254-4109 ▲		254-4309 ▲	
351 SVO Yates 1994 design	254-4110 ▲		254-4310 ▲	
351 SVO and Fontana aluminum blocks w/'94 or later Yates heads	254-4102 ▲	254-4101 ▲	254-4302 ▲	254-4301 ▲
351 "R" block with C3 heads	254-4111 ▲	254-4501 ▲	254-4311 ▲	254-4601 ▲
351 "R" block w/6049-N351 heads	254-4112 ▲		254-4314 ▲	
Std. 351 Block w/6049-N351 heads	254-4113 ▲		254-4315 ▲	
351 "R" block with Brodix/Neal heads or Blue Thunder heads			254-4312 ▲	
Glidden Victor SC-1 heads for Ford Windsor			154-4303 ▲	
World - Man O'War iron/aluminum block w/ standard SBF or Man O'War 18° heads			154-4301 ▲	
World - Man O'War iron/aluminum block w/ Man O'War 10° heads			154-4302 ▲	
FORD, BIG BLOCK				
390-428 FE series with factory heads or Edelbrock heads	155-4001 ▲		155-4201 ▲	
390-428 FE series with Blue Thunder heads			155-4204 ▲	
427 SOHC	155-4002 ▲		155-4202 ▲	
429-460 cid with factory heads & 429CJ SVO alum #M-6049-A429, also Edelbrock, KAASE	155-4003 ▲		155-4203 ▲	
460 SVO aluminum, M-6049-A460 & M-6049-B460, C460 (must use 12pt. nuts)			255-4304 ▲	
460 cid with Blue Thunder heads	255-4101 ▲		255-4301 ▲	
460 cid with Trick Flow "Pro Stock" heads			255-4305 ▲	
6.2L Boss V8			255-4306 ▲	
FORD, COYOTE				
5.0L (2011-2012) M12 ARP2000			256-4702 ▲	
5.0L (2013-2017) M11 ARP2000			256-4301 ▲	
5.0L (2018-2019) M12 ARP2000			256-4302 ▲	
5.2L Shelby GT350 Voodoo (2015-2020) ARP2000			256-4303 ▲	

Red part numbers indicate new items

Application	Hex Nuts	Hex Nuts U/C Studs	12-Point Nuts	12-Point Nuts U/C Studs
FORD, FLATHEAD				
1938-48 (24 stud) V8 w/ Edelbrock #1125 heads - 8740 studs, polished ARP Stainless acorn nuts and washers	154-4101 ▲			
1949-53 (24 stud) V8 w/ Edelbrock #1115 heads - 8740 studs, polished ARP Stainless acorn nuts and washers	154-4102 ▲			
1938-48 (24 stud) V8 w/ Offenhauser heads - 8740 studs, polished ARP Stainless acorn nuts, washers	154-4103 ▲			
1949-53 (24 stud) V8 w/ Offenhauser heads - 8740 studs, polished ARP Stainless acorn nuts, washers	154-4104 ▲			
1936-48 (24 stud) V8 w/ factory heads - 8740 studs, polished ARP Stainless acorn nuts and washers	154-4105 ▲			
FORD, MODULAR				
4.6L & 5.4L 2V/4V	156-4101 ▲		156-4301 ▲	
4.6L & 5.4L 2V/4V ARP2000	256-4001 ▲		256-4201 ▲	
4.6L & 5.4L 3V ARP2000	256-4002 ▲		256-4202 ▲	
FORD, 4, 5 AND 6-CYLINDER				
1600cc, Escort M10			151-4203 ▲	
1.6L EcoBoost ARP2000			251-4302 ▲	
2.0L (YB) DOHC Cosworth Sierra/Escort M12				251-4701 ▲
2.0L Zetec				251-4702 ▲
2000cc Pinto			151-4201 ▲	
2300cc Pinto			151-4202 ▲	151-4702 ▲
2.3L Duratec (2003 & later)			151-4204 ▲	
2.3L EcoBoost			151-4301 ▲	
2.5L Duratec V6			253-4701 ▲	
2.7L EcoBoost				153-4302 ▲
2.5L (B5254) DOHC 5-cylinder ARP2000				251-4703 ▲
3.5L EcoBoost				153-4303 ▲
3.8L V6 Super Coupe T-bird	153-4001 ▲		153-4203 ▲	
4.0L SOHC V6			253-3701 ▲	
4.0L (XR6) inline 6 ARP2000 M12			252-4302 ▲	
4.0L (XR6) inline 6 ARP2000 M14 to 1/2" diameter step stud conversion			252-4301 ▲	
4.5L SVO inline valve V6, head #M6049-H380	253-4102 ▲		253-4302 ▲	
Model A 201 cid, 4-cylinder - 8740 studs, polished ARP Stainless acorn nuts and washers	151-4002 ▲			
240-300 cid inline 6	152-4001 ▲		152-4201 ▲	
GENERAL MOTORS				
2.2L Ecotec				231-4701 ▲
HOLDEN				
Commodore V6 (7/16" diameter)	205-4002 ▲			
308 cid with 12 bolt head (early) carbureted (7/16" diameter)	205-4001 ▲			205-4601 ▲
308 cid with 12 bolt head (early) carbureted (7/16" diameter - 1/2" longer than stock)				205-4602 ▲
308 cid with 10 bolt head (late) EFI (7/16" diameter)			205-4201 ▲	

Application	Hex Nuts	Hex Nuts U/C Studs	12-Point Nuts	12-Point Nuts U/C Studs
HOLDEN (CONTINUED)				
308 cid with 10 bolt head (1/2″ diameter)			234-4201 ▲	
HONDA/ACURA				
1.5L (L15) SOHC			208-4308 ▲	
1.6L (B16A)				208-4601 ▲
1.6L (D16Y) Civic			208-4305 ▲	
1.6L (D16Z-Only) M10			208-4301 ▲	
1.8L (B18A1) Non-VTEC, Acura M11				208-4302 ▲
1.8L (B18C1) VTEC, Acura GS-R M11				208-4303 ▲
2.0L (B20A5)				208-4703 ▲
2.0L (B20B) with B16A head				208-4306 ▲
2.0L (F20) S2000				208-4702 ▲
2.0L (K20A2/A3) VTEC				208-4701 ▲
2.2L (H22A4) VTEC				208-4304 ▲
2.3L (H23A) VTEC				208-4307 ▲
3.0/3.2L NSX 1990-95, ARP2000, 12pt			208-4309 ▲	
HYUNDAI				
2.0L (G4KF) ARP2000			228-4301 ▲	
JEEP				
4.0L inline 6, 1/2″ (two lengths)			146-4201 ▲	
LANCIA				
2.0L 16V Delta Integrale ARP2000				275-4701 ▲
MAZDA				
1.6L (B6) & 1.8L (BP) DOHC Miata			218-4701 ▲	
2.0L FS-DE (1998-02)			218-4703 ▲	
2.3L DOHC 16V (2003 & later)			218-4702 ▲	
2.5L (KL) Series V6 ARP2000				218-4704 ▲
MITSUBISHI				
2.0L (4B11) DOHC (2008 & later) ARP2000			207-4206 ▲	
2.0L (4B11) DOHC (2008 & later) Custom Age 625+			207-4207 ▲	
2.0L (4G63) DOHC (1993 & earlier) M12			207-4201 ▲	207-4701 ▲
2.0L (4G63) DOHC (1994-07) M11			207-4203 ▲	207-4702 ▲
2.0L (4G63) DOHC (1994-07) M11 Custom Age 625+			207-4302 ▲	
2.6L (G54B)			207-4202 ▲	
3.0L (6G72) DOHC V6 ARP2000				207-4205 ▲
NISSAN/DATSUN				
A-12 engines			202-4202 ▲	

Red part numbers indicate new items

Application	Hex Nuts	Hex Nuts U/C Studs	12-Point Nuts	12-Point Nuts U/C Studs
NISSAN/DATSUN (CONTINUED)				
A-14 engines			202-4203 ▲	
L20 series, 4-cylinder			202-4201 ▲	
L24, L26, L28 series, 6-cylinder			202-4206 ▲	
1.6L (CA16DE/DET) & 1.8L (CA18DE/DET)			202-4302 ▲	202-4702 ▲
2.0L (SR20DE/DET) DOHC (1991-01) M11				102-4701 ▲
2.0L (SR20DET/RN14) DOHC Turbo (1991-94) M12			202-4303 ▲	
2.0L (RB20DE/DET) & 2.5L (RB25DE/DET) inline 6			202-4301 ▲	
2.4L (KA24DE) DOHC			202-4304 ▲	
2.4L (KA24E) SOHC			202-4307 ▲	
2.5L (YD25) 4-cylinder diesel ARP2000			202-4306 ▲	
2.5L (RB25DE/DET) inline 6 ARP2000 M11			202-4309 ▲	
2.6L (RB26DETT) GT-R inline 6 ARP2000			202-4207 ▲	
2.6L (RB26DETT) GT-R inline 6 Custom Age 625+			202-4208 ▲	
3.0L (VG30DE/DETT) DOHC V6			202-4308 ▲	
3.0L (VQ30) & 3.5L (VQ35) DOHC V6				202-4701 ▲
3.8L (VR38DETT) DOHC V6 Custom Age 625+			202-4305 ▲	
OLDSMOBILE				
2.3L Quad 4			281-4301 ▲	
215 cid, aluminum heads	184-4002 ▲		184-4202 ▲	
403 cid	184-4004 ▲		184-4204 ▲	
Batton	184-4005 ▲		184-4205 ▲	
455 cid with factory heads or Edelbrock heads 7/16˝	185-4001 ▲		185-4201 ▲	
OPEL/VAUXHALL				
2.0L 16V			209-4301 ▲	209-4701 ▲
2.5L V6 Opel			209-4302 ▲	209-4702 ▲
POLARIS				
RZR 1000 ARP2000				288-4701 ▲
PONTIAC				
Iron Duke 4 cylinder 1/2”	191-4001 ▲		191-4201 ▲	
Super Duty 4 cylinder with “Iron Duke” head	290-4101 ▲		290-4301 ▲	
3800 supercharged V6 (L67 Regal, SC Monte Carlo, Impala) (1999 & later)	193-4001 ▲		193-4002 ▲	
Ram Air 2 & 455			190-4201 ▲	
Ram Air 5	190-4005 ▲		190-4205 ▲	
350-400-428-455 cid with D port heads (1967 & later)	190-4002 ▲		190-4202 ▲	
400 Ram Air 2 and 4, 455 HO and 455 Super Duty with Round port heads (1968-74)	190-4003 ▲		190-4203 ▲	
400-455 cid with Edelbrock Performer & RPM heads 60579, 60599 (mfg. before 3/15/02) (#8556)			190-4304 ▲	

Application	Hex Nuts	Hex Nuts U/C Studs	12-Point Nuts	12-Point Nuts U/C Studs
PONTIAC				
400-455 cid with Edelbrock Performer & RPM heads 60579, 60599 (mfg. after 3/15/02) (#8549)			190-4305 ▲	
400-455 cid with Edelbrock Performer D port heads 61579, 61599 (#8561)			190-4306 ▲	
PORSCHE				
2.0L-3.8L air cooled engines - 911 & 930 Turbo - premium austenitic studs, Dilivar replacement				204-4206 ▲
2.5L SOHC/DOHC water cooled engines - 944				204-4211 ▲
3.0L DOHC water cooled engine - 944				204-4301 ▲
3.4L water cooled engine - 911 (996) Non-Turbo				204-4707 ▲
3.6L Turbo water cooled engine - 911 (996) Turbo				204-4210 ▲
RENAULT				
2.0L (F4R) DOHC ARP2000			216-4301 ▲	
ROVER				
K Series				206-4209 ▲
3.5L, 3.9L & 4.2L V8 with 14 bolt heads	124-4003 ▲			
3.9L, 4.0L, 4.2L & 4.6L V8 with 10 bolt heads			157-4301 ▲	
SATURN				
1.9L DOHC (1991-99)			165-4202 ▲	
1.9L SOHC (1999-02)			165-4201 ▲	
SEA-DOO				
Rotax RXP-X255			168-4201 ▲	
SUBARU				
EJ Series DOHC ARP2000				260-4701 ▲
EJ Series DOHC Custom Age 625+				260-4704 ▲
EJ Series SOHC ARP2000				260-4702 ▲
2.0L (FA20) DOHC ARP2000			260-4301 ▲	
SUZUKI				
GSX 1300R Hayabusa with cylinder spacer (1999-05) ARP2000				271-4701 ▲
1.6L (M16A) DOHC ARP2000			271-4301 ▲	
TRIUMPH - SEE BMC, PAGE 42				
TOYOTA				
1.5L (1NZFE) DOHC ARP2000			203-4101 ▲	
1.6L (4AGE) 16V DOHC			203-4203 ▲	
1.6L (4AGE) 20V DOHC ARP2000			203-4304 ▲	
1.6L (2TC) & 1.8L (3TC)			203-4206 ▲	
1.6l (1ZZFE) DOHC ARP200				203-4703 ▲
1.8L (2ZZGE) DOHC ARP2000			203-4302 ▲	
2.0L (3SGTE) DOHC			203-4204 ▲	

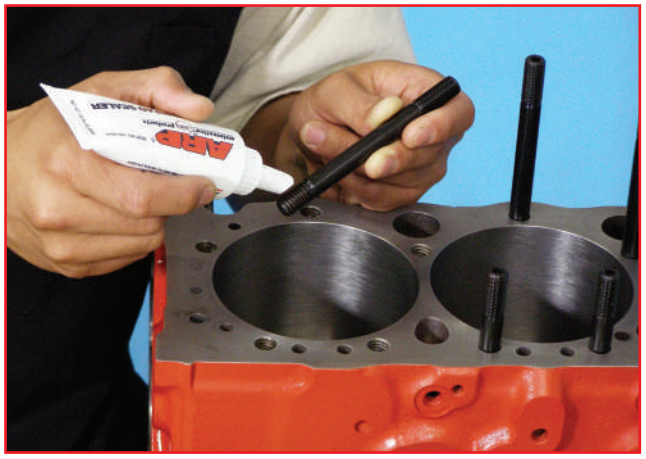
Red part numbers indicate new items

Application	Hex Nuts	Hex Nuts U/C Studs	12-Point Nuts	12-Point Nuts U/C Studs
TOYOTA (CONTINUED)				
2.0L (3SGTE) DOHC Custom Age 625+			203-4207 ▲	
2.0L (4U-GSE) DOHC ARP2000			203-4305 ▲	
2.4L (2AZFE) DOHC, 2006 & earlier ARP2000			203-4303 ▲	
2.4L (2AZFE) DOHC, 2007 & later ARP2000			203-4306 ▲	
2.4L (22R)			203-4201 ▲	
3.0L (7MGE/GTE) inline 6 (1981-92) Supra			203-4202 ▲	203-4701 ▲
3.0L (2JZGE/GTE) inline 6 (1993-98) Supra			203-4205 ▲	203-4702 ▲
3.0L (2JZGE/GTE) inline 6 (1993-98) Supra Custom Age 625+			203-4301 ▲	
3.8L (F Series) inline 6 (1969-74)	203-4001 ▲			
5.7L 3UR-FE ARP2000				203-4704 ▲
VAUXHALL - SEE OPEL, PAGE 51				
VOLKSWAGEN/AUDI				
Audi 5 cylinder, 10 valve			204-4205 ▲	204-4703 ▲
Audi 5 cylinder, 20 valve			204-4207 ▲	204-4704 ▲
Volkswagen air-cooled, single port, M8			204-4303 ▲	
Volkswagen air-cooled, dual port, M8			204-4304 ▲	
Volkswagen air-cooled, single port, M10			204-4305 ▲	
Volkswagen air-cooled, dual port, M10			204-4306 ▲	
Volkswagen air-cooled, single port, M10 (with M14 repair thread)			204-4307 ▲	
Volkswagen air-cooled, dual port, M10 (with M14 repair thread)			204-4308 ▲	
1.6L & 1.9L Turbo & Non-Turbo diesel (1982-02) ARP2000				204-4706 ▲
1.8L & 2.0L 8V Golf/Jetta & 1.6L Super Vee M11			204-4203 ▲	204-4701 ▲
1.8L & 2.0L 16V Golf/Jetta			204-4204 ▲	204-4702 ▲
1.8L DOHC 20V Turbo M10/ARP2000 (without installation tool)			204-4103 ▲	
1.8L DOHC 20V Turbo M10, ARP2000 (with installation tool)			204-4104 ▲	
1.8L DOHC 20V Turbo M11, ARP2000 (without installation tool) (early AEB)			204-4101 ▲	
1.8L DOHC 20V Turbo M11, ARP2000 (with installation tool) (early AEB)			204-4102 ▲	
2.0L (FSI/TFSI) DOHC, ARP2000			204-4302 ▲	
2.7L (Bi-Turbo) DOHC V6, ARP2000			204-4105 ▲	
2.8L & 2.9L (VR6) 12 valve				204-4705 ▲
VOLVO				
2.5L (B5254) DOHC 5-cylinder ARP2000				219-4301 ▲

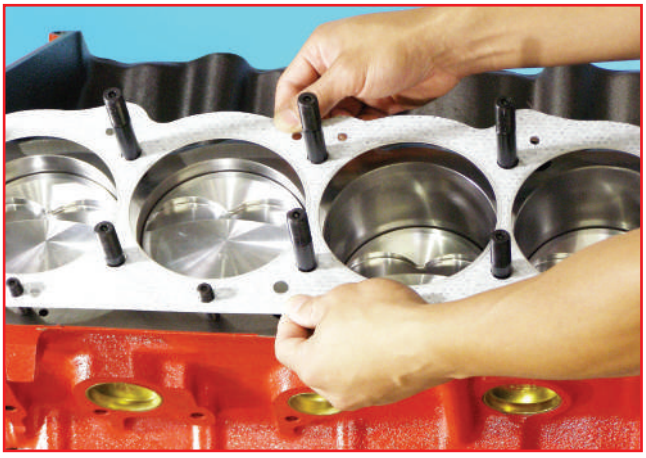
HEAD STUD INSTALLATION

1. Clean and chase all bolt threads in block to ensure proper thread engagement and accurate torque readings.

2. All hardware should be cleaned and inspected for possible shipping damage prior to installation.



3. Since most studs extend into the water jacket, coat threads with ARP thread sealer and screw in hand tight ONLY.



4. Install gasket and head, then lubricate the stud threads, the washers and nuts with ARP Ultra-Torque fastener assembly lubricant prior to their installation.

5. Following the engine manufacturer's torque sequence, tighten the nuts to the recommended torque value found on the instruction sheet provided with each kit.

NOTE: To ensure positive sealing of "wet" head studs, a hardening or semi-hardening sealant, such as Loc-Tite or Permatex, etc. should be used. Some engine builders employ a sealer in the coolant, such as Aluma-Seal, Silver Seal or K&W sealer, etc. You may also use high temperature RTV silicone. Whatever product is used, it is best if the cylinder head is installed and torqued to proper levels ***BEFORE THE SEALANT HAS CURED!***

CYLINDER HEAD BOLTS

HIGH PERFORMANCE SERIES

High Performance head bolts are available with a reduced wrenching hex or 12-point and wide area flanged head that eliminates the need for valve train removal to facilitate cylinder head retorquing. All High Performance Series bolts are 180,000 psi (which is 15% stronger than Grade 8) and kits come complete with hardened parallel-ground washers.

PROFESSIONAL SERIES

All Pro Series bolts are cold-forged to ensure molecular integrity, heat-treated prior to thread rolling and machining, and meet the ARP "ZERO defect – ZERO failure" quality standard. ARP Pro Series head bolt kits are application specific and designed to deliver superior strength typically associated with competition engines. Pro Series kits are available in standard (8740) 190,000 psi tensile strength material and proprietary (ARP2000®) 220,000 psi tensile strength material where noted. All Pro Series head bolts have a reduced wrenching hex or 12-point head and wide area flange to permit the use of larger diameter valve springs and eliminate the need for valve train removal during cylinder head retorquing. Hardened parallel-ground washers are included in each kit. Most applications have undercut short bolts that can help eliminate head gasket failures through providing more "stretch" to compensate for the additional compression of gaskets.

Application	High Performance		Pro Series		Stainless	
	Hex	12-Point	Hex	12-Point	Hex	12-Point
AUDI - SEE VOLKSWAGEN, PAGE 59						
AMC						
258 cid inline 6 with 1/2″ bolts, all same length	112-3601▲					
290-343-390 cid (1969 and earlier) 7/16″	114-3601▲					
290-343-390 cid (1969 and earlier) with Edelbrock heads 7/16″	114-3605▲					
304-360-390-401 cid (1970 & later) 1/2″	114-3602▲					
304-360-390-401 cid (1970 & later) with Edelbrock heads 1/2″	114-3604▲					
401 cid with Indy heads	114-3603▲					
BUICK						
V6 Stage I (1977-85)	123-3601▲	123-3701▲		223-3701▲	423-3601●	423-3701●
V6 Grand National and T-Type (1986-87)	123-3603▲	123-3703▲		223-3703▲		
V6 with 1986-87' block and GN1 Champion heads				223-3705▲		
V6 Stage II				223-3700▲		

Application	High Performance		Pro Series		Stainless	
	Hex	12-Point	Hex	12-Point	Hex	12-Point
BUICK (CONTINUED)						
V6 Stage II with Champion heads				223-3704▲		
V6 with Duttweiler and M&A aluminum heads	123-3602▲					
350 cid	120-3601▲					
350 cid (black oxide inner rows, stainless steel outer row)					420-3601▲	
455 cid	125-3601▲					
CHEVROLET, SMALL BLOCK						
23° Cast iron OEM, Gen III Vortec/Truck, most Edelbrock, LT-AFR, Brodix-8,-10,-11,-11xb, LT-1, Dart Pro-1, Trick Flow heads & most World Products heads	134-3601▲	134-3701▲		234-3701▲	434-3601●	434-3701●
23° Cast iron OEM, Gen III Vortec/Truck, most Edelbrock, LT-AFR, Brodix-8,-10,-11,-11xb, LT-1, Dart Pro-1, Trick Flow heads & most World Products heads (black oxide inner rows, stainless steel outer row)	134-3603▲	134-3703▲				
23° Pro Action head	134-3604▲					
12-Rollover Brodix, 18° Brodix	134-3602▲	134-3702▲		234-3702▲		
18° standard port	134-3607▲			234-3707▲		
18° standard port with undercut bolts				234-3723▲		
18° hi-port	134-3608▲			234-3708▲		
18° hi-port with undercut bolts				234-3720▲		
18° hi-port with 3/8˝ holes, casting #10134363 and 64				234-3721▲		
18° hi-port with 3/8˝ holes, casting #10134363 and 64 with undercut bolts				234-3722▲		
Bowtie with Brodix 12 - Weld-Tech, Dart II, WP Sportsman II, Brodix Track I				234-3703▲		
Dart-Buick				234-3709▲		
Oldsmobile 14°				234-3705▲		
Pontiac Brodix aluminum heads, raised intake, -10xz RI				234-3704▲		
CHEVROLET, SMALL BLOCK - LS SERIES						
	8740 (190,000 psi)		ARP2000 (220,000 psi)		Polished Inconel (220,000 psi)	
Gen III LS Series small block (2003 & earlier), two lengths	134-3609▲	134-3709▲	234-3601▲	234-3724▲	434-3609▲	434-3709▲
Gen III LS Series small block (2004 & later - except LS9) w/ all same length bolts	134-3610▲	134-3710▲	234-3602▲	234-3725▲	434-3610▲	434-3710▲
Gen IV 6.2L (LS9) small block	130-3601▲	130-3701▲	230-3601▲	230-3701▲	430-3601▲	430-3701▲
LSA	134-3613▲	134-3713▲	234-3603▲	234-3726▲	434-3613▲	434-3713▲
World - Motown LS iron block w/ LS Series heads	134-3611▲					
CHEVROLET, SMALL BLOCK - LT SERIES						
Gen V 6.2L (LT1/LT4) small block ARP2000 (without M8 corner bolts)				234-3710▲		
Gen V 6.2L (LT1/LT4) small block ARP2000 (with M8 corner bolts included)				234-3711▲		

Red part numbers indicate new items

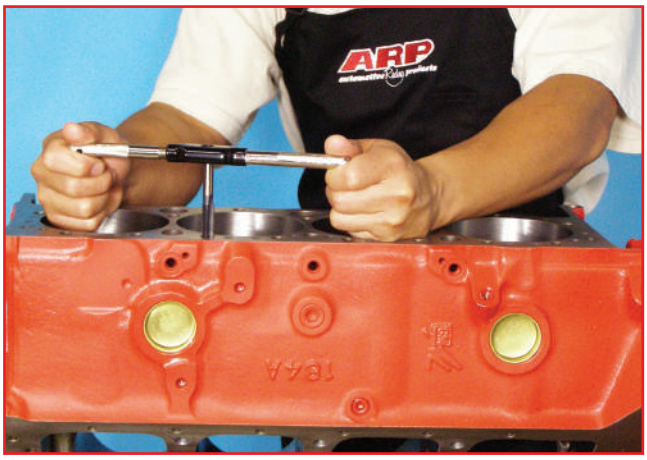
Application	High Performance		Pro Series		Stainless	
	Hex	12-Point	Hex	12-Point	Hex	12-Point
CHEVROLET, BIG BLOCK						
348, 409, Cast iron OEM	135-3602▲					
396-402-427-454 Cast iron OEM	135-3601▲	135-3701▲		235-3701▲	435-3601●	435-3701●
396-402-427-454 Cast iron OEM (black oxide inner rows, stainless steel outer rows)	135-3604▲	135-3704▲				
Mark IV with Late Bowtie aluminum, Iron Dart, Pro-1, Pro Top Line & World Products iron heads	135-3603▲	135-3703▲		235-3703▲	435-3603●	435-3703●
Mark IV block with Brodix-2, -4, Canfield aluminum & World Products aluminum heads	135-3606▲	135-3702▲		235-3702▲	435-3606●	435-3702●
Mark IV block with Edelbrock heads 60409, 60429, 60459, 60479, 60499, 60559	135-3610▲	135-3710▲			435-3610●	435-3710●
Mark IV or Mark V block with Brodix aluminum heads	135-3609▲	135-3709▲		235-3709▲		
Mark IV or Mark V block with Edelbrock heads 77609, 77659, 7760, 7765	135-3611▲	135-3711▲				
Mark IV or Mark V block with Edelbrock heads 77609, 77659, 7760, 7765 with undercut bolts				235-3711▲		
Mark IV or Mark V block with AFR Casting # 315/335/357 with undercut bolts				135-3712▲		
Mark V with 502 heads		135-3706▲		235-3706▲		
Mark V or Mark VI block with late Bowtie, Dart aluminum, AFR & World Products heads	135-3607▲	135-3707▲		235-3707▲		
Dart aluminum head exhaust bolts only, (8 pieces)	135-3605▲	135-3705▲		235-3708▲	435-3605●	435-3705●
Pontiac Pro Stock aluminum head, Brodix				235-3704▲		
Pontiac Pro Stock aluminum head, Dart Big Chief				235-3705▲		
CHEVROLET, 6-CYLINDER						
90° V6				233-3701▲		
90° V6 with 18° standard port	133-3607▲			233-3707▲		
90° V6 with 18° hi-port				233-3708▲		
90° V6 hi-port 3/8˝ holes				233-3721▲		
CHRYSLER, SMALL BLOCK						
273-318-340-360 Wedge	144-3602▲					
318-340-360 Wedge with W-2, W-2 Econo heads or Edelbrock RPM heads	144-3601▲					
318-340-360 Wedge with W-5, W-7 heads	144-3604▲					
318-340-360 Wedge with RHS Pro Action 360 X heads	144-3606▲					
318-360 Magnum with factory heads or Edelbrock Magnum heads	144-3605▲					
5.7L, 6.1L & 6.4L Gen III Hemi				147-3901▲		
CHRYSLER, BIG BLOCK						
383-400-413-426-440 Wedge with factory heads or Edelbrock RPM heads 60919/929/149/189	145-3606▲	145-3706▲			445-3606●	445-3706●
383-400-413-426-440 Wedge with factory heads or Edelbrock RPM heads 60919/929/149/189, with undercut bolts				245-3706▲		

Application	High Performance		Pro Series		Stainless	
	Hex	12-Point	Hex	12-Point	Hex	12-Point
CHRYSLER, BIG BLOCK (CONTINUED)						
383-400-413-426-440 Wedge with Edelbrock Victor heads 77919, 77929	145-3609▲					
383-400-413-426-440 Wedge with Indy 440 heads	145-3607▲					
426 factory Hemi & Mopar 426-472-528 Hemi Crate Motor with factory heads or Edelbrock Hemi Victor Jr. Heads - 7/16˝				145-3901▲		
CHRYSLER, 4-CYLINDER						
2.2L & 2.5L M11 ARP2000				241-3701▲		
CUMMINS						
ISF2.8 ARP2000				247-4301▲		
FORD, SMALL BLOCK						
289-302 with factory heads or Edelbrock heads 60259, 60379	154-3601▲	154-3701▲			454-3601●	454-3701●
302 Boss	154-3602▲	154-3702▲		254-3702▲	454-3602●	454-3702●
302 with 351 Windsor heads 1/2˝-7/16˝ insert washer with 7/16˝ bolts	154-3605▲	154-3705▲			454-3605●	454-3705●
302 with 351 Windsor heads 1/2˝-7/16˝ stepped bolt				254-3708▲		
351 Cleveland & 351-400M	154-3604▲			254-3704▲		
351 Cleveland SVO, iron block				254-3701▲		
351 Windsor with factory heads or Edelbrock heads 60259, 60379	154-3603▲					
351 World Products SBF 351W	154-3607▲					
351 SVO, Yates design				254-3709▲		
351 SVO, Yates 1994 design				254-3710▲		
351R block with C3/C3L heads				254-3711▲		
390-428 FE series with factory heads or Edelbrock heads 60069, 60079	155-3601▲					
FORD, BIG BLOCK						
390-428 FE series with Blue Thunder heads	155-3604●					
427 SOHC	155-3602▲					
429-460 cid				255-3701▲		
429-460 cid with Edelbrock heads 60669, 60079, 61669, 61649	155-3603▲					
4.5L SVO inline valve V6				253-3702▲		
HARLEY DAVIDSON MOTORCYCLE						
'48-'84 All pan heads & shovel heads					460-3601●	
'57-early '73 XL's					460-3602●	

Red part numbers indicate new items

Application	High Performance		Pro Series		Stainless	
	Hex	12-Point	Hex	12-Point	Hex	12-Point
HOLDEN						
308 cid with 12 bolt (early) carbureted 7/16″	205-3601▲					
308 cid with 12 bolt (early) carbureted 7/16″ with undercut bolts				205-3701▲		
JEEP						
3.8L & 4.2L (232 & 258 cid) inline 6 - 7/16″ (all same length)	146-3602▲					
3.8L & 4.2L (232 & 258 cid) inline 6 with 4.0L head - 7/16″ (two lengths)	146-3603▲					
4.0L (242 cid) inline 6 - 1/2″	146-3601▲					
MINI						
1.6L, W10/W11, (2002-08 Chrysler engine)				206-3601▲		
MITSUBISHI						
2.0L (4G63) DOHC (1994 & later) M11, with undercut bolts				207-3900▲		
OLDSMOBILE						
350-455 cid with factory heads or Edelbrock heads 60519, 60529 (1976 & earlier) 7/16″	180-3600▲	180-3700▲		280-3700▲	480-3600●	480-3700●
307-350-403-455 cid (1977 & later) 1/2″	180-3601▲					
PONTIAC						
326-347-370-389-421 cid with D port heads (1964 & earlier)	190-3608▲					
326-389-421 cid with D port heads (1965-66 only)	190-3602▲					
350-400-428-455 cid with D port heads (1967 & later)	190-3607▲					
400 Ram Air II/IV & 455 HO, Ram Air II, Super Duty with Round port heads (1968-74)	190-3601▲					
400-455 cid with Edelbrock Performer & RPM heads 60579, 60599 (mfg. before 3/15/02) (#8556)	190-3604▲					
400-455 cid with Edelbrock Performer & RPM heads 60579, 60599 (mfg. after 3/15/02) (#8549)	190-3605▲					
400-455 cid with Edelbrock Performer D port heads 61579, 61599 (#8561)	190-3609▲					
TOYOTA						
1.3L (4EFE/FTE) & 1.5L (5EFE/FHE) DOHC ARP2000				203-3801▲		
3.0L (7MGE/GTE) inline 6 (1981-92) Supra				203-3902▲		
VOLKSWAGEN/AUDI						
1.8L DOHC 20V Turbo M10, ARP2000 (without installation tool)				204-3901●		
1.8L DOHC 20V Turbo M10, ARP2000 (with installation tool)				204-3902●		

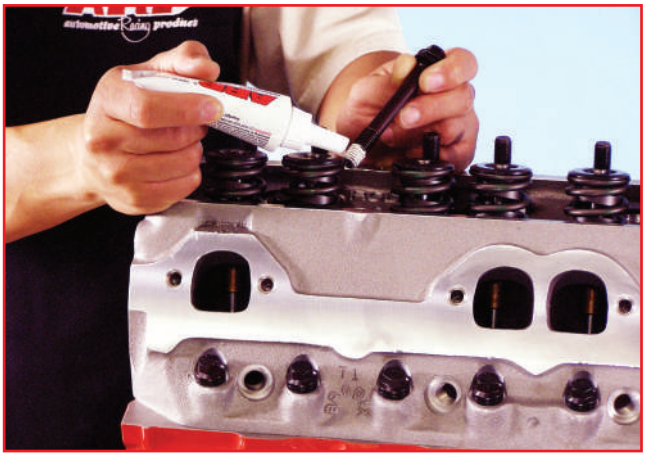
HEAD BOLT INSTALLATION



1. Clean and chase all bolt threads in block to ensure proper thread engagement and accurate torque readings.

2. Clean and inspect all hardware prior to installation, looking for shipping damages and defects.

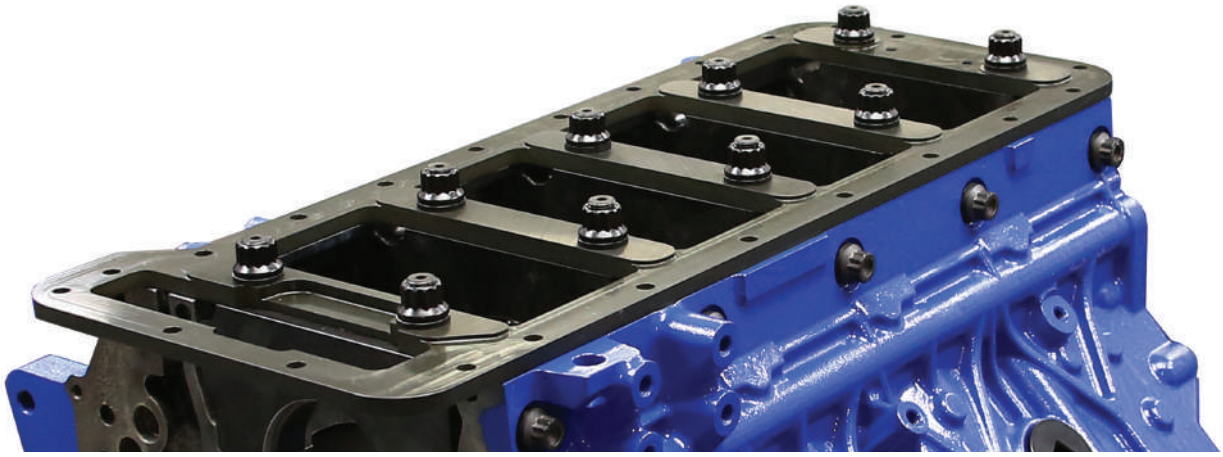
3. Install the head gasket and head, checking for improper fit, binding or misalignment. Make sure all mating surfaces are fully seated. Install the washers on the bolts with the chamfered side of the washer located towards the head of each bolt. Lubricate the washers and the underhead of the bolts with ARP Ultra-Torque fastener assembly lubricant.



4. Seal all threads extending into a water jacket with ARP thread sealer. Lubricate all threads on dry deck and/or main cap applications with ARP Ultra-Torque fastener assembly lubricant.

5. Following the engine manufacturer's torque sequence, tighten the bolts to the recommended torque value found on the instructions provided with each kit.

NOTE: All wet deck head bolt applications will require some type of sealant on the bolt threads to prevent coolant leakage. Always check each application (import and domestic) prior to installation to determine whether your application has a "wet deck" or "dry deck" cylinder block.



MAIN STUDS

There are many important reasons to use ARP main stud kits, including the elimination of main cap walk and fretting, as well as protecting the threads in your engine block. All kits come complete with hardened parallel-ground washers and high quality nuts. Some applications have provisions for mounting windage trays and have specially designed standoff studs with serrated lock nuts to position the windage tray and lock it securely in place. The studs are manufactured from 8740 chrome moly steel, heat-treated in-house to 190,000 psi tensile strength, and precision J-form threads rolled after heat-treat to create a fastener that has threads 2000% stronger than others.

STUDS vs. BOLTS

ARP recommends the use of main studs over bolts whenever possible for several key reasons. First is the ability to obtain more accurate torque readings because studs don't "twist" into the block. All clamping forces are on one axis. By the same token, there is less force exerted on the block threads, which contributes to improved block life (very critical on aluminum blocks). Finally, there are factors of easier engine assembly and proper alignment of caps every time.

Application	2-Bolt	4-Bolt
ACURA - SEE HONDA/ACURA, PAGE 63		
AUDI - SEE VOLKSWAGEN, PAGE 64		
BMC/TRIUMPH		
A Series	206-5401▲	
B Series (3 cap main)	206-5402▲	
B Series (3 cap main)	206-5402▲	
B Series (5 cap main)	206-5403▲	
2.0L SOHC TR7	206-5404▲	
Austin Healey 6-cylinder	206-5405▲	
BMW		
1.5L-2.0L (M10) & 2.3L (S14) 4-cylinder	201-5001●	
2.5L (M50), 2.8L (M52), 3.0L (S50US) & 3.2L (S52US) inline 6	201-5000▲	
3.2L (S54) inline 6	201-5002▲	
BUICK		
V6 Stage I & II	123-5401▲	
V6 Stage II without windage tray		222-5602▲
V6 Stage II with splayed cap bolts		322-5802▲
215 cid aluminum V8	124-5401▲	
350 cid	124-5402▲	

Application	2-Bolt	4-Bolt
BUICK (CONTINUED)		
401 cid (nail head)	124-5404▲	
400-430-455 cid (hex)	125-5401▲	
400-430-455 cid (12 pt nuts)	125-5402▲	
CADILLAC		
472-500 cid	135-5507▲	
CHEVROLET, SMALL BLOCK		
400 cid with windage tray		234-5606▲
400 cid with windage tray & splayed cap bolts		234-5605▲
400 cid with windage tray & 3.0˝ outer studs		234-5607▲
Large journal (hex)	134-5401▲	134-5601▲
Large journal (12 pt nuts)	134-5403▲	
Large journal with aftermarket (4-6 bolt) windage tray 3.25-3.48" stroke	234-5501▲	234-5601▲
Large journal with aftermarket (4-6 bolt) windage tray 3.50-4.00" stroke		234-5610▲
Large journal with splayed cap bolts		234-5602▲
Large journal with straps (F & R caps)	234-5503▲	234-5603▲
Large journal with straps & splayed cap bolts		234-5604▲
LT-1/LT-4 with factory windage tray (1992-97)	134-5502▲	
Small journal	134-5402▲	

Application	2-Bolt	4-Bolt
CHEVROLET, SMALL BLOCK (CONTINUED)		
Small journal with aftermarket windage tray	134-5501▲	
SB2 (including 4-bolt F & R caps) w/o windage tray		134-5602▲
SBC Rocket block		184-5403▲
Dart Little M with splayed cap bolts		234-5801▲
Dart Little M with splayed cap outer studs		134-5801▲
Dart Little M w/ iron main caps & splayed cap bolts		234-5609▲
Dart SHP iron block		134-5605▲
World - Motown iron block w/ outer bolts (for #2, 3 & 4)		134-5603▲
World - Motown alum block w/ outer bolts (for #2, 3 & 4)		134-5604▲
CHEVROLET, SMALL BLOCK - LS SERIES		
Gen III/LS Series small block & GMPP LSX block		234-5608●
Dart LS Next iron block		134-5901▲
World Prod. - Warhawk LS alum block		134-5802●
CHEVROLET, SMALL BLOCK - LT SERIES		
6.2L Gen V (LT1/LT4) 2013 & later (side bolts included)		234-5802▲
CHEVROLET, BIG BLOCK		
396-402-427-454 cid	135-5402▲	135-5601▲
396-402-427-454 cid with windage tray	235-5502▲	235-5701▲
8.1L (496 cid) Vortec		135-5901●
Mark IV Aluminum block		135-5603▲
Mark IV Bowtie with windage tray		235-5702▲
Mark V & VI 502		135-5606▲
Mark V & VI 502 with windage tray		235-5606▲
Mark V & VI Bowtie block w/ splayed cap outer studs		235-5602▲
Dart Big M with splayed cap bolts		235-5601▲
Dart Big M with splayed cap outer studs		235-5603▲
World - Merlin II & III blocks w/ outer bolts (for #2, 3 & 4)		135-5801▲
World - Merlin X alum block w/ outer bolts (for #2, 3 & 4)		135-5607▲
CHEVROLET, 6-CYLINDER		
235-261 cid inline 6 (1954-62)	132-5402▲	
194-230-250-292 cid inline 6 (1963 & later)	132-5401▲	
90° V6		233-5602▲
90° V6 with windage tray		233-5702▲
90° V6 with splayed cap bolts		233-5601▲
CHRYSLER		
2.0L SOHC/DOHC 4-cyl Neon (block # 4667642)	141-5801▲	
2.2L & 2.5L 4-cylinder M11	141-5401▲	

Application	2-Bolt	4-Bolt
CHRYSLER (CONTINUED)		
170-198-225 cid Slant Six	142-5401▲	
318-440 Wedge (hex)	140-5401▲	
318-440 Wedge (12 pt nuts)	140-5402▲	
318-340-360 Wedge with windage tray	240-5501▲	
5.7L, 6.1L & 6.4L Hemi with cross bolts	244-5400▲	
354-392 Hemi	145-5404▲	
426 factory Hemi	145-5601▲	145-5602▲
KB 426 Hemi	245-5602▲	
World - Hemi/ RB Wedge block		145-5603▲
CUMMINS - SEE DIESEL, BELOW		
DATSUN - SEE NISSAN, PAGE 64		
DIESEL		
Chevy Duramax 2.8L	230-5403▲	
Chevy Duramax 6.6L (LB7/LLY) (2005 & earlier)	230-5401▲	
Chevy Duramax 6.6L (LBZ/LMM) (2006 & later)	230-5402▲	
Cummins ISL ARP2000	247-5406▲	
Cummins ISF2.8 ARP2000	247-5407▲	
Cummins ISV5.0 ARP2000	247-5801▲	
Dodge/Cummins 3.9L 4BT ARP2000	247-5404▲	
Dodge/Cummins 5.9L 12V (1997 & earlier) M14	247-5402▲	
Dodge/Cummins 5.9L 12V & 24V (late '97-'06) 2-bolt M12	247-5401▲	
Dodge/Cummins 5.9L 24V (2004 & later) w/ factory block stiffener plate, 0.600″ counter bore	247-5403●	
Dodge/Cummins 6.7L (2007 & later) w/ factory girdle	247-5405●	
Ford 6.0L Power Stroke		150-5801●
Ford 6.4L Power Stroke		150-5802●
Ford 6.7L Power Stroke ARP2000		250-5802▲
Ford 7.3L Power Stroke (1993-03)		250-5801▲
Oldsmobile 5.7L (350 cid)	184-5402▲	
Nissan 2.5L (YD25) 4-cylinder diesel	202-5803▲	
DODGE		
Dodge Viper SRT-10 2008-2010	247-5501●	
FORD, SMALL BLOCK		
289-302 cid	154-5401▲	
289-302 cid with windage tray	254-5501▲	
289-302 cid with girdle (10 studs 1/2″ longer)	154-5408▲	
289-302 cid with girdle (7 studs 1/2″ longer)	154-5410▲	
302 cid with dual or rear sump oil pan*	154-5407▲	
302 SVO		154-5605▲
302 "R" block (1/2″ dia. studs)		254-5601▲

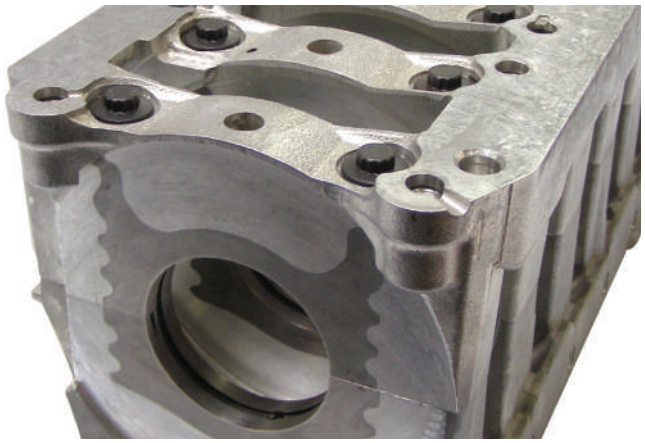
Red part numbers indicate new items

Application	2-Bolt	4-Bolt
FORD, SMALL BLOCK (CONTINUED)		
302 Dart Iron Eagle		154-5608▲
302 Dart SHP		154-5612▲
Boss 302 with windage tray		154-5602▲
M6010 Boss 302 with dual or rear sump oil pan*		154-5610▲
M6010 Boss 302 with front sump oil pan		154-5611▲
351 Cleveland	154-5404▲	154-5604▲
351 Windsor	154-5403▲	154-5606▲
351 Windsor with windage tray	154-5503▲	
351 Windsor with dual or rear sump oil pan*	154-5409▲	
351 SVO with outer studs (for mains No# 2,3,4)		154-5603▲
351 SVO with outer bolts (for mains No# 1,2,3,4,5)		354-5604▲
351 "R" block		354-5605▲
351 Dart Iron Eagle		154-5607▲
351 Dart SHP		154-5613▲
Ford Australian 7/16˝	154-5405▲	
Ford Australian 1/2˝	154-5406▲	
World - Manowar iron & alum blocks w/ outer bolts		154-5609▲
FORD, BIG BLOCK		
390-428 cid FE series (hex nuts, 10 studs) modification to #5 cap required	155-5401▲	
390-428 cid FE series (12 pt nuts, 10 studs) modification to #5 cap required	155-5421▲	
390-428 cid FE series (12 pt nuts, 8 studs & 2 boltsfor #5 cap) - no modifications required	155-5404▲	
429-460 cid	155-5402▲	155-5501▲
429-460 cid with Ford Motorsports windage tray	255-5502▲	255-5702▲
6.2L Boss V8		256-5802▲
FORD, COYOTE (SIDE BOLTS INCLUDED)		
5.0L		156-5803▲
FORD, MODULAR (SIDE BOLTS SOLD SEPARATELY)		
4.6L & 5.4L 2V/3V/4V without windage tray	156-5401▲	156-5802▲
4.6L & 5.4L 3V with windage tray		156-5901▲
4.6L 4V with windage tray		256-5701▲
4.6L supercharged Cobra w/ windage tray (2003-04)	156-5403▲	
Boss 5.0L (block# M-6010-BOSS50)	156-5404▲	
Boss 5.0L - Side bolts (block# M-6010-BOSS50)	156-5203▲	
Side bolts - Early aluminum block M8		156-5001●
Side bolts - Early cast iron block M8	156-5201▲	
Side bolts - Late aluminum block & 5.0L Coyote M9		156-5002●
Side bolts - Late cast iron block M9 (except Boss 5.0L)	156-5202▲	

Application	2-Bolt	4-Bolt
FORD, 4, 5 AND 6-CYLINDER		
1600cc Escort	151-5403▲	
2.0L Zetec (1997 and earlier)	151-5406▲	
2.0L Zetec (1998 and later)	151-5404▲	
2.3L Duratec (2003 & later)	151-5405▲	
2.3L EcoBoost	151-5407▲	
2000cc Pinto	151-5401▲	
2300cc Pinto	151-5402▲	
2.5L (B5254) DOHC 5-cyl (2005 & later) ARP2000		251-5801▲
3.5L EcoBoost (M10 outer, M9 inner studs)		253-5802▲
240-300 cid inline 6	152-5401▲	
4.0L XR6 inline 6	152-5402●	
4.5L SVO inline valve V6	253-5401▲	
HOLDEN		
308 cid	205-5401▲	
HONDA/ACURA		
CBR 1000RR motorcycle	208-5405▲	
1.5L (L15)	108-5401▲	
1.6L (B16A) (12 pt nuts)	208-5402▲	
1.8L (B18C1) Acura	208-5403▲	
1.8L (B18A1/B1) Acura	208-5404▲	
2.2L (H22A) & 2.3L (H23A) (12 pt nuts)	208-5401▲	
NSX 3.0/3.2L 1990-2005, ARP2000, 12pt		208-5801▲
HYUNDAI		
2.0L (G4KF) ARP2000	228-5401●	
JEEP		
4.0L Inline 6 without factory main girdle	146-5401▲	
LANCIA		
2.0L 16V Delta Integrale	175-5401▲	
MAZDA		
1.6L (B6) & 1.8L (BP) DOHC Miata (12 pt nuts)	218-5401▲	
2.3L DOHC 16V (2003 & later)	218-5402▲	
MINI		
1.6L N12, N14, N16, N18, (2008-15 Peugeot engine)	201-5401▲	
MITSUBISHI		
2.0L (4B11) DOHC (2008 & later)		207-5403●
2.0L (4G63) DOHC (2007 & earlier)	207-5401▲	
2.6L (G54B)	207-5402▲	
3.0L (6G72) V6 (1993 & later)		207-5801▲
L20 Series 4-cylinder	202-5401▲	

Application	2-Bolt	4-Bolt
NISSAN/DATSUN		
L24, L26 & L28 Series 6-cylinder	202-5406 ▲	
2.0L (SR20DE/DET)	202-5402 ▲	
2.4L (KA24DE)	102-5401 ▲	
2.5L (YD25) 4-cylinder diesel	202-5803 ▲	
2.5L (RB25DET) & 2.6L (RB26DETT) inline 6 ARP2000	202-5403 ▲	
3.0L (VG30DE/DETT) DOHC V6	102-5402 ▲	
3.5L (VQ35) DOHC V6		202-5801 ▲
3.8L (VR38DETT) DOHC V6 ARP2000		202-5802 ▲
OLDSMOBILE		
2.4L Quad 4	281-5401 ▲	
350-403 cid	184-5401 ▲	
Oldsmobile 5.7L (350 cid)	184-5402 ▲	
455 cid	185-5401 ▲	
DRCE-iron block	285-5801 ▲	
OPEL/VAUXHALL		
2.0L 16 valve	209-5401 ▲	
2.5L V6	209-5402 ▲	
POLARIS		
RZR 1000	188-5401 ▲	
PONTIAC		
Super Duty 4 cylinder - cast block	291-5801 ▲	
Super Duty 4 cylinder - mag block	291-5802 ▲	
3800 V6 supercharged (1999 & later) (hex)	193-5401 ▲	
3800 V6 supercharged (1999 & later) (12 pt nuts)	193-5402 ▲	
400-455 cid	194-5401 ▲	194-5601 ▲
RENAULT		
2.0L (F4R) DOHC	216-5401 ●	
ROVER		
4.0L & 4.6L V8 with side bolts	157-5401 ▲	

Application	2-Bolt	4-Bolt
SATURN		
1.9L DOHC (1991-99)	165-5402 ▲	
1.9L SOHC (1999-02)	165-5401 ▲	
SEA-DOO		
Rotax RXP-X255	168-5501 ▲	
SUZUKI		
GSX 1300R Hayabusa	271-5401 ▲	
1.6L (M16A) DOHC ARP2000		271-5201 ▲
TOYOTA		
1.5L (1NZFE) DOHC ARP2000	203-5408 ▲	
1.6L (4AGE) 16V/20V DOHC	203-5403 ▲	
1.8L (2ZZGE) DOHC	203-5407 ▲	
2.0L (3SFE) & 2.0L (3SGTE) DOHC	203-5404 ▲	
2.4L (2AZFE) DOHC ARP2000	203-5401 ▲	
2.4L (22R)	203-5406 ▲	
3.0L (7MGTE) Supra (1986-92) w/ bolts for #3 cap	203-5402 ▲	
3.0L (2JZGE/GTE) Supra (1993-98)	203-5405 ▲	
VOLKSWAGEN/AUDI		
Audi 5-cylinder	204-5409 ▲	
1.6L & 2.0L Rabbit, Golf & Jetta	204-5402 ▲	
2.0L (FSI/TFSI) DOHC ARP2000	204-5408 ●	
2.7L (Bi-Turbo) DOHC V6 ARP2000 (side bolts included)		204-5801 ●
2.8L & 2.9L VR6	204-5403 ▲	
VOLVO		
2.5L (B5254) DOHC 5-cyl (2000 & later) ARP2000		219-5801 ▲
2.5L (B5254) DOHC 5-cyl (1999 & earlier) ARP2000		219-5802 ▲



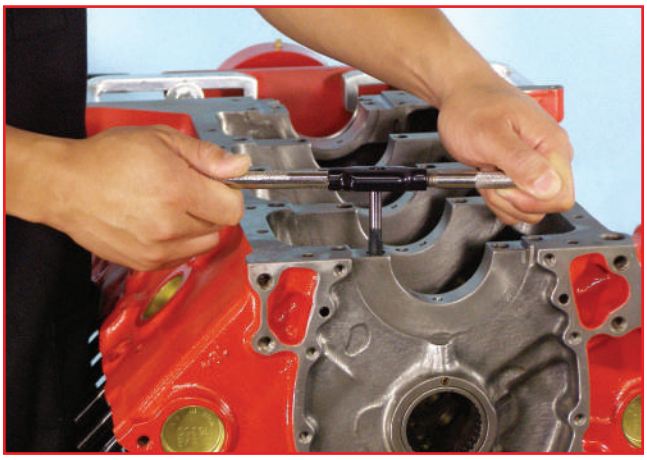
ENGINE CASE KITS

Application	Part No.
CASE HALVES STUD KIT	
Porsche 911-930 Turbo	504-9501 ●
CRANKCASE THRU-BOLT KIT	
Porsche 911-930 Turbo, 2.0L-2.7L air cooled engines	204-5407 ▲
Porsche 911-930 Turbo, 3.0L-3.3L air cooled engines	204-5405 ▲
Porsche 911-930 Turbo, 3.6L & 3.8L air cooled engines	204-5406 ▲
Subaru 2.0L (FA20) DOHC	260-5001 ●
Subaru 2.0L, 2.2L & 2.5L SOHC/DOHC EJ Series	260-5401 ●
Toyota 2.0L (4UGSE)	203-5002 ●

Red part numbers indicate new items

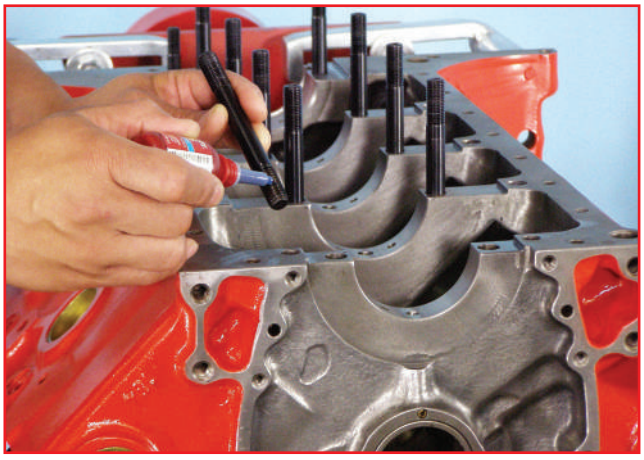
MAIN STUD INSTALLATION

There are a number of important considerations when installing ARP main studs. First and foremost is making sure the block and studs are as clean as possible. Foreign matter and debris can easily affect the quality of thread engagement and cause erroneous torque readings. Do not re-cut threads in the block – *use the special "chaser" taps as listed on page 136 of this catalog.* This will preserve the integrity of the threads and provide better engagement. Calibrate your torque wrench – even new wrenches have been known to be off by as much as 10 foot pounds! Use consistent tightening techniques.

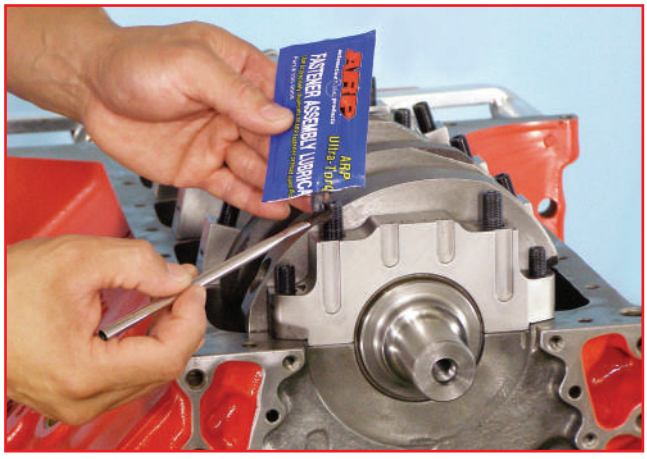


1. Clean and chase appropriate threads in block to ensure proper thread engagement and accurate torque readings.

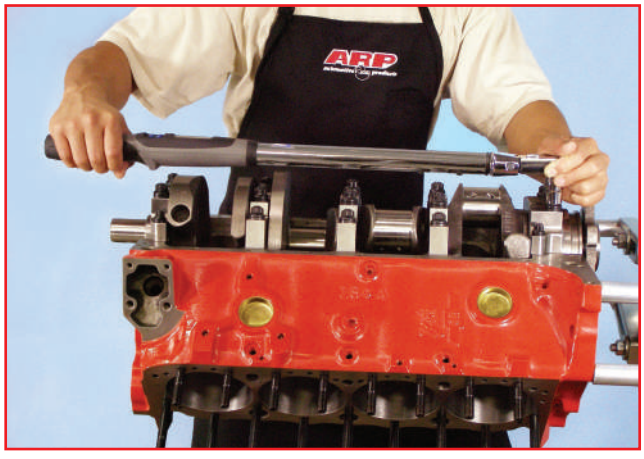
2. All hardware (and caps) should be cleaned and inspected prior to installation, looking for any shipping damage or defects.



3. Screw studs into block, finger tight ONLY. For permanent installation, apply Loc-tite (or similar adhesive) sparingly to threads. Be sure and install the caps promptly before the cement sets to prevent misalignment of studs in block.



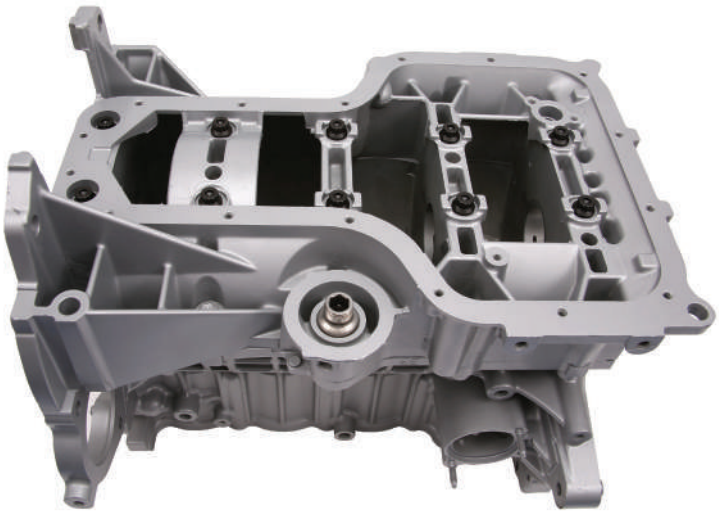
4. Install main caps, checking for binding and misalignment. Lubricate threads, nuts and washers with ARP Ultra-Torque fastener assembly lubricant before installation. Have the block align honed.



5. Following the engine manufacturer's torque sequence, tighten the nuts to the recommended torque value found on the instruction sheet provided with each kit.

MAIN BOLTS

Far superior to any other main bolts available for use in competition engines, ARP main bolts are designed to meet the exacting standards and demands of professional engine builders. Forged from 8740 chrome moly steel, all ARP main bolts feature a reduced wrenching head, large underhead radius and rolled threads for the utmost in reliability. The threads are rolled after heat-treating which gives them about 2000% better fatigue strength than most main bolts that are threaded prior to heat-treating. The popular **High Performance Series** is rated at 180,000 psi, and is a premium replacement for OEM fasteners. **Pro Series** main bolts are application-specific, rated at 190,000 psi, and designed for use in competition engines. Hardened parallel-ground washers are included with each kit.

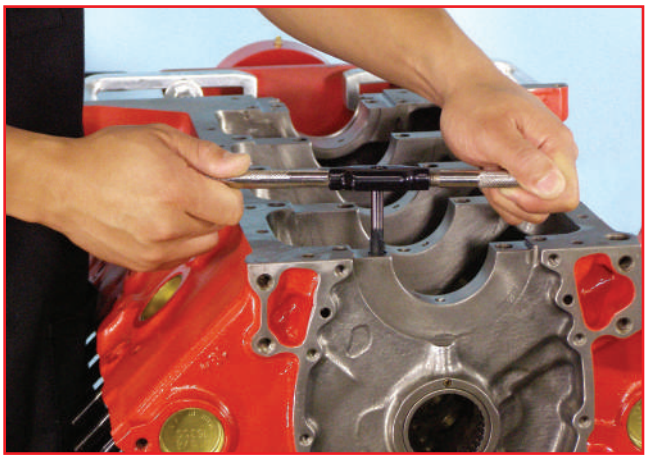


Application	High Performance		Pro Series	
	2-Bolt Main	4-Bolt Main	2-Bolt Main	4-Bolt Main
BMW				
S1000RR Motorcycle ARP2000 - Crankcase main bolt kit (29 pcs. with sealing washers)			201-5201 ●	
BUICK				
V6 Stage I		123-5201 ▲		
V6 stage II		123-5202 ▲		
455 cid	125-5201 ▲			
CADILLAC				
331-365-390 1949-62, hex	117-5001 ▲			
CHEVROLET, SMALL BLOCK				
Large journal - hex	134-5001 ▲	134-5202 ▲		
Large journal - 12 pt				234-5201 ▲
Large journal - with 1/2" straps on front & rear caps				234-5203 ▲
Small journal	134-5002 ▲			
Dart - SHP iron block		134-5204 ▲		
World - Motown iron block	134-5203 ●			
CHEVROLET, BIG BLOCK				
396-402-427-454 cid	135-5002 ▲	135-5201 ▲		
World - Merlin II & III iron blocks		135-5202 ●		
CHEVROLET, 6-CYLINDER				
90° V6				233-5201 ▲
90° V6 with 1/2˝ straps on front & rear caps				233-5203 ▲
CHRYSLER				
273-440 Wedge, reduced head height 12pt			140-5002 ▲	
273-440 Wedge, reduced head height hex			140-5003 ▲	

Red part numbers indicate new items

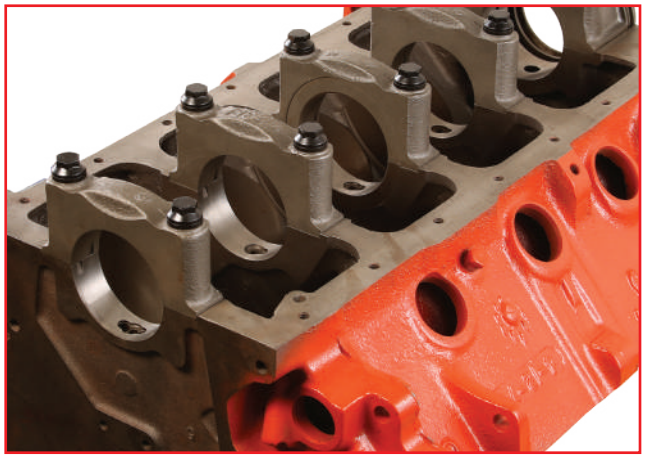
Application	High Performance		Pro Series	
	2-Bolt Main	4-Bolt Main	2-Bolt Main	4-Bolt Main
CHRYSLER (CONTINUED)				
426 Hemi with cross bolts	145-5201 ▲			
FORD, SMALL BLOCK				
289-302 cid - front or rear sump - oil pickup standoff bolt included	154-5001 ▲	154-5201 ▲		
302 Dart SHP		154-5205 ▲		
351 Windsor - front or rear sump - oil pickup standoff bolt included	154-5003 ▲	154-5203 ▲		
351 Cleveland & 351-400M - front or rear sump - oil pickup standoff bolt included	154-5004 ▲	154-5204 ▲		
351 Dart SHP		154-5206 ▲		
SVO 351 cid with 3/8″ outer bolts				254-5202 ▲
SVO 351 cid with 7/16″ outer bolts				254-5203 ▲
FORD, BIG BLOCK				
390-428 cid FE Series, 12-pt			155-5201 ▲	
429-460 cid	155-5202 ▲			
FORD, 6-CYLINDER				
4.5L SVO inline valve V6				253-5201 ▲
HOLDEN				
308 cid	205-5001 ▲			
JEEP				
4.0L inline 6 without factory main girdle	146-5001 ▲			
MGB				
3 cap main			206-5001 ▲	
5 cap main			206-5002 ▲	
MITSUBISHI				
2.0L (4B11) DOHC (2008 & later) ARP2000				207-5201 ●
OLDSMOBILE				
350-403 cid	184-5001 ▲			
350 cid diesel	184-5002 ▲			
455 cid	185-5001 ▲			
PORSCHE				
3.4L Non-Turbo water cooled engine - 911 (996)			204-5001 ●	
ROVER				
4.0L & 4.6L with cross bolts	157-5001 ▲			
SUBARU				
2.0L (FA20) DOHC - Crankcase thru bolt kit			260-5001 ●	
2.0L, 2.2L & 2.5L SOHC/DOHC EJ Series - Crankcase thru bolt kit			260-5401 ▲	
TOYOTA				
1.6L (4AGE) 16V/20V DOHC			203-5001 ●	
2.0L (4UGSE) - Crankcase thru bolt kit			203-5002 ●	

MAIN BOLT INSTALLATION

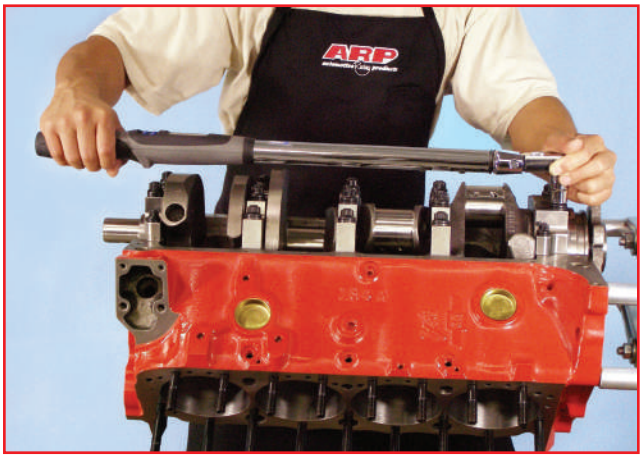


1. Clean and chase all bolt threads in block to ensure proper thread engagement and accurate torque readings.

2. Clean and inspect all hardware prior to installation, looking for shipping damages and defects.



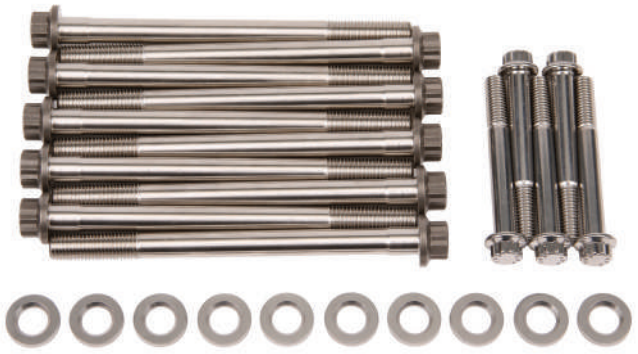
3. Install the main caps, checking for improper fit, binding or misalignment. Make sure all mating surfaces are fully seated. Install the washers on the bolts with the chamfered side of the washer located towards the head of each bolt. Lubricate the washers and the underhead of the bolts with ARP Ultra-Torque fastener assembly lubricant. Lubricate all threads on main bolts with ARP Ultra-Torque fastener assembly lubricant.



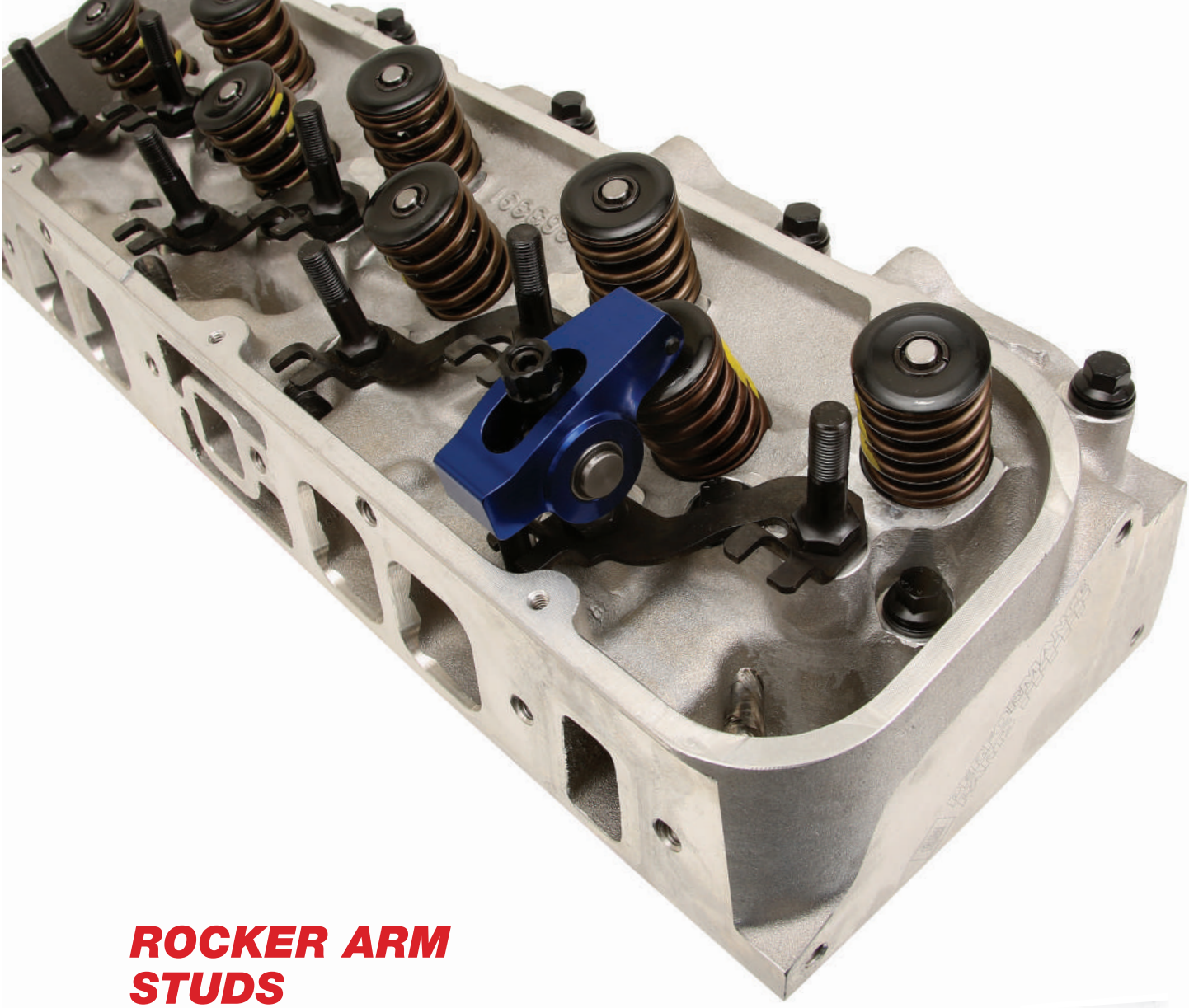
4. Following the engine manufacturer's torque sequence, tighten the bolts to the recommended torque value found on the instructions provided with each kit.

BMW S1000RR ARP2000 Main Bolt Kit

Subaru 2.0L FA20 Inconel 718 Main Bolt Kit



Red part numbers indicate new items



ROCKER ARM STUDS

If you have ever installed a rocker stud into a cylinder head and watched it wobble as it screwed in – you knew from the beginning that the rocker geometry was going to be inconsistent all over the place. ARP rocker studs are concentric within .005 T.I.R. thread pitch to thread pitch. They run-in straight and true. Lengths are exact – designed to provide positive seating every time. An extra-large radius base offers greater resistance to flex. Available in both High Performance and Pro Series models. NOTE: Not to be used with OEM-style, self-locking nuts. To be used with ARP's patented Perma-Loc® adjusters (see page 71).

HIGH PERFORMANCE SERIES

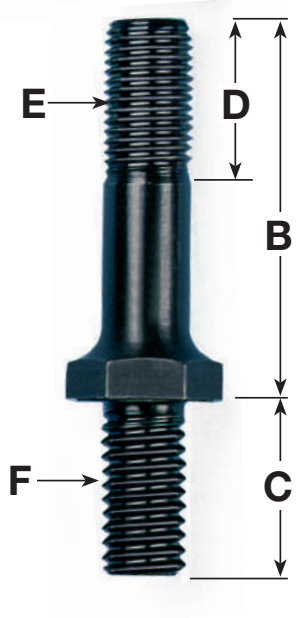
Made of 8740 chrome moly forgings and heat-treated to 180,000 psi. Excellent for E.T. Bracket Racing, limited rule oval track competition and street use.

PRO SERIES

Designed for competition applications, ARP's Pro Series rocker arm studs are made of premium grade 8740 chrome moly steel and heat-treated to a tensile strength of 190,000 psi.

NOTE: To verify the application and part number, please review the various dimensions:

B) overall stud height
C) screw-in thread depth
D) adjuster thread depth
E) shank diameter and thread
F) base diameter and thread.



Application	B	C	D	E	F	High Performance Full Set	High Performance 2-Pack	High Performance Pro Series
3/8˝ typical small block application ❸	1.750	0.700	0.800	3/8-24	7/16-14	134-7101	134-7121	234-7201
3/8˝ with roller rockers ❸	1.895	0.710	1.000	3/8-24	7/16-14	134-7104	134-7124	
7/16˝ typical small block application	1.770	0.700	0.670	7/16-20	7/16-14	134-7103	134-7123	234-7202
Aluminum heads, intake studs only, 8 pieces ❶	2.000	0.820	0.700	7/16-20	7/16-14			235-7204
Dart aluminum, 16 pieces ❶	2.000	1.3, 0.820	0.700	7/16-20	7/16-14			235-7205
Aluminum heads, exhaust studs only, 8 pcs. ❶	2.000	1.650	0.700	7/16-20	7/16-14			235-7203
Mark V	1.900	0.750	1.000	7/16-20	3/8-16	135-7102	135-7122	
With roller rockers and stud girdle ❶	2.100	0.750	0.800	7/16-20	7/16-14			334-7203
With roller rockers and stud girdle	2.000	0.750	0.800	7/16-20	7/16-14			334-7204
With roller rockers and stud girdle ❶	2.100	0.850	0.800	7/16-20	7/16-14			334-7202
With roller rockers and stud girdle	1.900	0.860	0.830	7/16-20	7/16-14			234-7205
With roller rockers and stud girdle ❸	1.900	0.660	0.830	7/16-20	7/16-14			334-7201
7/16˝ typical small block application ❹	1.900	0.750	0.850	7/16-20	7/16-14			200-7202
7/16˝ typical big block application ❶	1.750	0.800	0.850	7/16-20	7/16-14	135-7101	135-7121	235-7201
With roller rockers and stud girdle	1.900	0.850	0.850	7/16-20	7/16-14			234-7206
Chevrolet big block (aluminum heads)	2.350	0.850	0.850	7/16-20	7/16-14	135-7202	135-7222	
With roller rockers and girdles	1.900	0.750	1.000	7/16-20	7/16-14	100-7101	100-7121	200-7201
Typical Ford small block ❺	1.900	0.750	1.000	7/16-20	7/16-14	100-7101	100-7121	200-7201
Dart aluminum heads, 16 pieces	2.000	1.3, 0.820	1.000	7/16-20	7/16-14			235-7202
Aluminum heads, exhaust studs only, 8 pieces	2.000	1.650	1.000	7/16-20	7/16-14			235-7206
Aluminum heads, intake, 8 pieces	2.000	0.820	1.000	7/16-20	7/16-14			235-7207
7/16˝ with 1/2˝ coarse, Pontiac (1964 & later)	2.000	1.025	1.050	7/16-20	1/2-13			290-7201
SVO 351 cid, with roller rockers and girdle	2.700	0.850	1.300	7/16-20	7/16-14			354-7204
SVO 351 cid, with roller rockers and girdle	2.800	0.800	1.500	7/16-20	7/16-14			354-7203
SVO 351 cid, with roller rockers and girdle	3.000	0.660	1.930	7/16-20	7/16-14			354-7202
SVO 351 cid, with roller rockers and girdle	3.000	0.950	1.750	7/16-20	7/16-14			254-7201
Chevrolet late model Vortec	1.750	0.600	0.850	3/8-24	M8 x 1.25	134-7201	134-7221	
GM 4.3L Vortec V6	1.595	0.800	0.580	3/8-24	M10 x 1.50	100-7201	100-7221	
Chevrolet big block 496 cid (8100 series)	1.750	0.750	0.600	7/16-20	M10 x 1.50	135-7201	135-7221	
SBC GEN III/IV LS Series (non adjustable), excluding LS7	1.460	1.100	0.500	5/16-24	M8 x 1.25			234-7207
SBC GEN V 6.2L (LT1/LT4)	1.000	1.100	0.500	5/16-24	M8 x 1.25			234-7208
Chrysler 318-360 Magnum (non adjustable)	1.425	0.625	0.600	5/16-24	5/16-18			144-7201 ▲

❶ These parts have a shank portion under hex to locate guide plate.
❷ Fits most stock SBChevy with 3/8 screw-in studs
❸ Fits most stock SBChevy with 7/16 screw-in studs
❹ Fits most stock BBChevy with 7/16 screw-in studs
❺ Fits most SBFord with 7/16 screw-in studs
❻ Fits most SBFord with 3/8 screw-in studs

IMPORTANT TECH NOTE
It is highly advisable to determine what the optimum rocker arm stud length is for your particular application. This is especially true when "long" pushrods and valves are employed - you should raise the "installed height" of the rocker arm to compensate for the longer -than-stock components.

Red part numbers indicate new items

PERMA-LOC® ROCKER ARM ADJUSTERS

- Exclusive 12-point head
- Heat-treated premium grade A 8740 chrome moly steel
- Patented design
- 190,000 psi tensile strength
- Precision machined threads
- Locking set screw ground flush with rocker arm stud
- Doesn't require special tools

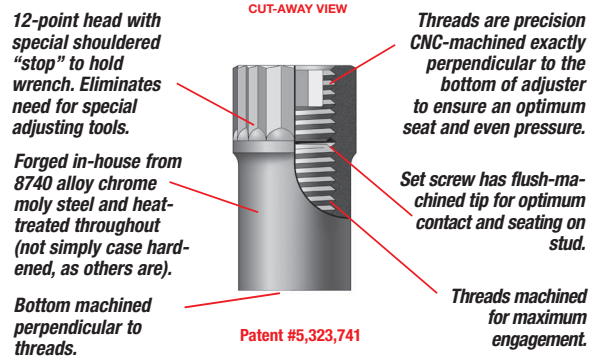
One of the more aggravating things found in many high performance engines is constantly having to re-adjust rocker arms. Until ARP introduced the patented Perma-Loc adjuster, there wasn't a "poly lock" on the market that you didn't have to continually tighten.

There are several important reasons why ARP's exclusive Perma-Loc rocker arm adjusters won't loosen like others. First, the adjuster body is heat-treated all the way through (not just case hardened). This eliminates the thread "movement" common to others. Secondly, the threads are machined exactly perpendicular to the bottom of the adjuster, so it seats evenly and applies pressure on a full 360° circle. Lastly, the set screw is machined flush on the bottom (not pointed) so it will have optimum contact on the rocker arm stud.

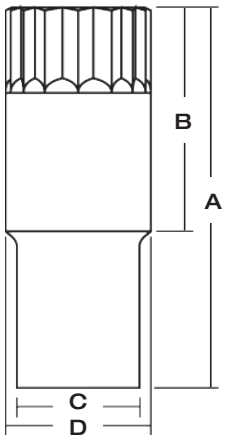
You'll find ARP Perma-Loc's easy to use, too. The compact 12-point head is designed to hold your wrench in position while you lock the set screw with an Allen wrench.

All in all, they're the best you can buy!

PERMA-LOC® SPECIAL FEATURES:



Application	Length (A)	Thread Size	Body Length (B)	Shank Size (C)	Body Dia (D)	16pc Pack
Stamped steel rocker	1.200	3/8-24	n/a	0.620	n/a	300-8241
Stamped steel rocker	1.200	7/16-20	n/a	0.640	n/a	300-8242
Aluminum rocker	1.200	3/8-24	n/a	0.550	n/a	300-8243
Aluminum rocker	1.200	3/8-24	n/a	0.600	n/a	300-8244
Aluminum rocker	1.200	7/16-20	n/a	0.550	n/a	300-8245
Aluminum rocker	1.200	7/16-20	n/a	0.600	n/a	300-8246
Stud girdle	2.050	7/16-20	1.200	0.560	0.750	300-8247
Stud girdle	2.615	7/16-20	1.735	0.560	0.750	300-8248
Big block with girdle	2.050/2.615	7/16-20	1.200/1.735	0.560	0.750	300-8249



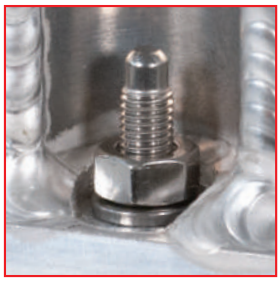
Because there are many different style rocker arms made by each manufacturer, we suggest that you verify the physical dimensions and thread requirements prior to ordering. If you have any questions, call ARP's tech staff toll-free for details.

ROCKER PEDESTAL STUD KIT

Application	Part No.
Dodge Cummins 24V, 12pt	247-7201

VALVE COVER BOLTS & STUDS

To ensure proper sealing of valve covers, ARP manufactures a variety of special application-specific bolt and stud kits. Many professional engine builders prefer to use studs because of their ability to properly position the gasket and guide the cover into position. ARP offers studs and bolts in a choice of chrome moly steel with a black oxide finish or polished ARP Stainless. You have a choice between conventional hex head bolts and nuts or compact, 12-point designs. The nuts feature a wide base for better load distribution and sealing, while the compact head is easily accessed. Stud kits come complete with nuts and washers, while bolt kits are shipped with the required flat washers.

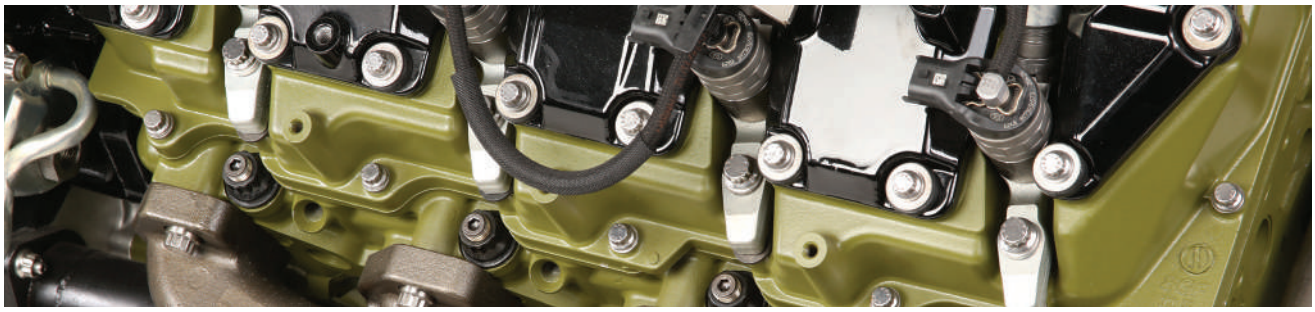




Application NOTE: Bolts have washers.			STUD OAL	STUD KITS				BOLT KITS			
				Black Oxide		Stainless		Black Oxide		Stainless	
	Qty	Size	BOLT UHL	Hex	12-Point	Hex	12-Point	Hex	12-Point	Hex	12-Point
CHRYSLER											
KB Hemi	20	1/4-20	2.450		245-7601 ●						
5.7L & 6.1L Hemi	20	M6 x 1.0	30mm (1.181 in.)					140-7502 ▲	140-7501 ▲	440-7502 ●	440-7501 ●
HYUNDAI											
G4KF 2.0L	18	M6 x 1.0	45mm (1.772 in.)								428-7501 ●
CAST ALUMINUM COVERS											
Bolt kit	8	1/4-20	0.812					100-7507 ▲	100-7503 ●	400-7507 ●	400-7503 ●
Bolt kit	14	1/4-20	0.812					100-7504 ▲	100-7508 ●	400-7508 ●	400-7504 ●
Chevy SB2 w/ nyloc nuts	16	1/4-20	1.800			434-7609 ●					
Stud kit	8	1/4-20	1.500	200-7603 ●	200-7613 ●	400-7603 ●	400-7613 ●				
Stud kit	12	1/4-20	1.500	200-7610 ●	200-7620 ●	400-7606 ●	400-7616 ●				
Stud kit	14	1/4-20	1.500	200-7604 ●	200-7614 ●	400-7604 ●	400-7614 ●				
Stud kit	16	1/4-20	1.500	200-7605 ●	200-7615 ●	400-7605 ●	400-7615 ●				
Stud kit, Dart, Brodix, B&B	8	1/4-20	3.500	200-7606 ●	200-7616 ●						
Stud kit, Dart, Brodix, B&B	14	1/4-20	3.500	200-7607 ●	200-7617 ●						

Red part numbers indicate new items

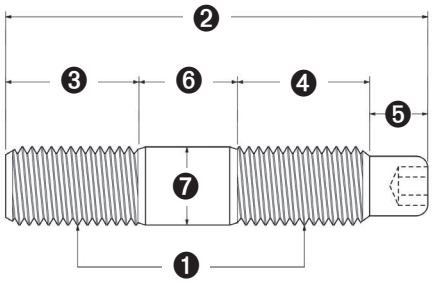
VALVE COVER BOLTS & STUDS *(CONTINUED)*

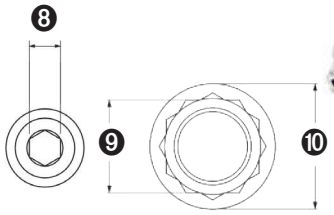


Application NOTE: Bolts have washers.			STUD OAL	STUD KITS				BOLT KITS			
				Black Oxide		Stainless		Black Oxide		Stainless	
	Qty	Size	BOLT UHL	Hex	12-Point	Hex	12-Point	Hex	12-Point	Hex	12-Point
Stud kit, Dart, Brodix, B&B	16	1/4-20	3.500	200-7608 ●	200-7618 ●						
Stud kit, BB Chevy	14	1/4-20	1.500 4.500		200-7619 ●						
Bolt kit, Brodix head, SB	4	1/4-20	4.000					100-7511 ▲	100-7514 ●	400-7511 ●	400-7514 ●
Bolt kit, Brodix head, SB	4	1/4-20	4.250					100-7512 ▲	100-7515 ●	400-7512 ●	400-7515 ●
Bolt kit, Brodix head, SB	4	1/4-20	4.500					100-7513 ▲	100-7516 ●	400-7513 ●	400-7516 ●
Bolt kit, Brodix head, BB	7	1/4-20	4.000					100-7517 ▲	100-7520 ●	400-7523 ●	400-7526 ●
Bolt kit, Brodix head, BB	7	1/4-20	4.250					100-7518 ▲	100-7521 ●	400-7524 ●	400-7527 ●
Bolt kit, Brodix head, BB	7	1/4-20	4.500					100-7519 ▲	100-7522 ●	400-7525 ●	400-7528 ●
Chevy, Gen III/IV LS Series small block (.165 thick washer)	8	M6 x 1.0	2.755					100-7524 ▲	100-7523 ▲	400-7529 ●	400-7530 ●
Chevy, Gen III/IV LS Series small block with 0.375˝ spacer	8	M6 x 1.0	80mm (3.150 in.)					134-7503 ▲	134-7504 ▲	434-7503 ●	434-7504 ●
Chevy, Gen III/IV LS Series small block with 0.750˝ spacer	8	M6 x 1.0	90mm (3.543 in.)					134-7505 ▲	134-7506 ▲	434-7505 ●	434-7506 ●
Chevy GEN V 6.2L (LT1/ LT4)	20	M6 x 1.0	30mm (1.181 in.)					134-7502 ▲	134-7501 ▲	434-7502 ●	434-7501 ●
Chevy Duramax 6.6L (LB7)	46	M6 x 1.0	20mm 30mm (.787/1.181 in.)					100-7532 ▲	100-7531 ▲	400-7532 ●	400-7531 ●
Chevy Duramax 6.6L (LLY/LBZ.LMM/LML)	52	M6 x 1.0	25mm, 30mm 45mm (0.984, 1.181, 1.772 in.)					100-7534 ▲	100-7533 ▲	400-7534 ●	400-7533 ●
Ford Racing M-6582-Z351	16	1/4-20	1.000 4.500					154-7503 ▲	154-7502 ●	454-7503 ●	454-7502 ●
STAMPED STEEL COVERS											
350 Chevy, center bolted	8	1/4-20	3.250					100-7509 ▲	100-7510 ●	400-7509 ●	400-7510 ●
Bolt kit	8	1/4-20	0.515					100-7505 ▲	100-7501 ●	400-7505 ●	400-7501 ●
Bolt kit	14	1/4-20	0.515					100-7506 ▲	100-7502 ●	400-7506 ●	400-7502 ●
Stud kit	8	1/4-20	1.170	200-7601 ●	200-7611 ●	400-7601 ●	400-7611 ●				
Stud kit	14	1/4-20	1.170	200-7602 ●	200-7612 ●	400-7602 ●	400-7612 ●				

METRIC STAINLESS ACCESSORY STUDS

ARP has developed some innovative multi-purpose accessory studs that feature a "nut starter" nose and a hex-broached tip for ease of installation that can be used for exhaust systems, intake manifold and a host of other uses. The studs are manufactured from a specially alloyed ARP Stainless developed by ARP that is rated at 180,000 tensile strength and are resistant to the rust and corrosion that plagues ordinary fasteners. The studs come with 12-point nuts and flat washers.





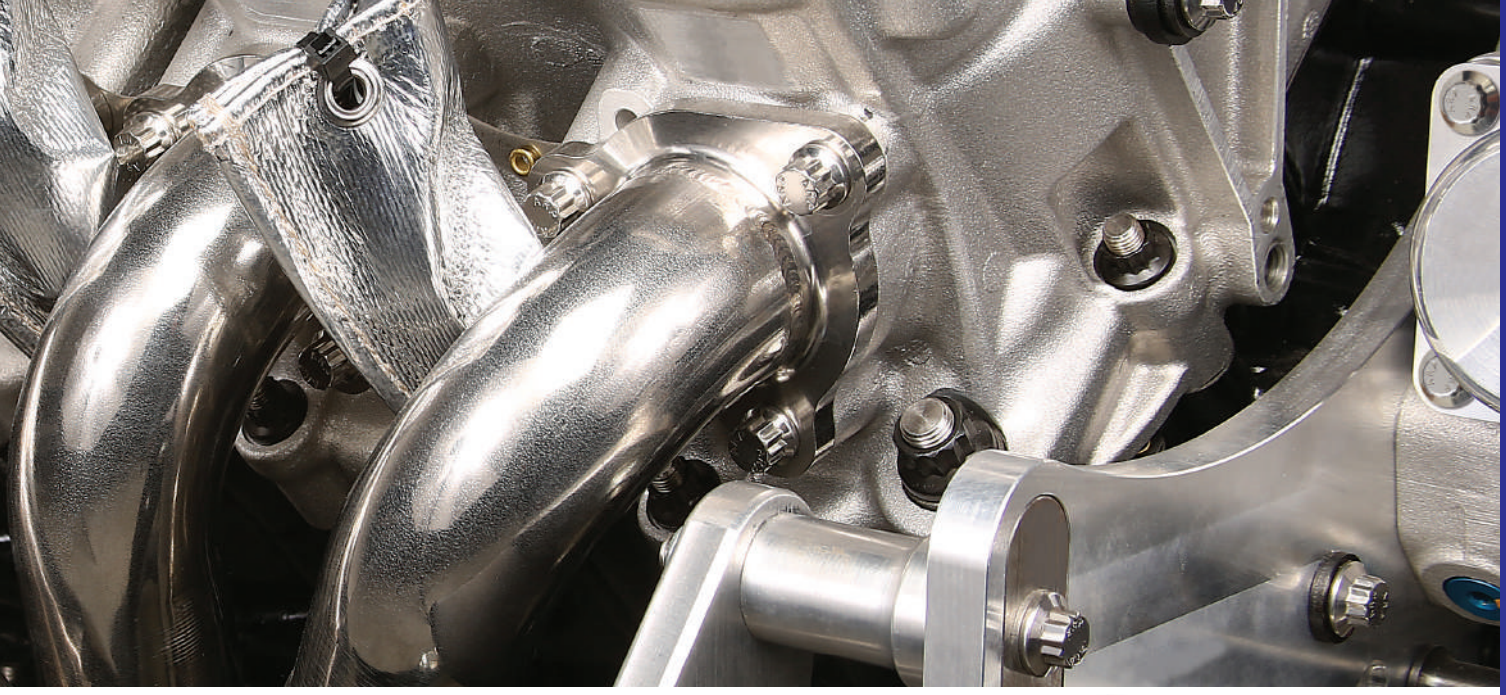
Great for Intake & Exhaust Systems

❶ Diameter & Thread Pitch	❷ OAL mm (in.)	❸ Thread Length mm (in.)	❹ Thread Length mm (in.)	❺ Nose Length mm (in.)	❻ Min. Grip mm (in.)	❼ Grip Dia. mm (in.)	❽ Broach mm	❾ Wrench Size mm	❿ Collar Dia. mm (in.)	4-Pack	8-Pack	10-Pack	16-Pack
M8 x 1.25 x 1.25	**32** (1.250)	**12.7** (0.500)	**12.7** (0.500)	**5.1** (0.200)	**1.3** (0.050)	**8.0** (0.313)	**3**	**10**	**13.6** (0.535)	400-8001	400-8011	400-8021	400-8031
	38 (1.500)	**14.0** (0.550)	**14.0** (0.550)	**5.1** (0.200)	**5.1** (0.200)					400-8002	400-8012	400-8022	400-8032
	45 (1.750)	**15.2** (0.600)	**20.7** (0.815)	**5.1** (0.200)	**3.5** (0.135)					400-8003	400-8013	400-8023	400-8033
	51 (2.000)	**15.2** (0.600)	**21.3** (0.837)	**5.1** (0.200)	**9.2** (0.363)					400-8004	400-8014	400-8024	400-8034
	57 (2.250)	**15.2** (0.600)	**21.3** (0.837)	**5.1** (0.200)	**15.8** (0.620)					400-8005	400-8015	400-8025	400-8035
M10 x 1.25 x 1.25	**48** (1.900)	**17.8** (0.700)	**19.1** (0.750)	**n/a**	**11.4** (0.450)	**10.0** (0.392)	**4**	**12**	**17.8** (0.700)	400-8006	400-8016	400-8026	400-8036
	55 (2.150)	**17.8** (0.700)	**19.1** (0.750)	**6.4** (0.250)	**11.4** (0.450)					400-8007	400-8017	400-8027	400-8037
M10 x 1.50 x 1.25	**48** (1.900)	**17.8** (0.700)	**19.1** (0.750)	**n/a**	**11.4** (0.450)	**10.0** (0.392)	**4**	**12**	**17.8** (0.700)	400-8008	400-8018	400-8028	400-8038
	55 (2.150)	**17.8** (0.700)	**19.1** (0.750)	**6.4** (0.250)	**11.4** (0.450)					400-8009	400-8019	400-8029	400-8039

HEADER COLLECTOR BOLT KITS

Application	Dia.	UHL	Total flange thickness	12-Point
CHEVROLET				
All standard headers and collectors with 3 bolt flange (6 pcs.)	3/8-24	1.250	0.475-.600	400-1213
All standard headers and collectors with 3 bolt flange (6 pcs.)	3/8-24	1.375	0.600-.725	400-1214
All standard headers and collectors with 3 bolt flange (6 pcs.)	3/8-24	1.500	0.725-.850	400-1215

Red part numbers indicate new items



HEADER BOLTS & STUDS

ARP manufactures a variety of premium grade bolt and stud kits to facilitate installation of exhaust headers including the popular stainless stud kit with 12-point nuts. The ARP Stainless material is not affected by corrosion or extreme heat, making it ideal for the application. What's more, the compact 12-point nut lets you easily slip a socket close to the pipe. Studs are manufactured with a unique nut-starter nose that helps prevent cross-threading. Studs and bolts come either black oxide chrome moly or polished ARP Stainless. Both are nominally rated at **180,000 psi** tensile strength; substantially stronger than Grade 8 hardware. Specially drilled "NASCAR" models are available for those who wish to safety wire their header bolts to prevent loosening.

Special "NASCAR" model header bolts are available that are drilled for use of safety wire. Perfect for any racer who desires the ultimate in security. Available for small block and big block Chevrolet engines, plus many "universal" applications.

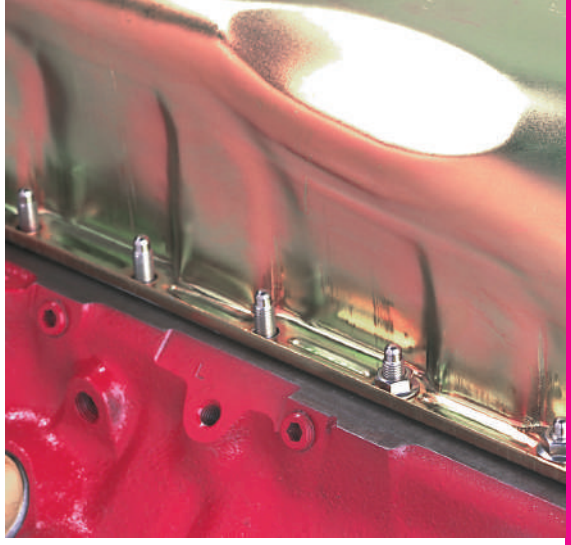
Application NOTE: Bolts come with washers.			STUD OAL	STUD KITS				BOLT KITS			
				Black Oxide		Stainless		Black Oxide		Stainless	
	Qty.	Size	BOLT UHL	Hex	12-Point	Hex	12-Point	Hex	12-Point	Hex	12-Point
BUICK											
3.8L V6	12	3/8	1.670	120-1412 ●	120-1402 ●	420-1412 ●	420-1402 ●				
350-455 cid	14	3/8	1.670	120-1411 ●	120-1401 ●	420-1411 ●	420-1401 ●				
350-455 cid	14	3/8	0.750					120-1101 ▲	120-1201 ●	420-1101 ●	420-1201 ●
CHEVROLET, SMALL BLOCK											
3/8″ dia. bolt, 3/8″ wrench	12	3/8	0.750					100-1101 ▲	100-1201 ●	400-1101 ●	400-1201 ●
3/8″ dia. bolt, drilled, 3/8″ wrench	12	3/8	0.750					100-1103 ▲	100-1203 ●	400-1103 ●	400-1203 ●
3/8″ dia. bolt, 3/8″ wrench	12	3/8	0.875					100-1116 ▲	100-1216 ●	400-1116 ●	400-1216 ●
3/8″ dia. bolt, 3/8″ wrench	12	3/8	1.000					100-1111 ▲	100-1211 ●	400-1111 ●	400-1211 ●
3/8″ dia. stud	14	3/8	1.670				400-1400 ●				
3/8″ dia. stud	12	3/8	1.670	100-1412 ●	100-1402 ●	400-1412 ●	400-1402 ●				

Application NOTE: Bolts come with washers.			STUD OAL	STUD KITS				BOLT KITS			
				Black Oxide		Stainless		Black Oxide		Stainless	
	Qty.	Size	BOLT UHL	Hex	12-Point	Hex	12-Point	Hex	12-Point	Hex	12-Point
CHEVROLET, SMALL BLOCK - LS SERIES											
1/4″ wide header flange	12	M8	0.984					134-1101▲	134-1201▲	434-1101●	434-1201●
3/8″ wide header flange	12	M8	1.181					134-1102▲	134-1202▲	434-1102●	434-1202●
3/8″ wide header flange - stud kit	12	M8	1.750				434-1301●				
CHEVROLET, SMALL BLOCK - LT SERIES											
3/8″ wide header flange - 6.2L (LT1/LT4)	10	M8	1.181					134-1104▲	134-1103▲	434-1104●	434-1103●
3/8″ wide header flange - 6.2L (LT1/LT4)	10	M8	1.750				434-1401●				
CHEVROLET, BIG BLOCK											
3/8″ dia. bolt, 3/8″ wrench	16	3/8	0.750					100-1102▲	100-1202●	400-1102●	400-1202●
3/8″ dia. bolt, 3/8″ wrench	16	3/8	.875					100-1117▲	100-1217●	400-1117●	400-1217●
3/8″ dia. bolt, drilled, 3/8″ wrench	16	3/8	0.875							400-1104●	400-1204●
3/8″ dia. stud	16	3/8	1.670	100-1413●	100-1403●	400-1413●	400-1403●				
3/8″ dia. bolt, 3/8″ wrench	16	3/8	1.000					100-1112▲	100-1212●	400-1112●	400-1212●
CHRYSLER											
5/16″ dia. bolt	14	5/16	0.750					144-1102▲	144-1202▲	444-1102●	444-1202●
KB Hemi, stud w/prov for blower brackets, Mopar 340-360 cid	16	3/8	1.670/ 2.000	245-1311▲	245-1301▲	445-1311●	445-1301●				
Neon, Spt, PT Cruiser 2.4 turbo	10	M8	2.000				441-1302●				
Neon, SOHC & DOHC	8	M8	2.000				441-1301●				
5.7L & 6.1L Hemi V8	16	M8	1.181					140-1101▲	140-1201▲	440-1101●	440-1201●
FORD											
3/8″ bolt	16	3/8	0.750					100-1102▲	100-1202●	400-1102●	400-1202●
3/8″ stud	16	3/8	1.670	100-1414●	100-1404●	400-1414●	400-1404●				
OLDSMOBILE											
330-455 cid	14	3/8	0.750					180-1101▲	180-1201●	480-1101●	480-1201●
330-455 cid	14	3/8	1.670	180-1411●	180-1401●	480-1411●	480-1401●				
UNIVERSAL											
Bolt kit, 5/16″ wrench	12	3/8	0.750					100-1107▲	100-1207●	400-1107●	400-1207●
Bolt kit, 5/16″ wrench	16	3/8	0.750					100-1108▲	100-1208●	400-1108●	400-1208●
Bolt kit, 5/16″ wrench	12	3/8	1.000					100-1109▲	100-1209●	400-1109●	400-1209●
Bolt kit, 5/16″ wrench	16	3/8	1.000					100-1110▲	100-1210●	400-1110●	400-1210●
Bolt kit, drilled, uses 3/8″ socket	16	3/8	0.750							400-1105●	400-1205●
Bolt kit, drilled, uses 3/8″ socket	12	3/8	0.875							400-1106●	400-1206●
Stud kit	16	3/8-5/16	1.500	100-1401●	100-1411●						
Stud kit, broached w/ 12-pt, locking nut, 3/8″	14	3/8	1.125	100-1405●	100-1415●						

Red part numbers indicate new items

OIL PAN BOLT & STUD KITS

The engineers at ARP spent quite a bit of time developing these highly effective, unique oil pan studs. They're designed to make it as easy as possible to install a pan and seal it properly. You'll note that the studs have a radi-used bullet nose that serves to locate the pan rails, then allow the nuts to be easily installed without the worry of cross-threading. For those who prefer bolts, ARP's got you covered, too. Both are available in black oxide finished chrome moly steel or polished ARP Stainless. Also, you may choose between conventional hex style or the space-saving 12-point nuts. The stud kits come complete with a special locking flanged nut, while the bolt kits come with washers.



TECH TIP: Always use some type of lubricant, such as ARP Ultra-Torque fastener assembly lubricant, when assembling fasteners. Assembling without lubricant can lead to galling or seizing, resulting in costly, time consuming repairs.

Application NOTE: Bolts come with washers.	STUD KITS				BOLT KITS			
	Black Oxide		Stainless		Black Oxide		Stainless	
	Hex	12-Point	Hex	12-Point	Hex	12-Point	Hex	12-Point
CHEVROLET, SMALL BLOCK								
265-400 cid (w/std. 2-pc. cork gasket)	234-1901 ●	234-1902 ●	434-1901 ●		234-1802 ▲	234-1801 ●	434-1802 ●	434-1801 ●
265-400 cid (w/ 1-pc. rubber gasket)					134-1802 ▲	134-1801 ●	434-1804 ●	434-1803 ●
350 cid with girdle, 5/16″ diameter	334-1902 ●							
Gen III/IV LS Series small block					134-6901 ▲	134-6902 ▲	434-6901 ●	434-6902 ●
GEN V 6.2L (LT1/LT4)					134-1806 ▲	134-1805 ▲	434-1806 ●	434-1805 ●
CHEVROLET, BIG BLOCK								
396-454 cid (w/ standard 2-pc. cork gasket)	235-1901 ●	235-1902 ●	435-1901 ●	435-1902 ●	235-1802 ▲	235-1801 ●	435-1802 ●	435-1801 ●
396-454 cid (w/ 1-pc. rubber gasket)					135-1802 ▲	135-1801 ●	435-1804 ●	435-1803 ●
CHEVROLET, 6-CYLINDER								
90° V6	333-1901 ●							
CHRYSLER, SMALL BLOCK								
318-340-360 Wedge & 318-360 Magnum	200-1901 ●	200-1902 ●	400-1901 ●	400-1902 ●	200-1802 ▲	200-1801 ●	400-1802 ●	400-1801 ●
5.7L & 6.1L Hemi					140-1802 ▲	140-1801 ▲	440-1802 ●	440-1801 ●
CHRYSLER, BIG BLOCK								
KB Hemi, 1.300″ U.H.L	245-1901 ●	245-1903 ●						
KB Hemi, 1.700″ U.H.L	245-1902 ●	245-1904 ●	445-1902 ●	445-1904 ●				
FORD, SMALL BLOCK								
289-302-351C & 351W (early model)	254-1901 ●	254-1902 ●	454-1901 ●	454-1903 ●	254-1802 ▲	254-1801 ●	454-1802 ●	454-1801 ●
302-351W (late model with side rails)	254-1903 ●	254-1904 ●	454-1902 ●	454-1904 ●	254-1804 ▲	254-1803 ●	454-1804 ●	454-1803 ●
FORD, BIG BLOCK								
390-428 cid FE Series					255-1802 ▲	255-1801 ●	455-1802 ●	455-1801 ●
HOLDEN								
V8					105-1802 ●	105-1801 ●	405-1802 ●	405-1801 ●
PONTIAC								
350-455 cid	200-1901 ●	200-1902 ●	400-1901 ●	400-1902 ●	200-1802 ▲	200-1801 ●	400-1802 ●	400-1801 ●

OIL PUMP BOLTS & STUDS

You've probably heard many a horror story about someone losing an engine when the oil pump fell off into the pan because of a broken bolt. Well, you can put your mind at ease when using ARP's premium grade oil pump bolt and stud kits. You have a choice of black oxide finished 8740 chrome moly steel or polished ARP Stainless. Both are nominally rated at **180,000 psi** tensile strength to provide you with plenty of clamping force. Moreover, take your pick between conventional hex style or 12-point designs. This is "insurance" that no conscientious engine builder should be without! The studs come with flat washers and nuts, while the Ford bolt kit has flat washers only. These inexpensive fasteners can literally save your engine.

Application	Black Oxide		Stainless	
	Hex	12-Point	Hex	12-Point
CHEVROLET				
Small block, stud kit	230-7001 ●	230-7002 ●		
Small & big block, 3.125˝, high volume, stud kit	230-7003 ●	230-7004 ●		
FORD				
3/8˝ & 5/16˝ 4 piece bolt kit	150-6902 ▲	150-6901 ●	450-6902 ▲	450-6901 ▲
Oil pump to pickup, stud kit	154-7005 ▲			

FUEL PUMP BOLT KITS

Make sure that mechanical fuel pumps stay properly aligned by using ARP's durable black oxide finished chrome moly or rust-proof stainless bolts (both materials are nominally rated at **180,000 psi** and considerably stronger than Grade 8 hardware). Your choice of either conventional hex or 12-point head. Washers are included.

Application	Black Oxide		Stainless	
	Hex	12-Point	Hex	12-Point
CHEVROLET	130-1602 ▲	130-1601 ●	430-1602 ●	430-1601 ●
PONTIAC	190-1602 ▲	190-1601 ●	490-1602 ●	490-1601 ●

MOTOR MOUNT BOLT KITS

Secure any engine with complete confidence with ARP's rugged motor mount bolts. You can choose between black oxide finished 8740 chrome moly or corrosion-resistant stainless steel; choice of hex or 12-bolt head. Kits come complete with flat washers.

Application	Black Oxide		Stainless	
	Hex	12-Point	Hex	12-Point
Chevy, V6 & V8 - mount to block	130-3102 ▲	130-3101 ●	430-3102 ●	430-3101 ●
Chevy, V6 & V8 - mount to block w/ Energy Suspension mounts	130-3106 ▲	130-3107 ●	430-3106 ●	430-3107 ●
Chevy, V6 & V8 - mount to frame	130-3105 ▲		430-3105 ●	
Chevy, LS Series small block mount bracket to block (6 pc.)	134-3102 ●	134-3101 ●	434-3102 ●	434-3101 ●
Chevy, LS Series small block mount bracket to block (8 pc.)	134-3104 ●	134-3103 ●	434-3104 ●	434-3103 ●
Chrysler 5.7L & 6.1L Hemi	140-3102 ▲	140-3101 ▲	440-3102 ●	440-3101 ●
Ford, 289-302-351W	150-3102 ▲	150-3101 ▲	450-3102 ●	450-3101 ●
Pontiac, All V8	190-3102 ▲	190-3101 ▲	490-3102 ●	490-3101 ●

Red part numbers indicate new items

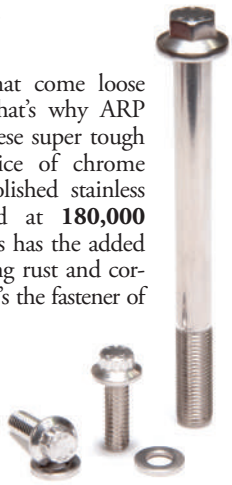
FRONT COVER, WATER PUMP & ALTERNATOR KITS

Also available as part of ARP's complete Engine & Accessory kits on page 91.

ARP's timing cover bolts are available in both polished stainless steel or black oxide finish chrome moly. You also can choose between standard hex head bolts or compact 12-point fasteners.

Studs are preferred by many pro engine builders because they eliminate the chance of pinching gaskets and contribute to easier engine assembly. You will note that ARP studs feature a special "bullet nose" to guide the nut accurately into place. Available in black oxide finish 8740 chrome moly or polished stainless steel with hex or 12-point nuts.

Alternators that come loose are a pain, so that's why ARP came up with these super tough bolts. Your choice of chrome moly steel or polished stainless (nominally rated at **180,000 psi**). The stainless has the added advantage of being rust and corrosion resistant. It's the fastener of choice!



Application NOTE: Bolts come with washers.	STUD KITS				BOLT KITS			
	Black Oxide		Stainless		Black Oxide		Stainless	
	Hex	12-Point	Hex	12-Point	Hex	12-Point	Hex	12-Point
BUICK								
350, timing cover					120-3202 ●	120-3201 ●	420-3202 ●	420-3201 ●
CHEVROLET								
90° V6, timing cover	333-1401 ●							
3/8˝ alternator pivot bolt							430-3303 ●	430-3304 ●
All V8, alternator bracket bolts					130-3302 ▲	130-3301 ●	430-3302 ●	430-3301 ●
All V8, timing cover	200-1401 ●	200-1411 ●	400-1401 ●		200-1502 ●	200-1501 ●	400-1502 ●	400-1501 ●
All V8, timing cover with Jesel belt or gear drive		334-1401 ●						
All V8, water pump long					130-3202 ▲	130-3201 ●	430-3202 ●	430-3201 ●
SB Chevy, water pump short					134-3204 ▲	134-3203 ▲	434-3204 ●	434-3203 ●
Gen III/IV LS Series, timing cover					134-1501 ●	134-1502 ●	434-1501 ●	434-1502 ●
Gen III/IV LS Series, water pump with thermostat housing bolts					134-3201 ▲	134-3202 ▲	434-3201 ●	434-3202 ●
Gen III/IV LS Series, rear motor cover					134-1503 ●	134-1504 ●	434-1503 ●	434-1504 ●
Gen V 6.2L (LT1/LT4) timing cover					134-1506 ●	134-1505 ●	434-1506 ●	434-1505 ●
CHRYSLER								
5.7L & 6.1L Hemi, rear main seal plate					140-0002 ●	140-0001 ●	440-0002 ●	440-0001 ●
5.7L & 6.1L Hemi, timing cover & water pump					140-1502 ▲	140-1501 ▲	440-1502 ●	440-1501 ●
KB Hemi, timing cover	245-1511 ●	245-1501 ●	445-1511 ●	445-1501 ●				
FORD								
289-302, aluminum timing cover & w-pump					154-1504 ▲	154-1503 ●	454-1504 ●	454-1503 ●
289-302, aluminum t-cover & cast iron w-pump					154-3204 ▲	154-3203 ▲	454-3204 ●	454-3203 ●
289-302, cast-iron timing cover & w-pump					154-1502 ▲	154-1501 ●	454-1502 ●	454-1501 ●
289-302, aluminum t-cover & aluminum w-pump					154-3202 ▲	154-3201 ▲	454-3202 ●	454-3201 ●
351 SVO, timing cover	354-1401 ●							

Application NOTE: Bolts come with washers.	STUD KITS				BOLT KITS			
	Black Oxide		Stainless		Black Oxide		Stainless	
	Hex	12-Point	Hex	12-Point	Hex	12-Point	Hex	12-Point
FORD (CONTINUED)								
351C, water pump					154-3206 ▲	154-3205 ▲	454-3206 ●	454-3205 ●
351W, alternator bracket bolts					150-3302 ▲	150-3301 ▲	450-3302 ●	450-3301 ●
PONTIAC								
All V8, alternator bracket bolts					190-3302 ▲	190-3301 ●	490-3302 ●	490-3301 ●
All V8, timing cover and water pump					190-1502 ▲	190-1501 ●	490-1502 ●	490-1501 ●

WATER PUMP PULLEY STUDS & BOLTS

Whether you're mounting your fan directly to the water pump, or using a spacer for clearance, ARP has you covered with our 180,000 psi water pulley kits. Our kits come in 8470 or polished ARP Stainless and cover spacers up to 3.250″ in 0.250″ increments.

Application *NOTE:* *Bolt kits come with washers.* *All kits include 4 of each piece.*	Thread	Stud: OAL Bolt: UHL	8740 / Black Oxide		ARP Stainless / Polished	
			Hex	12-Point	Hex	12-Point
			wrenching: 1/2″	wrenching: 3/8″	wrenching: 1/2″	wrenching: 3/8″
UNIVERSAL STUD KITS						
broached	5/16-24	1.250″	100-3201 ●	100-3216 ●	400-3201 ●	400-3216 ●
broached, starter nose		1.450″	100-3202 ●	100-3217 ●	400-3202 ●	400-3217 ●
0.250″ fan spacer, broached		1.500″	100-3203 ●	100-3218 ●	400-3203 ●	400-3218 ●
0.500″ fan spacer, broached		1.750	100-3204 ●	100-3219 ●	400-3204 ●	400-3219 ●
0.750″ fan spacer, broached		2.000	100-3205 ●	100-3220 ●	400-3205 ●	400-3220 ●
1.000″ fan spacer, broached		2.250	100-3206 ●	100-3221 ●	400-3206 ●	400-3221 ●
1.250″ fan spacer, broached		2.500	100-3207 ●	100-3222 ●	400-3207 ●	400-3222 ●
1.500″ fan spacer, broached		2.750	100-3208 ●	100-3223 ●	400-3208 ●	400-3223 ●
1.750″ fan spacer, broached		3.000	100-3209 ●	100-3224 ●	400-3209 ●	400-3224 ●
2.000″ fan spacer, broached		3.250	100-3210 ●	100-3225 ●	400-3210 ●	400-3225 ●
2.250″ fan spacer, broached		3.500	100-3211 ●	100-3226 ●	400-3211 ●	400-3226 ●
2.500″ fan spacer, broached		3.750	100-3212 ●	100-3227 ●	400-3212 ●	400-3227 ●
2.750″ fan spacer, broached		4.000	100-3213 ●	100-3228 ●	400-3213 ●	400-3228 ●
3.000″ fan spacer, broached		4.250	100-3214 ●	100-3229 ●	400-3214 ●	400-3229 ●
3.250″ fan spacer, broached		4.500	100-3215 ●	100-3230 ●	400-3215 ●	400-3230 ●
UNIVERSAL BOLT KIT						
flanged head	5/16-24	0.750″				400-3217 ●

Red part numbers indicate new items

STARTER BOLT KITS

Installing starter motors in the cramped confines of a race car is simplified by use of ARP's special bolts, which feature small diameter heads to make accessibility more convenient. These starter bolts are made from Custom 450 stainless steel material that is nominally rated at 180,000 psi and substantially stronger than Grade 8 hardware. ARP stainless starter bolts are 100% maintenance free and include standard shank knurling where applicable. Complete with washers where required.

Application	Dia.	UHL	Hex	12-Point
CHEVROLET				
All standard & OEM high torque starters, long & short	3/8-16	1.975/4.660	430-3505	430-3508
All standard & OEM high torque starters, medium	3/8-16	3.760	430-3502	430-3501
All standard & OEM high torque starters, long	3/8-16	4.660	430-3507	430-3509
Aftermarket gear reduction starters, long & short	3/8-16	1.750/4.400	430-3516	430-3515
Aftermarket gear reduction starters, long	3/8-16	4.400	430-3514	430-3513
8.1L Vortec - Long	M10	4.470	430-3512	430-3511
Gen III/IV LS Series small block	M10	1.775/4.470	430-3506	430-3510
FORD				
2-bolt	3/8-16	1.500	450-3503	450-3501
3-bolt	3/8-16	1.500	450-3504	450-3502
3-bolt	5/16-18	1.250	450-3606	450-3505
PRO STOCK				
3/8˝ 2-bolt	3/8-16	3.760	430-3504	

SEAL PLATE & ACCESSORY CAM DRIVE

If the survivability of your camshaft drive, through an entire race without stripping or breaking, has been a matter of concern – ARP's new cam drive should put your mind to rest. We built this setup to be "bulletproof." Totally reliable. A through-hardened, not just case hardened, chrome moly shaft, premium grade Viton seal, plus anodized aluminum plate are manufactured in-house to insure that every part is guaranteed ARP quality.

Application	1.0˝	1.5˝
All 9/16-18 x 0.625	934-0005	934-0006

The perfect compliment to our "bulletproof" cam drives are these precision seal plates. They're made of CNC-machined 7075-T4 alloy aluminum and anodized to resist corrosion. Available in 2.100˝ and 2.380˝ diameters to fit most any OEM or aftermarket block.

Application	Diameter	Part No.
Small Block GM, 2.100 O.D. block	2.100	934-0007
Dart, aluminum block	2.380	934-0008

SPECIFICATIONS

- Drive: forged ARP2000, 220,000 psi alloy chrome moly steel with corrosion-resistant oxide finish.
- Concentricity: 0.001 T.I.R., between shaft and hex, 1˝ and 1.5˝ length
- Threads: form rolled 9/16˝ x 0.625˝ on cam end, 3/8˝ hex on drive
- Seal Plate: CNC-machined 7075-T4 aluminum with Viton seal

AIR CLEANER STUDS

Keep your air cleaner firmly in position with an ARP stud kit. Includes your choice of a black oxide finished chrome moly or stainless steel stud with an appropriate nut. Vastly superior to the cheap fasteners that sometimes get used.

Application	Black Oxide	Stainless
5/16 x 2.225″ OAL	200-0301 ▲	400-0301 ●
5/16 x 2.700″ OAL	200-0302 ▲	400-0302 ●
5/16 x 3.200″ OAL	200-0303 ▲	400-0303 ●
1/4 x 2.225″ OAL	200-0304 ▲	400-0304 ●

Application	Black Oxide	Stainless
1/4 x 2.443″ OAL	200-0307 ●	400-0307 ●
1/4 x 2.700″ OAL	200-0305 ▲	400-0305 ●
1/4 x 3.200″ OAL	200-0306 ▲	400-0306 ●

DISTRIBUTOR STUD KITS

One of the most critical – yet often overlooked – fasteners used in any engine locks the timing in place. ARP offers these premium grade studs in black oxide finished chrome moly or polished ARP Stainless. A special bullet nose helps guide nut into place without cross-threading. Choice of conventional hex or space-saving 12-point nuts. Washers included.

Application	Black Oxide		Stainless	
	Hex	12-Point	Hex	12-Point
Chevrolet	130-1702 ●	130-1701 ●	430-1702 ●	430-1701 ●
Ford	150-1702 ●	150-1701 ●	450-1702 ●	450-1701 ●
Pontiac	190-1702 ●	190-1701 ●	490-1702 ●	490-1701 ●

THERMOSTAT HOUSING BOLTS

Nobody likes water leaks. And here's ARP's contribution to the solution. These premium grade bolts are engineered to properly engage the manifold threads and resist loosening. They're application-specific, and come in your choice of black oxide finished chrome moly or rust-proof stainless steel, with handy 12-point or standard hex heads. Washers included.

Application	UHL	Black Oxide		Stainless	
		Hex	12-Point	Hex	12-Point
Chrevrolet (3 pc)	1.00/2.00	130-7402 ▲	130-7401 ●	430-7402 ●	430-7401 ●
Chevrolet LS Series	20mm	134-7402 ▲	134-7401 ▲	434-7402 ●	434-7401 ●
Ford FE	2.250	155-7402 ▲	155-7401 ●	455-7402 ●	455-7401 ●
Ford 351W	0.875	150-7402 ▲	150-7401 ●	450-7402 ●	450-7401 ●
Pontiac	1.000	190-7402 ▲	190-7401 ●	490-7402 ●	490-7401 ●

Red part numbers indicate new items

CARBURETOR STUD KITS

The best way to make sure that carburetors stay perfectly sealed to the intake manifold is through the use of ARP's carb studs. They're offered in a variety of heights to accommodate most any combination of carb and spacer, and are available in 8740 chrome moly with a black oxide finish or ARP Stainless. Special ARP Pro Series NASCAR type stud **kits have one of the studs drilled** to facilitate sealing the carburetor in the engine by race officials. All carb studs include a nut starter nose (except where noted) and kits come with hex nuts and washers.

Application	Qty.	Size	O.A.L.	Black Oxide	Stainless	Pro Series
Standard	4	5/16	1.700	200-2401	400-2401	
Standard with Moroso #64919 return spring kit	4	5/16	1.700 (2) & 2.050 (2)	200-2421	400-2421	300-2421
Standard with Moroso #64927 return spring kit	4	5/16	1.700 (3) & 2.050 (1)	200-2424	400-2424	300-2424
1/2″ spacer	4	5/16	2.225	200-2403	400-2403	
1″ spacer	4	5/16	2.700	200-2402	400-2402	
1″ spacer with Moroso #64919 return spring kit	4	5/16	2.700 (2) & 3.050 (2)	200-2420	400-2420	300-2420
1″ spacer with Moroso #64927 return spring kit	4	5/16	2.700 (3) & 3.050 (1)	200-2423	400-2423	300-2423
2″ spacer	4	5/16	3.700	200-2404		300-2404
3″ spacer	4	5/16	4.700	200-2405		
1-1 /4″ Moroso spacer	4	5/16	3.200	200-2408	400-2408	
2″ Moroso spacer	8	5/16	1.250* (4) & 1.700 (4)	200-2409		
2″ Moroso spacer with Moroso #64919 return spring kit	8	5/16	1.250* (4) & 1.700 (2) & 2.050 (2)	200-2419	400-2419	300-2419
2″ Moroso spacer with Moroso #64927 return spring kit	8	5/16	1.250* (4) & 1.700 (3) & 2.050 (1)	200-2422	400-2422	300-2422
Dominator with 1/2″ or 1″ spacer	4	5/16	3.200	200-2412	400-2412	
Dominator carb stud, no spacer	4	5/16	2.225	200-2414	400-2414	
Dominator carb stud, with spacer	4	5/16	4.400	200-2415		
HP Dominator carb stud, no spacer	4	5/16	2.225	200-2416		
HP Dominator carb stud with 1/2″ spacer	4	5/16	2.700	200-2417		
HP Dominator carb stud with 1″ spacer	4	5/16	3.200	200-2418		
Standard (drilled for NASCAR wire seal)	4	5/16	1.700			300-2401
2″ spacer (drilled for NASCAR wire seal)	8	5/16	2.225 (1) & 1.700 (7)			300-2406
1″ spacer (drilled for NASCAR wire seal)	4	5/16	2.700			300-2403
1/2″ spacer (drilled for NASCAR wire seal)	4	5/16	2.225			300-2402
1″ Moroso spacer (drilled for NASCAR wire seal)	4	5/16	2.700			300-2407
1-1/4″ Moroso spacer (drilled for NASCAR wire seal)	4	5/16	3.200			300-2408
2″ Moroso spacer (drilled for NASCAR wire seal)	8	5/16	1.250* (4) & 1.700 (1) & 1.700 (1)			300-2409
Quadrajet (all), with 1/4″ base gasket	4	5/16	1.700 (2) & 4.400 (2)	200-2413	400-2413	

*Does not have starter nose

COIL BRACKET BOLTS

Add a touch of class to your coil bracket installation with an ARP bolt kit. Available in black oxide finished chrome moly or rust-proof stainless steel, as well as with a conventional hex head or 12-point (great for tight, hard-to-reach coils). Washers included.

Application	Black Oxide		Stainless	
	Hex	12-Point	Hex	12-Point
Chevrolet	130-2302	130-2301	430-2302	430-2301
Chevrolet Small Block - LS Series	134-2302	134-2301	434-2302	434-2301
Chevrolet 6.2L (LT1/LT4)	134-2304	134-2303	434-2304	434-2303
Chrysler 5.7L & 6.1L Hemi	140-2302	140-2301	440-2302	440-2301
Ford Small Block - Windsor	150-2302	150-2301	450-2302	450-2301

INTAKE MANIFOLD BOLT & STUD KITS

Prevent intake manifold leaks with ARP's quality fasteners. They're nominally rated at **180,000 psi** and precision machined for optimum thread engagement. Wide underhead flange and companion washers provide even load distribution. Precision rolled threads prevent galling while promoting more consistent torque loading. Facilitates optimum sealing of gasket surfaces. Available in choice of black oxide finish chrome moly or corrosion resistant stainless steel, as well as hex or 12-point heads. Washers included.

NOTE: Kits designed for factory OEM intakes

Application	Black Oxide		Stud	Stainless		
	Hex	12-Point		Hex	12-Point	NASCAR
AMC						
290-343-390 cid, uses 3/8″ socket	114-2001▲			414-2001●	414-2101●	
BUICK						
3.8L V6	123-2001▲			423-2001●		
215 cid, uses 3/8″ socket	124-2001▲	124-2101●		424-2001●	424-2101●	
CHEVROLET						
SB 2, standard deck					334-2104●	
SB 2, tall deck, drilled						334-2105●
Small block, 1.000″, drilled						334-2102●
Small block, 1.250″, drilled						334-2103●
265-400 cid, factory OEM, 1.000″, 12 pieces	134-2001▲	134-2101●		434-2001●	434-2101●	
265-400 cid, factory OEM, 1.500″, 12 pieces		134-2102●				
305-350 Vortec, fits most aftermarket alum. intakes	134-2002▲	134-2103●		434-2002●	434-2102●	
305-350 Tuned Port	134-2004▲	134-2104●		434-2004●	434-2104●	
LS1, LS4, LS6, 4.8L-RL4, 5.3L-LM7, 6.0L-LQ4, 4.480″ UHL	130-2001▲	130-2101▲		430-2001●	430-2101●	
LS, Edelbrock Intake, 45mm UHL	130-2002▲	130-2102▲		430-2002●	430-2102●	
LS, GM Performance Intake, 55mm UHL	130-2003▲	130-2103▲		430-2003●	430-2103●	
Gen III/IV LS Series small block, valley cover bolts	134-8001●	134-8002●		434-8001●	434-8002●	
396-454 cid, 1.250″ U.H.L.	135-2001▲	135-2101●		435-2001●	435-2101●	
502 cid, 1.500″ U.H.L.	135-2002▲			435-2002●	435-2102●	
CHRYSLER						
318-440 Wedge, uses 3/8″ socket	144-2001▲	144-2101●		444-2001●	444-2101●	
5.7L & 6.1L Hemi with aluminum intake manifold	144-2003▲	144-2103▲		444-2003●	444-2103●	
FORD						
260-289-302, 351W, uses 3/8″ socket	154-2001▲	154-2101●		454-2001●	454-2101●	
289-302, 351W intake stud kit			354-2103▲			
351C, 351-400M	154-2004▲	154-2104●		454-2004●	454-2104●	
351W, uses 3/8 wrenching	154-2002▲	154-2102●		454-2003●	454-2103●	
351W, Edelbrock RPM Air Gap intake	154-2005▲	154-2105▲		454-2005●	454-2105●	
351C, Edelbrock RPM Air Gap intake	154-2006▲	154-2106▲		454-2006●	454-2106●	
351 SVO, Jack Roush design, drilled						354-2102●
390-428 cid FE Series	155-2002▲	155-2102●		455-2002●	455-2102●	
429-460 cid	155-2005▲	155-2105●		455-2001●	455-2101●	
HOLDEN						
V8	105-2001▲	105-2101▲		405-2001●	405-2101●	
PONTIAC						
350-455 cid, uses 3/8″ socket	194-2001▲	194-2101●		494-2001●	494-2101●	

Red part numbers indicate new items

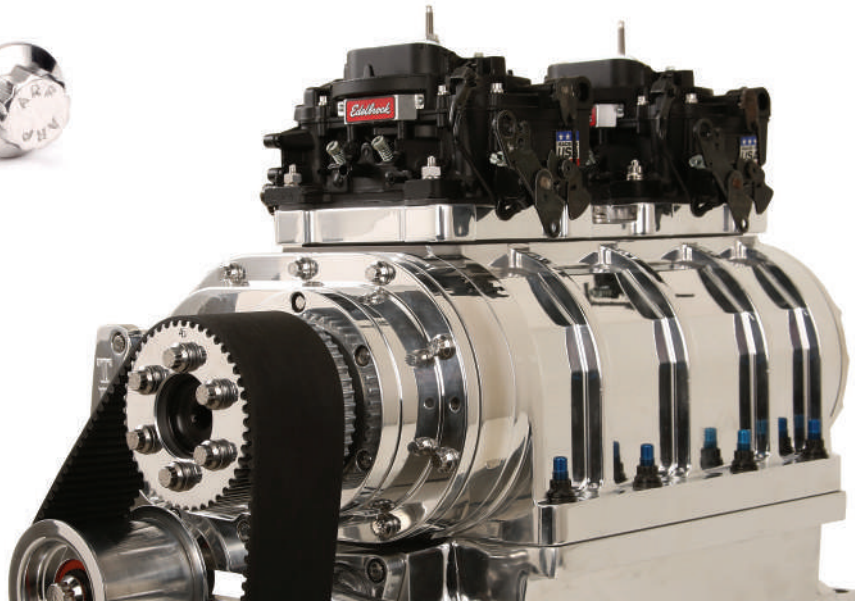
CARBURETOR FLOAT BOWL KITS

The smart way to attach a float bowl is with ARP's special new bolts. They're made from ARP Stainless and are virtually impervious to corrosion. A polished finish makes them an enhancement to any carb. They are 5/16″ wrenching and nominally rated at **180,000 psi**. Available for both single and dual metering block Holley and Carter AFB applications.

Application	Pieces	Part No.
Carter AFB - Edelbrock Performer & Thunder	8	400-0313 ●
Holley 2-barrel, hex	4	400-0312 ●
Holley Dual metering blocks, hex	8	400-0310 ●
Holley Single metering blocks, hex	8	400-0311 ●

BLOWER PULLEY BOLTS

Application	Thread	UHL	Hex	12-Point
671-871 blower - stainless with washers (others lengths available in bulk fasteners)	3/8-24	1.000	400-0602 ●	400-0601 ●



BLOWER STUDS

Engineered to minimize damage to either manifold or blower housing during unexpected blower explosions – these break-away blower studs are designed to allow separation of manifold and blower. Use of these special studs could save you thousands of dollars! Manufactured from premium-quality aluminum and heat-treated to provide the optimum balance between keeping the supercharger in place and breaking under a predetermined amount of force. Kit comes complete with anodized studs, 12-point, quality steel nuts and heavy-duty parallel-ground and hardened steel washers.

Application	Diameter	OAL	12-Point
Blower stud kit (blue)	7/16	2.880	100-0601 ▲
SSI blower stud kit (red)	7/16	2.500	100-0602 ▲

HARMONIC DAMPER BOLT KITS

As the crankshaft flexes and twists, the harmonic damper absorbs incredible amounts of kinetic energy. To ensure that the damper is locked in position, ARP has developed these ultra strong **190,000 psi** bolts that let you exert maximum clamping force. Special features include 1/4″ thick, wide area washer and an extra tall 12-point head that accepts a deep socket and eliminates the worry of stripping the head.

Application	UHL	Thread Size	Socket Size	Part No.
BUICK				
All V6 & V8	1.300	3/4-16	13/16	120-2501 ●
CHEVROLET				
Small block	2.470	7/16-20	5/8	134-2501 ●
Small block	2.470	7/16-20	13/16	234-2501 ●
Small block	2.470	7/16-20	1-1/16	234-2502 ●
Gen III/IV LS Series small block (except LS7)	4.325	M16 x 2.0	1-1/16	234-2503 ●
Gen IV 7.0L (LS7) & GEN V 6.2L (LT1) small block	5.185	M16 x 2.0	1-1/16	234-2504 ●
CHEVROLET				
Big block	1.550	1/2-20	5/8	135-2501 ●
Big block	1.550	1/2-20	13/16	235-2501 ●
Big block	1.550	1/2-20	1-1/16	235-2502 ●
CHRYSLER				
318-440 Wedge & 426 Hemi with thin damper	1.420	3/4-16	1-1/16	245-2501 ●
318-440 Wedge with thick damper & Viper V10	2.200	3/4-16	1-1/16	240-2501 ●
5.7L, 6.1L & 6.4L Hemi	4.000	M14 x 1.50	19mm	147-2501 ●
SRT-10	2.175	3/4-16	13/16	147-2504 ●
DIESEL				
Chevy 6.6L Duramax - bolt	2.750	M18 x 1.50	27mm	129-2503 ●
Chevy 6.6L Duramax - washer for 129-2503, as applicable				200-8793 ▲
Dodge/Cummins 5.9L 12V/24V (2007 & earlier) (4 pcs.)	1.425	M12 x 1.25	14mm	147-2502 ▲
Dodge/Cummins 5.9L & 6.7L 24V (2008 & later) (4 pcs.)	1.725	M12 x 1.25	14mm	147-2503 ▲

Red part numbers indicate new items

HARMONIC DAMPER BOLT KITS

Application	UHL	Thread Size	Socket Size	Part No.
Ford 6.0L & 6.4L Power Stroke	2.425	M12 x 1.25	19mm	150-2505▲
Ford 6.7L Power Stroke	1.825	M12 x 1.5	19mm	150-2504▲
DODGE				
Viper SRT-10	2.175	3/4-16	3/4	147-2504▲
Hellcat/Demon	4.000	M16 x 1.5	3/4	147-2803▲
FORD				
1.8L & 2.0L Duratec	1.735	M14 x 1.50	19mm	251-2501●
4.6L & 5.4L Modular V8	1.800	M12 x 1.50	18mm	156-2501●
5.0L Coyote V8	4.200	M12 x 1.50	19mm	156-2502●
289-460 cid (except 351C)	2.050	5/8-18	5/8	150-2501●
351C	1.800	5/8-18	5/8	154-2501●
HONDA				
B Series (B16/18)	1.350	M14 x 1.25	19mm	208-2501●
MITSUBISHI				
2.0L (4G63) DOHC	1.525	M14 x 1.50	19mm	207-2501●
NISSAN				
2.6L (RB26) Inline 6	3.500	M18 x 1.50	27mm	102-2501●
OLDSMOBILE				
V8	1.300	3/4-16	13/16	180-2501●
PONTIAC				
350-455 cid	1.580	5/8-18	5/8	190-2501●
SUBARU				
FA20	4.450	M13 x 1.5	1-1/16	160-2501●

SQUARE DRIVE DAMPER BOLTS

ARP offers a special version of its rugged **190,000 psi** rated damper bolt that can accept a standard 1/2″ drive ratchet or breaker bar to facilitate rotating the crank assembly.

- 1/2″ square drive forged into bolt head, enabling the rotation of an engine with any 1/2″ drive tool
- Made from heat-treated 8740 chrome moly steel with heavy-duty black oxide finish

Application	Part No.
Buick	120-2502●
Chevrolet Small Block	134-2503●
Chevrolet Big Block	135-2503●
Chrysler	145-2503●
Ford 289-460 cid (except 351C)	150-2503●
Ford 351C	154-2502●
Oldsmobile	180-2502●
Pontiac	190-2502●

OIL PUMP DRIVESHAFT KITS

Many an engine has been destroyed as a result of oil pump driveshaft failure. To cure this all-too-common problem, ARP has designed an extra heavy-duty shaft that will provide you with the necessary reliability. The shaft is made from heat-treated, premium grade aerospace chrome moly steel. Moreover, the shaft diameter is a larger diameter than the OEM unit. These features combine to enable ARP shafts to handle the added torque requirements of increased capacity oil pumps or heavy viscosity lubricants.

CHEVY DRIVES: Made from premium grade 8740 and heat-treated to **190,000 psi**, ARP uses a unique manufacturing process where the alignment sleeve is roll formed onto the shaft (not welded or pinned), enabling the sleeve to float, allowing for slight misalignment.

FORD DRIVES: Made from ARP2000 and heat-treated to **220,000 psi**. These pump drives feature a CNC milled (not broached) hex, and has the retaining washer installed.

Application	Part No.
CHEVROLET	
Small block (up to 1996)	134-7901 ●
Big block	135-7901 ▲
Big block (+0.400 tall deck)	135-7902 ▲
FORD	
239-312 Y block	154-7906 ●
289-302 cid & Boss 302	154-7904 ●
351W	154-7901 ●
351C, 351-400M	154-7905 ●
390-428 cid FE Series	154-7902 ●
429-460 cid	154-7903 ●

IMPORTANT NOTE: Make sure you ***ALWAYS*** check clearances: shaft to block and pump to distributor.

ALTERNATOR STUD KITS

Strange as it may seem, there have been many races lost in oval track, off-road and endurance competition due to the OEM alternator stud failing and the subsequent loss of electrical power. To prevent this from ever happening, conscientious engine builders rely on ARP's "bulletproof" alternator studs. They're made from a premium grade 8740 chrome moly steel alloy and heat-treated to a nominal **190,000 psi** tensile strength. They are very rigid and won't bend under the stress of competition, eliminating problems with alternator pulley alignment. Here's more reliable "insurance" from the innovators at ARP. Available in 5.000″ and 5.250″ lengths. Includes a 12-point nut and flat washer.

Description	OAL	Coarse Thread Length	Fine Thread Length	Part No.
7/16 stud	5.000	1.000	1.000	300-0501 ▲
7/16 stud	5.250	1.000	1.000	300-0502 ▲

FUEL PUMP PUSHROD KITS

Stock fuel pump pushrods leave a lot to be desired. In fact, they've been known to break at the most inopportune time. To provide you with required reliability and improved performance, ARP has developed these sophisticated and durable pushrods. They're made from premium grade aerospace chrome moly and centerless ground to precise diameter. A hollow core serves to reduce the reciprocating mass, which requires less energy to operate. The less drag on the motor, the more power available to you!

NOTE: Not for use on roller cams!

Application	Diameter	OAL	Part No.
Chevy Small Block	1/2	5.750″	134-8701 ●
Chevy Big Block	1/2	5.750″	135-8701 ▲

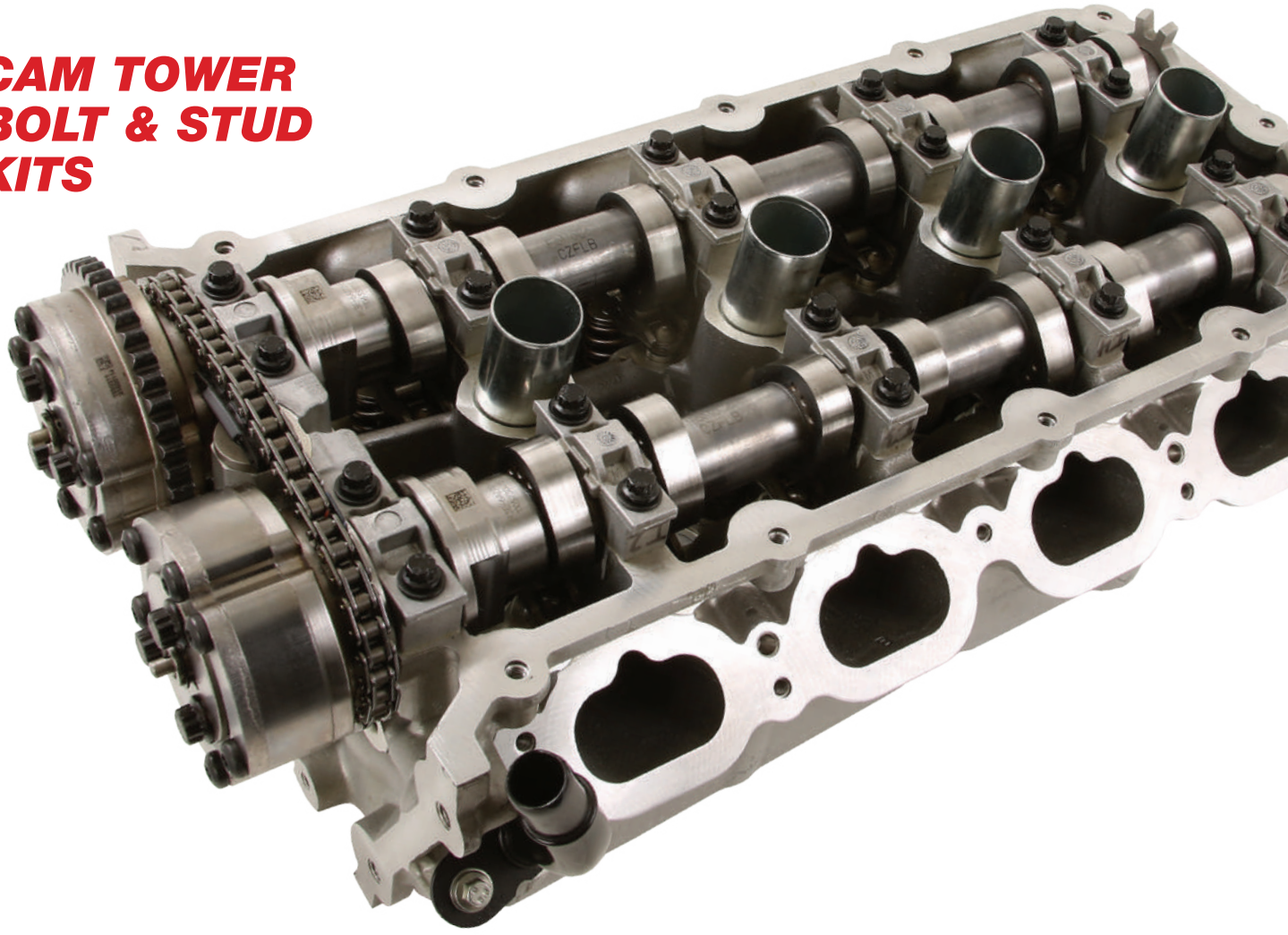
Red part numbers indicate new items

CAM BOLT KITS

Install an ARP cam bolt kit and end your camshaft timing worries! ARP quality delivers increased pre-load clamping force and assures positive timing gear register. Includes appropriate fasteners for your application. Increased material strength overcomes valve train harmonics and stress. Added features include oversized bolt head flange for cam button retention and reduced socket head size to facilitate easy installation and removal. Available in both **High Performance** and **Pro Series** kits.

Application	UHL	Thread Size	Socket Size	High Perf. 180,000 psi	Pro Series 190,000 psi
BMW					
1.6L Mini - cam sprocket bolt kit	2.085	M12 x 1.5	19mm		206-1001 ●
BUICK					
All V6	0.560	5/16-18	3/8	123-1001 ●	
CHEVROLET					
265-454 cid	0.750	5/16-18	1/2	134-1001 ●	234-1001 ●
265-454 cid - with oversize head for use with cam button	0.750	5/16-18	7/16		300-1001 ●
Gen III/IV LS Series small block - cam retainer plate	20mm (.787 in.)	M8 x 1.25	10mm	134-1002 ●	
Gen III/LS Series small block - cam sprocket bolt kit	25mm (.984 in.)	M8 x 1.25	10mm	134-1003 ●	
CHRYSLER					
383-440 Wedge & 426 Hemi - 3 bolt pattern	0.750	3/8-16	5/8	144-1001 ▲	
383-440 Wedge & 426 Hemi - 3 bolt pattern (reduced head, extended length)	0.875	3/8-16	3/8	244-1001 ●	
FORD					
260-289-302 cid (1965-68)	1.460	3/8-16	5/8	154-1001 ▲	254-1001 ▲
302-351W cid (1969 & later)	1.580	3/8-16	5/8	155-1001 ▲	255-1001 ▲
351C, 351-400M	1.970	3/8-16	5/8	154-1002 ▲	254-1002 ▲
351 SVO - cam retainer plate bolt kit	0.750	1/4-20	7/16		250-1001 ●
390-428 cid FE Series	1.750	7/16-14	5/8	155-1002 ●	255-1002 ●
429-460 cid	1.580	3/8-16	5/8	155-1001 ●	255-1001 ●
6.2L V8 cam phaser bolt kit, 12 bolts, RH thread	35mm (1.378 in)	M6 x 1.0	8mm	155-1003 ●	
6.2L V8 cam phaser and sprocket bolt kit, 6 bolts	1.700	M7 x 1.0	10mm		255-1003 ●
FORD, 4-CYLINDER					
2.0L Zetec	1.600	M10 x 1.5	18mm		251-1002 ●
2.3L Duratec	1.225	M10 x 1.5	15mm		151-1001 ●
FORD, COYOTE					
5.0L cam phaser bolt kit, 24 bolts, RH thread	35mm (1.378 in)	M6 x 1.0	8mm	156-1006 ●	
5.0L cam phaser and sprocket bolt kit, 12 bolts - ARP2000 (220,000 psi)	1.700	M7 x 1.0	10mm		256-1003 ●
FORD, MODULAR					
4.6L & 5.4L Modular V8 - M10 cam sprocket bolt kit (1 per cam required)	1.700	M10 x 1.5	18mm		256-1002 ●
4.6L & 5.4L Modular V8 - M12 cam sprocket bolt kit (1 per cam required)	1.800	M12 x 1.5	18mm		256-1001 ●
MITSUBISHI					
2.0L (4G63) DOHC - cam sprocket bolt kit	1.180	M12 x 1.25	14mm		107-1002 ●
PONTIAC					
350-455 cid	1.000	1/2-20	3/4	190-1001 ▲	
TOP FUEL					
Hemi (220,000 psi)	1.380	3/8-24	3/8		244-1002 ●

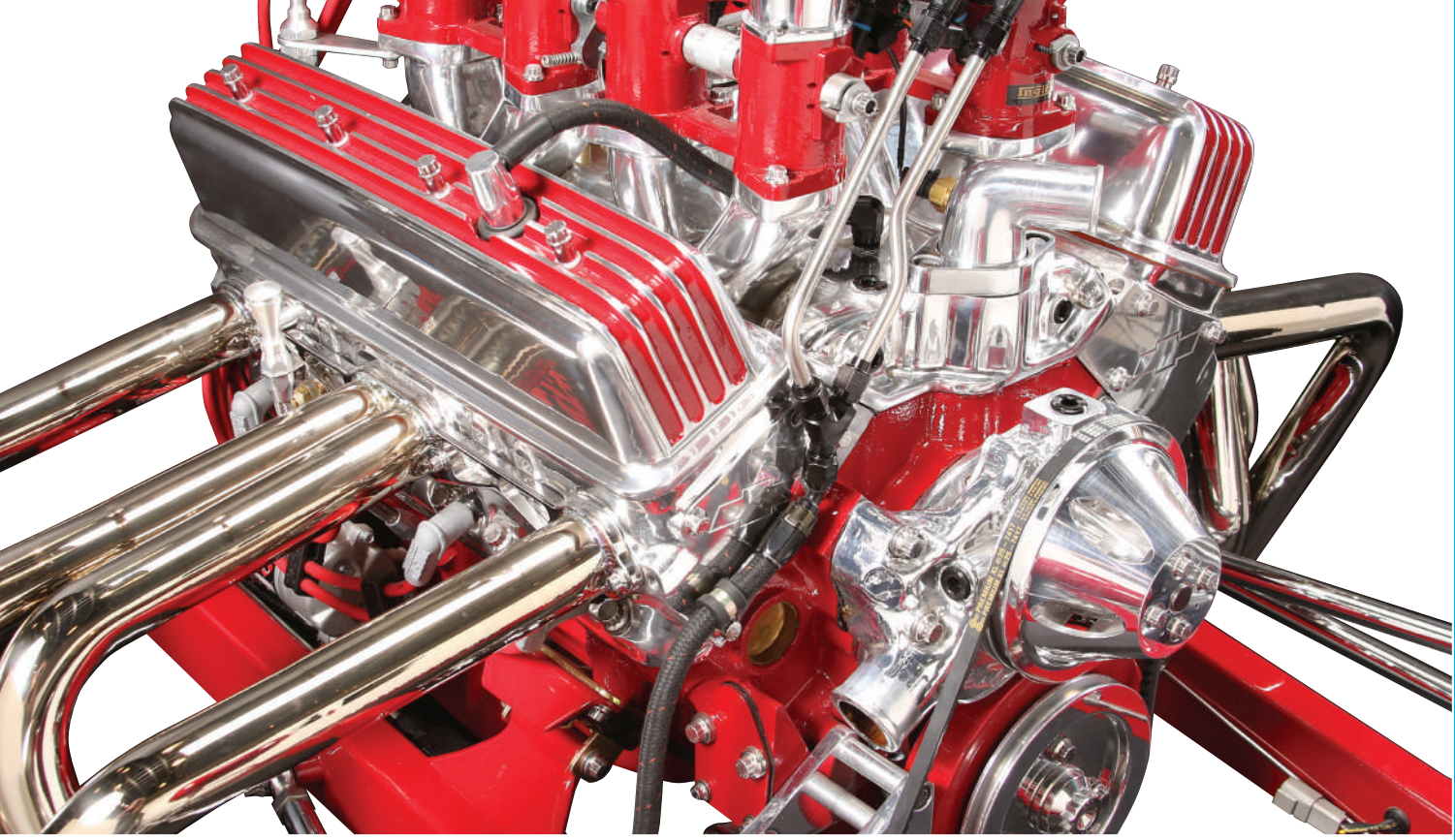
CAM TOWER BOLT & STUD KITS



Camshaft positioning is critical on overhead cam engines and ARP makes sure that the cam towers are properly secured through use of these durable bolts and studs. They're made from 8740 chrome moly steel, with threads rolled after heat treat to ensure the optimum fatigue strength. Far superior to OEM fasteners.

Application	UHL	Thread Size	Socket Size	High Perf. 180,000 psi	Pro Series 190,000 psi
CHRYSLER					
2.0L DOHC & 2.4L DOHC - cam tower stud kit (head# 4667086)	1.825 / 2.115	M6 x 1.0 / M8 x 1.0	8mm / 10mm	141-1001 ●	
FORD, MODULAR					
4.6L & 5.4L 2V - cam tower stud kit	1.825 / 2.070	M6 x 1.0	8mm		156-1002 ●
4.6L & 5.4L 3V - cam tower stud kit	1.825	M6 x 1.0	8mm		156-1001 ●
4.6L 4V - cam tower stud kit	1.825 / 2.070	M6 x 1.0	8mm		156-1003 ●
5.0L Coyote - cam tower bolt kit - hex	1.575	M6 x 1.0	8mm	156-1005 ●	
5.0L Coyote - cam tower bolt kit - 12pt	1.575	M6 x 1.0	8mm	156-1004 ●	
HYUNDAI					
2.0L (G4KF) - cam tower stud kit	1.825 / 2.115	M6 x 1.0 / M8 x 1.0	8mm / 10mm	128-1001 ●	
MITSUBISHI					
2.0L (4B11) Turbo - cam tower stud kit	1.825 / 2.115	M6 x 1.0 / M8 x 1.0	8mm / 10mm	107-1001 ●	
2.0L (4G63) DOHC - cam tower bolt kit	1.575	M8 x 1.25	10mm	107-1003 ●	
VOLKSWAGEN/AUDI					
2.0L (FSI) - cam tower bolt kit	1.500	M6 x 1.0	8mm		104-1001 ▲

Red part numbers indicate new items



ENGINE & ACCESSORY FASTENER KITS

It's easy to assemble a show-quality engine when you use ARP's handy Engine & Accessory Fastener Kit. Virtually everything you need comes completely organized in one convenient package (no need to deal with twelve different part numbers)! More importantly, each and every fastener is superior in strength to the OEM bolts, and also significantly better than hardware grades (even Grade 8). You have a choice of two premium quality materials and finishes.

Those who desire a dazzling engine will no doubt prefer fasteners made of ARP Stainless, which has the added benefit of being resistant to rust and corrosion. The stainless steel is polished to achieve a brilliant luster, and provides a distinctive, maintenance-free environment. Each kit has a dozen different type fasteners, all neatly organized and labeled in protective vacuum-wrapped packages.

Both materials are nominally rated at **180,000 psi** tensile strength and come in both hex and 12-point heads.

Please note that these kits are designed for carbureted engines. Newer EFI applications may require the purchase of additional fasteners.

- ***Each Kit Contains 12 Groups of Fasteners (except for Briggs & Stratton and Suzuki)***
- ***Black Oxide Finish 8740 Chrome Moly Steel or polished ARP Stainless***
- ***Stronger Than Any Hardware Grades***
- ***Choice Of Hex or 12-Point Heads***
- ***Available For All Popular Engine Types***
- ***100% Satisfaction Guaranteed.***
- ***Save Time, Money and Hassles!***

Everything you need to attach components and accessories from a long block on up is packaged in one economical, convenient kit!

ENGINE & ACCESSORY FASTENER KITS

** 1987 & newer EFI engines or those with aftermarket components may require additional fasteners be purchased*

Application	Black Oxide		Stainless	
	Hex	12-Point	Hex	12-Point
BRIGGS & STRATTON				
4-cycle, 5 horsepower Jr. Dragster			500-9601 ●	500-9501 ●
CHEVROLET				
350-400 cid with headers (1986 & earlier)*	534-9801 ●	534-9701 ●	534-9601 ●	534-9501 ●
305-350 cid with headers (1987-95)	534-9802 ●	534-9702 ●	534-9602 ●	534-9502 ●
350 LT1-LT4 with headers (1992-97)	534-9803 ●	534-9703 ●	534-9603 ●	534-9503 ●
305-350 Vortec with headers (1996 & later) except LS1 and LS6	534-9804 ●	534-9704 ●	534-9604 ●	534-9504 ●
Gen III/LS Series small block, with stock exhaust manifold or headers with 0.375-0.500˝ flange	534-9805 ●	534-9705 ●	534-9605 ●	534-9505 ●
396-454 cid*	535-9801 ●	535-9701 ●	535-9601 ●	535-9501 ●
CHRYSLER				
318-340-360 Wedge*	544-9801 ▲	544-9701 ▲	544-9601 ●	544-9501 ●
383-440 Wedge	545-9801 ▲	545-9701 ▲	545-9601 ●	545-9501 ●
5.7/6.1L Hemi with aluminum intake*	540-9801 ▲	540-9701 ▲	540-9601 ●	540-9501 ●
FORD				
289-302 cid*	554-9801 ▲	554-9701 ▲	554-9601 ●	554-9501 ●
Boss 302*	554-9802 ▲	554-9702 ▲	554-9602 ●	554-9502 ●
351 Cleveland	554-9804 ▲	554-9704 ▲	554-9604 ●	554-9504 ●
351 Windsor*	554-9803 ▲	554-9703 ▲	554-9603 ●	554-9503 ●
390-428 FE Series	555-9802 ▲	555-9702 ▲	555-9602 ●	555-9502 ●
429-460 cid*	555-9801 ▲	555-9701 ▲	555-9601 ●	555-9501 ●
PONTIAC				
350-455 cid*	594-9801 ▲	594-9701 ▲	594-9601 ●	594-9501 ●
SUZUKI				
GSX 1300R Hayabusa - Case halves bolt kit				471-9501 ●
GSX 1300R Hayabusa - Accessory bolt kit				571-9501 ●

Red part numbers indicate new items

FLYWHEEL BOLT KITS

Flywheel and Flexplate bolts play an important role in the performance and safety of race cars and street machines alike. That's why the fastener experts at ARP have developed special bolts that are far superior to OEM hardware. ARP offers two styles of Flywheel/Flexplate bolts: The premium grade Pro Series, originally developed for NASCAR competition, has a **190,000 psi** rating and the High Performance Series is rated at **180,000 psi**. They are both forged from aerospace alloy and heat-treated prior to thread rolling and machining. Both feature an exclusive, flat, 12-point head design and larger than stock shank diameter for increased strength and improved flywheel register. Complete with washers and nuts where applicable.

NOTE 1: All flywheel and flexplate bolts listed below are Pro Series 190,000 psi rated bolts unless noted otherwise.
NOTE 2: The thread size of metric fasteners is listed using international designations. For example, "M10" indicates a 10mm thread size.
NOTE 3: SMF = Single Mass Flywheel

Application	UHL	Thread Size	Part No.
BMC			
1600cc A Series	0.900	3/8-24	206-2802 ●
BMW			
2.3L (S14) (22mm UHL)	0.870	M12 x 1.5	201-2801 ●
2.3L (S14) (28mm UHL)	1.100	M12 x 1.5	201-2802 ●
CHEVROLET			
90° V6 & 265-454 V8 w/ 2pc. rear seal High Performance Series	1.000	7/16-20	100-2801 ●
90° V6 & 265-454 V8 w/ 2pc. rear seal	1.000	7/16-20	200-2802 ●
90° V6 & 305-502 V8 w/ 1pc. rear seal	1.000	7/16-20	200-2807 ●
V8 with Tilton flywheel - uses 1/2″ socket	0.875	7/16-20	330-2801 ●
Gen III/IV LS Series small block	0.880	M11 x 1.5	330-2802 ●
Gen V 6.2L (LT1/LT4) 2013 & later	1.125	M11 x 1.5	234-2801 ●
LT1 6.2L	0.900	M11 x 1.0	234-2802 ●
6.6L Duramax diesel	1.600	M16 x 1.5	230-2801 ●
CHRYSLER/DODGE			
SL6, 3.9L V6 & 273-440 V8 w/ 6 bolt crank	0.875	7/16-20	240-2801 ●
Aftermarket 383-440 V8 & 426 Hemi w/ 8 bolt crank	0.875	1/2-20	245-2801 ●
5.7L, 6.1L & 6.4L Hemi V8	1.000	M10 x 1.0	147-2801 ●
5.9L 12V/24V Cummins diesel (2004 & earlier)	1.250	M12 x 1.25	147-2802 ▲
FORD			
1.8L & 2.0L Duratec	0.990	M12 x 1.0	251-2802 ●

FLYWHEEL BOLTS (CONT.)

Application	UHL	Thread Size	Part No.
FORD (CONTINUED)			
2.0L (YB Series) Cosworth	1.150	M10 x 1.0	251-2803 ●
2.0L Zetec	0.900	M11 x 1.0	251-2801 ●
2000cc Pinto	1.150	M10 x 1.0	151-2801 ●
4.6L & 5.4L Modular V8	1.000	M10 x 1.0	254-2801 ●
5.0L Coyote V8	0.975	M10 x 1.0	156-2801 ●
289-460 V8 - High Performance Series	1.000	7/16-20	100-2801 ●
289-460 V8	1.000	7/16-20	200-2802 ●
351 NASCAR V8 - uses 3/4˝ socket	0.925	7/16-20	350-2802 ●
V8 with Tilton flywheel - uses 1/2˝ socket	0.950	7/16-20	350-2801 ●
6.0L & 6.4L Power Stroke diesel (SMF) *3	2.015	M10 x 1.0	150-2802 ▲
6.4L Power Stroke diesel - crank flange adapter bolt kit	2.425	M12 x 1.25	150-2506 ●
6.7L Power Stroke diesel	1.825	M12 x 1.5	150-2801 ▲
HONDA			
1.5L & 1.6L SOHC, D Series (6 pcs.)	0.780	M12 x 1.0	208-2801 ●
1.6L, 1.7L, 1.8L & 2.0L DOHC B Series (8 pcs.)	0.890	M12 x 1.0	208-2802 ●
HYUNDAI			
2.0L (G4KF)	1.000	M12 x 1.25	128-2801 ●
JEEP			
4.0L inline 6	0.875	1/2-20	146-2801 ●
MINI			
1.6L N12, N14, N16, N18, (SMF) *3	0.800	M9 x 1.25	101-2801 ●
1.6L N12, N14, N16, N18, 4-cylinder	1.000	M9 x 1.25	101-2802 ●
MITSUBISHI			
2.0L (4B11) DOHC (2008 & later)	0.700	M12 x 1.25	207-2801 ●
2.0L (4G63) DOHC (1992 & earlier) (6 pcs.)	0.825	M12 x 1.25	107-2802 ●
2.0L (4G63) DOHC (1993-07) (7 pcs.)	0.825	M12 x 1.25	107-2801 ●
2.0L (4G63) DOHC (1996-07) EVO 4-9 (7pcs.)	0.600	M12 x 1.25	107-2803 ●
NISSAN			
2.0L (SR20DE/DET) 4-cyl	0.925	M10 x 1.0	102-2803 ●
2.4L (KA24) 4-cyl	1.000	M12 x 1.25	102-2802 ●
2.5L (RB25) & 2.6L (RB26) inline 6	1.180	M12 X 1.25	102-2801 ●
OPEL/VAUXHALL			
2.0L	0.985	M10 x 1.25	209-2801 ●
PONTIAC			
Iron Duke 4 cylinder (12 pcs.)	0.750	7/16-20	291-2801 ●
350-455 V8 with washers (6 pcs.)	1.000	1/2-20	290-2802 ▲
PORSCHE			
2.0L-3.0L air cooled (1970-77)	1.000	M12 x 1.25	204-2802 ●
3.0L-3.8L air cooled (1978-97)	0.770	M10 x 1.25	204-2801 ●

Red part numbers indicate new items

FLYWHEEL BOLTS *(CONT.)*

Application	UHL	Thread Size	Part No.
ROVER			
K Series (6 pcs.)	0.826	M10 x 1.0	206-2803 ●
SUBARU			
2.0L (FA20) DOHC	0.925	M10 x 1.0	260-2801 ●
SUZUKI			
1.6L (M16A) DOHC	0.750	M10 x 1.25	171-2801 ●
TOP FUEL			
8740 with washers (190,000 psi)	1.000	1/2-20	200-2804 ▲
L19 with washers (260,000 psi)	1.000	1/2-20	200-2805 ▲
TOYOTA			
1.6L (4AGE) DOHC (8 pcs.)	1.050	M10 x 1.25	203-2802 ●
1.8L (2ZZGE) DOHC	0.875	M10 x 1.25	103-2802 ●
2.0L (3SGTE) DOHC (8 pcs.)	1.000	M12 x 1.25	203-2801 ●
2.0L (4UGSE)	0.925	M10 x 1.0	203-2804 ●
2.2L (20R) & 2.4L (22R) (6 pcs.)	1.040	M11 x 1.25	203-2803 ●
2.4L (2AZFE) DOHC (8 pcs.)	1.000	M12 x 1.25	103-2801 ●
VAUXHALL - SEE OPEL, PAGE 94			

FLEXPLATE BOLT KITS

ARP offers two styles of Flexplate bolts: premium grade Pro Series rated at **190,000 psi** and High Performance Series that are rated at **180,000 psi**. Both feature an exclusive, flat, 12-point head design and larger than stock shank diameter for increased strength and improved flywheel register.

Application	UHL	Thread Size	Part No.
CHEVROLET			
90° V6 & 265-454 V8 w/ 2pc. rear seal High Performance Series	0.680	7/16-20	100-2901 ●
90° V6 & 265-454 V8 w/ 2pc. rear seal	0.680	7/16-20	200-2902 ●
90° V6 & 305-502 V8 w/ 1pc. rear seal	0.725	7/16-20	200-2906 ●
Gen III/IV LS Series small block	0.880	M11 x 1.5	244-2901 ●
Gen III/IV LS Series small block w/ 700R4/ Turbo 350-400 adapter plate	1.075	M11 x 1.5	244-2902 ●
Gen V 6.2L (LT1/LT4) small block	0.760	M11 x 1.5	234-2902 ●
6.6L Duramax diesel	0.775	M16 x 1.5	230-2901 ●
CHRYSLER/DODGE			
SL6, 3.9L V6 & 273-440 V8 w/ 6 bolt crank	0.500	7/16-20	200-2903 ●
Aftermarket 383-440 V8 & Hemi w/ 8 bolt crank	0.500	1/2-20	200-2905 ●
5.7L, 6.1L & 6.4L Hemi	0.700	M10 x 1.0	147-2902 ●
5.9L 12V & 24V Cummins diesel	0.700	M12 x 1.25	147-2901 ●
FORD			
2000cc & 2300cc Pinto	0.800	M10 x 1.0	251-2901 ●
289-460 V8 - High Performance Series	0.680	7/16-20	100-2901 ●

Application	UHL	Thread Size	Part No.
289-460 V8	0.680	7/16-20	200-2902 ●
4.6L & 5.4L Modular V8	0.800	M10 x 1.0	254-2901 ●
6.0L & 6.4L Power Stroke diesel	1.275	M10 x 1.0	150-2902 ▲
6.7L Power Stroke diesel	1.825	M12 x 1.5	150-2901 ▲
JEEP			
4.0L inline 6	0.500	1/2-20	146-2901 ●
MITSUBISHI			
2.0L (4G63) DOHC (1992 & earlier) (6 pcs.)	0.700	M12 x 1.25	107-2901 ●
2.0L (4G63) DOHC (1993-07) (7 pcs.)	0.460	M12 x 1.25	107-2902 ●
NISSAN			
2.4L (KA24) 4-cyl	0.460	M12 x 1.25	102-2902 ●
2.5L (RB25) & 2.6L (RB26) inline 6	0.700	M12 x 1.25	102-2901 ●
PONTIAC			
350-455 V8	0.675	1/2-20	200-2904 ●
SUBARU			
2.0L (FA20) DOHC	0.925	M10 x 1.0	260-2901 ●
TOYOTA			
2.0L (4UGSE) DOHC	0.925	M10 x 1.0	203-2901 ●

TORQUE CONVERTER BOLTS

You can forget about the problem of shearing a torque converter bolt after you install these super strong **190,000 psi** gems. They are designed for each specific application and provide the optimum grip. Kits come with hardened parallel-ground washers.

Application	UHL	Thread Size	Pro Series
CHRYSLER/DODGE			
Torqueflite 727 & 904 w/ production converter	0.450	5/16-24	240-7301 ●
Torqueflite 727 & 904 w/ aftermarket converter	0.500	7/16-20	240-7302 ●
NAG1 five speed automatic w/ production converter	0.700	M8 X1.25	147-7301 ●
GENERAL MOTORS			
Powerglide, TH350 & TH400 w/ production converter	0.750	3/8-24	230-7301 ▲
Powerglide, TH350 & TH400 w/ most aftermarket converter	0.725	7/16-20	230-7302 ●
Powerglide, TH350 & TH400 w/ race converter - 1/2˝ thick tabs	1.250	7/16-20	230-7303 ●
200, 700, 4L60 & 4L80 (3pcs. car)	0.590	M10 x 1.5	230-7304 ●
200, 700, 4L60 & 4L80 (6pcs. truck)	0.590	M10 x 1.5	230-7305 ●
Universal IMCA Brenn drive flange kit (6 bolts)	1.250	7/16-20	230-7306 ●

Red part numbers indicate new items

RING GEAR BOLT KITS

The tremendous shock loads generated at launch by most any drag racing vehicle equipped with today's sticky tire compounds or the acceleration and deceleration of oval track cars put considerable strain on the ring gear. For this reason, the fastener experts at ARP have developed the Pro Series ring gear bolts. They're forged from premium grade 8740 chrome moly steel and are heat-treated to a nominal rating of **190,000 psi** tensile strength. Specially hardened, precision-ground washers are included where required. Available to fit most any ring gear setup ranging from popular 9″ Ford GM 10- & 12-bolt rear ends to the beefy Strange differentials found in Top Fuel and Funny Car applications.

TECH NOTE

It is critically important to properly tighten ring gear bolts and make sure they don't loosen. This is especially important in drag cars with tire shake. It's also a good idea to check bolt tightness on a routine basis. If you use a locking compound (like Loc-Tite), it is best to install the ring gear first without any compound, then remove the bolts one at a time, reinstalling them with the compound. Be sure and torque each bolt before going on to the next one, because the Loc-Tite sets up fast. Install and torque the bolts in an alternating or crossing pattern to distribute the load evenly around the ring gear.

Application	UHL	Thread	Part No.
CHRYSLER			
7-1/4″ and 8-3/4″ (1972 & earlier) .390 grip	0.835	3/8-24 LH	240-3001 ●
Clutch-type LSD- case half bolts with washers	2.800	3/8-24 LH	250-3006 ▲
DANA			
Dana 60	1.060	1/2-20	200-3001 ●
FORD			
8″ ring gear bolt kit with washers	0.940	7/16-20	250-3009 ●
9″ uses 5/8″ socket	0.940	7/16-20	250-3002 ●
8.8″ and 9″ uses 3/4″ socket	0.750	7/16-20	250-3003 ●
Ring gear bolt kit with washers, 1/2″ shank	1.060	7/16-20	350-3004 ▲
GENERAL MOTORS			
8.2″ 10-bolt and all 12-bolt	0.800	3/8-24	230-3001 ●
7.2″, 7.5″, 7.625″ and 8.5″ 10-bolt	0.850	7/16-20 LH	230-3002 ●
STRANGE			
Top Fuel differential with washers	1.200	7/16-20	250-3001 ▲
TRU-TRAC			
Tru-trac	1.065	1/2-20	300-3001 ▲
VOLKSWAGEN			
VW 020 ring gear bolt kit with 12pt nuts	1.200	M9 x 1.00	204-3001 ●
VW 02A ring gear bolt kit with 12pt nuts	1.180	M10 x 1.25	204-3002 ●
VW 02M ring gear bolt kit with 12pt nuts	1.100	M9 x 1.00	204-3003 ●

CARRIER FASTENERS

When assembling a rear end, optimum reliability can be obtained by employing these rugged chrome moly bolts and studs.

Application	UHL	Thread	Part No.
FORD			
8″ carrier bearing stud kit	2.600	7/16-14,7/16-20	250-3008 ▲
8″ and 9″ pinion support bolt kit	1.000	3/8-16	250-3007 ▲
9″ carrier bearing stud kit	3.250	1/2-13, 1/2-20	250-3004 ▲
9″ carrier bearing stud kit, H case (hex)	3.400	1/2-13, 1/2-20	250-3012 ▲
9″ carrier bearing stud kit, H case (12pt)	3.400	1/2-13, 1/2-20	250-3013 ▲
9″ housing stud kit (10 pcs.)	1.645	3/8-24	250-3005 ●
9″ pinion support stud kit (12 pt, ss)	2.000	3/8-16, 3/8-24	250-3010 ●
9″ pinion support stud kit (hex, ss)	2.000	3/8-16, 3/8-24	250-3011 ●
9″ pinion support stud kit (12 pt, blk)	2.000	3/8-16, 3/8-24	250-3020 ●
9″ pinion support stud kit (hex, blk)	2.000	3/8-16, 3/8-24	250-3021 ●

CLUTCH COVER/PRESSURE PLATE BOLT KITS

The importance of pressure plate bolts in a racing or hi-performance street application cannot be emphasized nearly enough. These fasteners play a key role in both the performance and safety of a vehicle. Because of this, ARP has developed special pressure plate bolts that are application specific to ensure the optimum grip length. ARP offers High Performance Series bolts that are made from a premium grade chrome moly and hardened to a nominal tensile strength of **180,000 psi**. The Pro Series bolts, originally developed for NASCAR competition, are stronger and rated at **190,000 psi**. Both models feature a large diameter, low-profile design. Complete with washers.

Application	Thread Size	High Perf.	Pro Series
CHEVROLET			
265-502 V8	3/8-16	130-2201 ▲	230-2202 ▲
350 LT1 1992-97	3/8-16	134-2202 ●	
V8 with Tilton flywheel and 3 disk AP clutch	5/16-24		330-2202 ●
V8 with Tilton flywheel (1.500 UHL bolts)	5/16-24		330-2203 ●
Gen III/IV LS Series small block (10″ & 11″ clutch) .750 O.D.	M10 x 1.50	134-2201 ●	
Gen III/IV LS Series small block (12″ clutch) .625 O.D.	M10 x 1.50	134-2203 ▲	
CHRYSLER/DODGE			
5.7L & 6.1L Hemi	M10 X1.50	147-2201 ▲	
FORD			
289-460 V8 (1985 & earlier)	5/16-18	150-2201 ▲	250-2201 ▲
302-351W V8 (1986-95)	M8 x 1.25	150-2202 ▲	
4.6L & 5.4L Modular V8	M10 x 1.50	156-2201 ▲	
V8 w/ Tilton flywheel and 3 disk AP clutch (hex)	5/16-24		350-2202 ●
V8 w/ Tilton flywheel and 3 disk AP clutch (12pt)	5/16-24		350-2203 ●
HONDA			
SOHC D Series (6 pcs.)	M8 x 1.25	108-2201 ▲	
DOHC B Series (9 pcs.)	M8 x 1.25	108-2202 ▲	
MINI			
1.6L N12, N14, N16, N18 (2008-15 Peugeot engine)	M8 x 1.25	101-2201 ▲	
1.6L W11/B16	M9 x 1.25	101-2202 ●	
NISSAN			
2.4L (KA24) 4-cyl (6 pcs.)	M8 x 1.25	102-2202 ▲	
2.0L (SR20DE) 4-cyl, 2.5L (RB25) & 2.6L (RB26) Inline 6 (9 pcs.)	M8 x 1.25	102-2201 ▲	
PONTIAC			
350-455 V8	3/8-16	190-2201 ▲	290-2201 ▲
SUZUKI			
1.6L (M16A)	M8 x 1.25	171-2201 ▲	
TOYOTA			
2.0L (20R) & 2.4L (22R)	M8 X1.25	103-2201 ▲	

Red part numbers indicate new items

BELLHOUSING BOLT & STUD KITS

These premium grade bolt and stud kits are engineered to properly engage the engine block threads and resist loosening. They're application-specific, and come in your choice of black oxide finished chrome moly or rust-proof stainless steel, with handy 12-point or standard hex heads. Washers and nuts included where applicable.

Application	Thread Size	Stud OAL Bolt UHL	Black Oxide		Stainless	
			Hex	12-Point	Hex	12-Point
CHEVROLET - BELLHOUSING TO ENGINE BLOCK BOLT KITS						
V6 & V8	3/8-16	1.375	129-0901 ▲	129-0902 ▲	429-0901 ●	429-0902 ●
Gen III/LS Series small block	M10 x 1.5	1.375	134-0901 ●	134-0902 ●	434-0901 ●	434-0902 ●
CHRYSLER/DODGE - BELLHOUSING TO ENGINE BLOCK BOLT KITS						
273-318-340-360 Wedge	3/8-16 7/16-14	1.375 1.500/1.750	144-0901 ▲	144-0902 ▲	444-0901 ●	444-0902 ●
383-400-413-426-440 Wedge	3/8-16 7/16-14	1.250 2.000/2.250	145-0901 ▲	145-0902 ▲	445-0903 ●	445-0902 ●
FORD - BELLHOUSING TO ENGINE BLOCK BOLT KITS						
289-302-351W small block - Automatic Transmission	7/16-14	1.500	154-0901 ▲	154-0902 ●	454-0901 ●	454-0902 ●
289-302-351W small block - Manual Transmission	7/16-14	1.500/2.250	154-0903 ▲	154-0904 ▲	454-0903 ●	454-0904 ●
TOP FUEL- BELLHOUSING TO ENGINE BLOCK STUD KITS						
Chevy, Chrysler KB Hemi	3/8	2.000		245-0901 ▲		445-0901 ●
Top fuel motor plate, std.	7/16	2.150		245-0202 ▲		
Top fuel motor plate, w/ 1/4″ spacer	7/16	2.400	245-0201 ▲			
UNIVERSAL - BELLHOUSING TO MANUAL TRANS STUD KITS						
7/16-14	7/16-14	2.750	100-0903 ▲	100-0904 ▲	400-0903 ●	400-0904 ●
1/2-13	1/2-13	2.750	100-0901 ▲	100-0902 ▲	400-0901 ●	400-0902 ●

MANUAL TRANSMISSION CASE BOLT KITS

Application	Black Oxide		Stainless	
	Hex	12-Point	Hex	12-Point
GENERAL MOTORS				
Muncie 4 speed (1963-1968)	130-9803 ▲	130-9804 ▲	430-9803 ●	430-9804 ●
Muncie 4 speed (1969-1975)	130-9801 ▲	130-9802 ▲	430-9801 ●	430-9802 ●

PORSCHE TRANSMISSION MOUNT STUD KIT

These fasteners are manufactured from high strength ARP Stainless and are superior to the OEM Porsche fasteners.

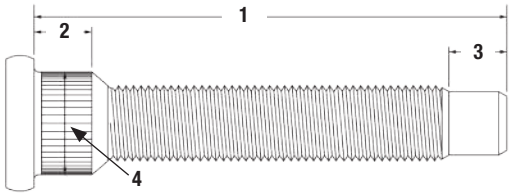
Application	12-Point
Porsche 911-930 Turbo	504-9502 ●

AUTO TRANSMISSION PAN BOLT KITS

Application	12-Point
GENERAL MOTORS	
Turbo 350-400	430-0401 ●

WHEEL STUDS

- replacement for stock wheel studs
- heat-treated 8740 chrome moly
- 190,000 psi tensile strength
- cadmium plated for extra durability
- sold in 4- & 5-packs
- nuts not included



Please test fit the lug nuts you plan to use prior to installing the studs in the hubs. Our threads are rolled to a stronger thread spec and some nuts may be too tight.)

Wheel Stud Hole Sizes and Proper Interference Fit for the Knurl

Our OEM replacement wheel studs are designed to press-fit into the original hole in the OEM hub. If you are using one of our kits in another application, the hole should be checked to ensure it falls within the correct tolerance to allow for the proper amount of interference, so that the stud won't spin in the hole. For steel and cast iron hubs, the hole should be 0.006-0.016″ smaller than the Knurl Diameter. For aluminum hubs, the hole should be 0.010-0.016″ smaller than the Knurl Diameter. As a courtesy, we have provided the closest standard drill size that will provide a hole in that range.

If the hole is larger than the tolerance listed for the material, then the studs should not be used with that hub. The interference fit will not be tight enough and the stud could spin in the hole.

If you need to drill out the holes in your hub, the holes must be kept perpendicular to the face of the hub. If you do not have a fixture that clamps to the hub to guide the drill straight, use a setup similar to the one in the image at right. (A hand drill will not produce satisfactory results.)

All ARP wheel studs have an underhead radius. **Each hole must be chamfered 0.025″ to clear the underhead radius and prevent stud failure.**

Application	4 Knurl Dia.	Steel & Cast Iron Hubs hole (in.)	Steel & Cast Iron Hubs standard bit	Aluminum Hubs hole (in.)	Aluminum Hubs standard bit	1 UHL	2 Knurl Length	3 Nose Length	Thread Size	Part No.
CHRYSLER										
Chrysler, rear	0.680	0.664-0.674	43/64 in. (0.672 in.)	0.664-0.670	43/64 in. (0.672 in.)	3.125	0.400	0.400	1/2-20	100-7705▲
Chrysler, front and rear, 0.500″ over stock length	0.625	0.609-0.619	39/64 in. (0.609 in.)	0.609-0.615	39/64 in. (0.609 in.)	2.936	0.445	0.435	M14 x 1.50	100-7734▲
Chrysler, front and rear, 1.000″ over stock length	0.625	0.609-0.619	39/64 in. (0.609 in.)	0.609-0.615	39/64 in. (0.609 in.)	3.436	0.445	0.435	M14 x 1.50	100-7735▲
DODGE										
Neon, front	0.585	0.569-0.579	14.5 mm (0.571 in.)	0.569-0.575	14.5 mm (0.571 in.)	2.450	0.256	0.360	M12 x 1.50	100-7721▲
FORD										
Ford, rear disc brakes/ Chrysler front	0.625	0.609-0.619	39/64 in. (0.609 in.)	0.609-0.615	39/64 in. (0.609 in.)	3.500	0.400	0.437	1/2-20	100-7703▲
Ford, front disc brakes, early	0.618	0.602-0.612	39/64 in. (0.609 in.)	0.602-0.608	19/32 in.* (0.594 in.)	3.050	1.000	0.250	1/2-20	100-7707▲
Mustang II front	0.554	0.538-0.548	35/64 in. (0.547 in.)	0.538-0.544	13.5mm* (0.532 in.)	3.435	0.390	0.435	1/2-20	100-7714▲
Mustang (1994-04) front	0.595	0.579-0.589	37/64 in.* (0.578 in.)	0.579-0.585	37/64 in.* (0.578 in.)	3.110	0.300	0.300	1/2-20	100-7724▲
Mustang (2005 & later) front	0.550	0.534-0.544	13.5 mm* (0.532 in.)	0.534-0.540	13.5 mm* (0.532 in.)	3.315	0.300	0.300	1/2-20	100-7722▲

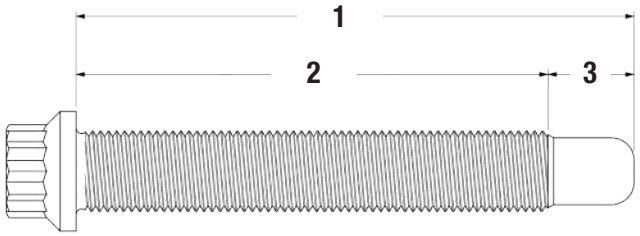
* If the standard drill bit size is in green, then the nearest standard drill bit is too small. You will need to use an appropriately sized reamer to enlarge the drilled hole until it is within the range listed for your hub material.

Application	4 Knurl Dia.	Steel & Cast Iron Hubs hole (in.)	Steel & Cast Iron Hubs standard bit	Aluminum Hubs hole (in.)	Aluminum Hubs standard bit	1 UHL	2 Knurl Length	3 Nose Length	Thread Size	Part No.
FORD (CONTINUED)										
Mustang (2005 & later) rear & most late model Fords w/ front & rear disc brakes	0.615	0.599-0.609	19/32 in.* (0.594 in.)	0.599-0.605	19/32 in.* (0.594 in.)	3.115	0.300	0.300	1/2-20	100-7723
Mustang, M14, 0.500″ over stock length	0.625	0.609-0.619	39/64 in. (0.609 in.)	0.609-0.615	39/64 in. (0.609 in.)	2.935	0.400	0.435	M14 x 1.50	100-7732
Mustang, M14, 1.000″ over stock length	0.625	0.609-0.619	39/64 in. (0.609 in.)	0.609-0.615	39/64 in. (0.609 in.)	3.435	0.400	0.435	M14 x 1.50	100-7733
GM										
Late GM drum brake	0.486	0.470-0.480	12 mm (0.472 in.)	0.470-0.476	12 mm (0.472 in.)	3.165	0.420	0.308	7/16-20	100-7701
Late GM disc brake and early drum brake	0.580	0.564-0.574	14.5 mm (0.571 in.)	0.564-0.570	9/16 in.* (0.563 in.)	3.200	0.300	0.305	7/16-20	100-7702
Late GM Camaro, Firebird, Corvette	0.509	0.493-0.503	1/2 in. (0.500 in.)	0.493-0.499	12.5 mm* (0.492 in.)	2.000	0.315	0.200	M12 x 1.50	100-7726
Late GM Camaro, Firebird, Corvette	0.509	0.493-0.503	1/2 in. (0.500 in.)	0.493-0.499	12.5 mm* (0.492 in.)	2.500	0.315	0.200	M12 x 1.50	100-7725
Late GM Camaro, Firebird, Corvette	0.509	0.493-0.503	1/2 in. (0.500 in.)	0.493-0.499	12.5 mm* (0.492 in.)	2.500	0.315	none	M12 x 1.50	100-7708
Late GM Camaro, Firebird, Corvette	0.509	0.493-0.503	1/2 in. (0.500 in.)	0.493-0.499	12.5 mm* (0.492 in.)	3.250	0.315	none	M12 x 1.50	100-7713
Camaro 2010-2017, M14, 0.500″ over stock length	0.625	0.609-0.619	39/64 in. (0.609 in.)	0.609-0.615	39/64 in. (0.609 in.)	2.700	0.350	0.435	M14 x 1.50	100-7736
Camaro 2010-2017, M14, 1.000″ over stock length	0.625	0.609-0.619	39/64 in. (0.609 in.)	0.609-0.615	39/64 in. (0.609 in.)	3.200	0.350	0.435	M14 x 1.50	100-7737
Corvette C5 Short 1/2″ conversion	0.509	0.493-0.503	1/2 in. (0.500 in.)	0.493-0.499	12.5 mm* (0.492 in.)	1.950	0.300	0.300	1/2-20	100-7730
Corvette C5 1/2″ conversion	0.509	0.493-0.503	1/2 in. (0.500 in.)	0.493-0.499	12.5 mm* (0.492 in.)	2.675	0.300	0.300	1/2-20	100-7731
HONDA										
Stock replacement (1996 & earlier) 4 pack	0.485	0.469-0.479	12 mm (0.472 in.)	0.469-0.475	12 mm (0.472 in.)	1.850	0.275	0.350	M12 x 1.50	100-7709
Stock replacement (1997 & later) 5 pack	0.485	0.469-0.479	12 mm (0.472 in.)	0.469-0.475	12 mm (0.472 in.)	1.850	0.275	0.350	M12 x 1.50	100-7710
Extended length (1996 & earlier) 4 pack	0.485	0.469-0.479	12 mm (0.472 in.)	0.469-0.475	12 mm (0.472 in.)	2.850	0.275	0.350	M12 x 1.50	100-7711
Extended length (1997 & later) 5 pack	0.485	0.469-0.479	12 mm (0.472 in.)	0.469-0.475	12 mm (0.472 in.)	2.850	0.275	0.350	M12 x 1.50	100-7712
Civic Type R & Si, 5 pack	0.647	0.631-0.641	41/64 in. (0.641 in.)	0.631-0.637	16 mm* (0.630 in.)	3.000	0.270	0.395	M14 x 1.50	100-7744
LEXUS										
IS 300	0.558	0.542-0.552	35/64 in. (0.547 in.)	0.542-0.548	35/64 in. (0.547 in.)	2.600	0.230	none	M12 x 1.50	100-7715
MAZDA										
Miata, front and rear (1990-93) & front (1994-05) 4 pack	0.507	0.491-0.501	12.5 mm (0.492 in.)	0.491-0.497	12.5 mm (0.492 in.)	2.750	0.335	0.350	M12 x 1.50	100-7719
Miata, rear (1994-05) 4 pack	0.579	0.563-0.573	14.5 mm (0.571 in.)	0.563-0.569	9/16 in. (0.563 in.)	2.750	0.300	0.350	M12 x 1.50	100-7720
RX7, 5 pack	0.507	0.491-0.501	12.5 mm (0.492 in.)	0.491-0.497	12.5 mm (0.492 in.)	2.750	0.335	0.350	M12 x 1.50	100-7743

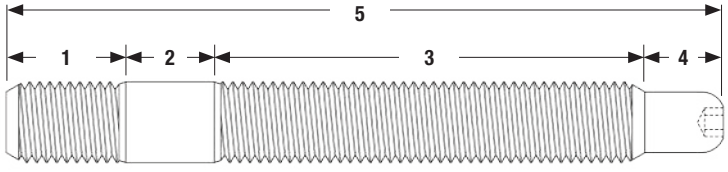
* If the standard drill bit size is in green, then the nearest standard drill bit is too small. You will need to use an appropriately sized reamer to enlarge the drilled hole until it is within the range listed for your hub material.

Application	4 Knurl Dia.	Steel & Cast Iron Hubs hole (in.)	Steel & Cast Iron Hubs standard bit	Aluminum Hubs hole (in.)	Aluminum Hubs standard bit	1 UHL	2 Knurl Length	3 Nose Length	Thread Size	Part No.
MITSUBISHI										
Lancer EVO VIII	0.565	0.549-0.559	14 mm (0.551 in.)	0.549-0.555	14 mm (0.551 in.)	3.000	0.270	0.350	M12 x 1.50	100-7717
SUBARU										
BRZ & WRX (stock replacement)	0.565	0.549-0.559	14 mm (0.551 in.)	0.549-0.555	14 mm (0.551 in.)	1.750	0.270	none	M12 x 1.25	100-7727
BRZ & WRX (extended length with nose)	0.565	0.549-0.559	14 mm (0.551 in.)	0.549-0.555	14 mm (0.551 in.)	1.950	0.270	0.200	M12 x 1.25	100-7728
BRZ & WRX (extended length with nose)	0.565	0.549-0.559	14 mm (0.551 in.)	0.549-0.555	14 mm (0.551 in.)	2.535	0.270	0.200	M12 x 1.25	100-7729
BRZ & WRX (extended length with nose)	0.565	0.549-0.559	14 mm (0.551 in.)	0.549-0.555	14 mm (0.551 in.)	3.000	0.270	0.350	M12 x 1.25	100-7716
TOYOTA										
Celica GTS (1986-89) front	0.565	0.549-0.559	14 mm (0.551 in.)	0.549-0.555	14 mm (0.551 in.)	2.340	0.325	0.363	M12 x 1.50	100-7718
AFTERMARKET										
Speedway Engineering and Frankland full floating hubs	0.568	0.552-0.562	14 mm* (0.551 in.)	0.552-0.558	14 mm* (0.551 in.)	2.970	0.710	0.465	1/2-20	100-7706

* If the standard drill bit size is in green, then the nearest standard drill bit is too small. You will need to use an appropriately sized reamer to enlarge the drilled hole until it is within the range listed for your hub material.



Application	1 UHL	2 Thread Length	3 Nose Length	Thread Size	Part No.
Aftermarket axles, 12 pt head, full thread	1.950	1.750	0.200	1/2-20	100-7738
	2.200	2.000	0.200	1/2-20	100-7739
	2.450	2.250	0.200	1/2-20	100-7740
	2.700	2.500	0.200	1/2-20	100-7741
	2.950	2.750	0.200	1/2-20	100-7742
	3.470	2.970	0.500	1/2-20	100-7704



1 Hub End		2	3 Nut End		4	5	
Thread Length	Thread Size	Shoulder Length	Thread Length	Thread Size	Nose Length	OAL	Part No.
0.585	M12 x 1.50	0.272	1.594	M12 x 1.50	0.504	2.955	100-7745

Red part numbers indicate new items

LOWER PULLEY BOLTS

To provide the reliability required in racing and high performance street applications, ARP offers these premium grade nominally rated **180,000 psi** fasteners to securely attach the water pump and lower pulleys. You can count on them to perform. Washers included.

Application	Thread	UHL (in.)	Socket Size	Black Oxide		Stainless	
				Hex	12-Point	Hex	12-Point
CHEVROLET - LOWER PULLEY							
Small Block and Big Block, 3-piece	3/8-24	0.750	3/8	330-6809 ●	330-6801 ●	430-6809 ●	430-6801 ●
Small Block and Big Block, 3-piece	3/8-16	0.750	3/8	330-6804 ●	330-6803 ●	430-6804 ●	430-6803 ●
Small Block and Big Block, 3-piece	3/8-24	0.750	7/16	330-6806 ●	330-6805 ●	430-6806 ●	430-6805 ●
Small Block and Big Block, 3-piece	3/8-16	0.750	7/16	330-6808 ●	330-6807 ●	430-6808 ●	430-6807 ●
Small Block and Big Block, 3-piece	3/8-24	2.125	1/2		334-6801 ●		
FORD - LOWER PULLEY							
3-piece	3/8-16	1.000	3/8	350-6811 ●	350-6801 ●	450-6811 ●	450-6803 ●
3-piece	3/8-16	1.000	7/16	350-6807 ●	350-6806 ●	450-6807 ●	450-6806 ●
4-piece	3/8-16	1.000	3/8	350-6808 ●	350-6802 ●	450-6808 ●	450-6805 ●
4-piece	3/8-16	1.000	7/16	350-6810 ●	350-6809 ●	450-6810 ●	450-6809 ●

DRIVE PLATE BOLT KITS

Developed for racers who leave nothing to chance, ARP's special drive plate bolts have many important features, including use of a premium grade chrome moly alloy, heat-treating to **190,000 psi,** J-form thread rolling after heat-treat and a special profile. The bolts come with special precision-ground washers.

Application	UHL	Part No.
7/16-14, 12 pt, drilled (8 pcs.)*	1.500	200-3401 ▲
7/16-14, 12 pt, drilled (5 pcs.)*	1.500	200-3402 ▲

*For use with most "Wide Five" drive hubs

SPRINT CAR DRIVE PINS

ARP sprint car drive pins feature a broached hex for ease of installation and proper pre-load while the rounded end facilitates quick, positive wheel location. All critical shear points feature a large radius for improved reliability and maximum load carrying capacity. Drive pins are rated **190,000 psi** tensile strength.

Application	Thread	Part No.
Front, 2.450˝ OAL	1/2-20	200-2601 ▲
Rear, 3.275˝ OAL	1/2-20	200-2602 ▲

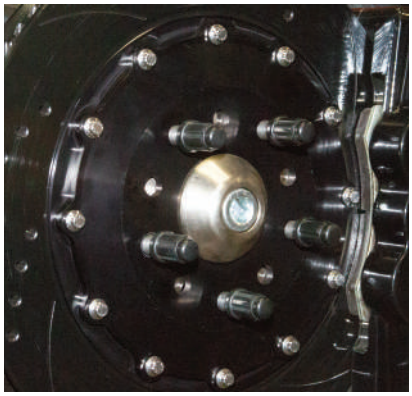
REAR END COVER BOLT KITS

Here's an easy way to enhance the appearance of any GM 10 or 12-bolt rear end setup. ARP Stainless rear end cover bolts offer a lustrous contrast to a painted OEM cover or perfectly compliment a chrome plated aftermarket version. These bolts are nominally rated at **180,000 psi** and much stronger than stock (or even Grade 8) hardware, have rolled threads for secure engagement and is resistant to rust and corrosion. Washers included.

Application	UHL	Thread	Part No.
GM 10-bolt, 12pt	0.750	5/16-18	437-3001
GM 12-bolt, 12pt	0.750	5/16-18	437-3002
Dana 60/40, 12pt	0.750	3/8-16	450-2701
Dana 60/40, hex	0.750	3/8-16	450-2702

BRAKE HAT BOLT KITS

The perfect upgrade for many original brake hat bolts, this ARP kit features bolts produced from only the finest quality 8740 chrome moly. Features an exclusive 12-point cap screw design and appropriate grip length per the application. All ARP brake hat bolts are drilled to permit safety wiring. Rated **190,000 psi** tensile strength.



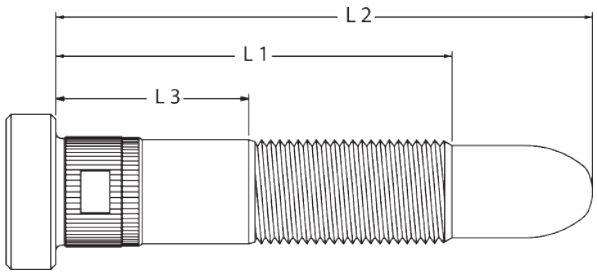
Application	UHL	Part No.
5/16-24 with washers, 12pt, 32 bolts	0.850	300-0801
5/16-18 with washers, 12pt, 32 bolts	0.850	300-0802
1/4-28 (48 pcs.)	0.750	300-0803

Red part numbers indicate new items

NOTE: The products listed in this section have been designed to comply with NASCAR® rules. No specific endorsement by NASCAR® is implied.

SPEED STUDS™

Because races can be won or lost in the pits, the engineers at ARP set about to create the ultimate oval track competition wheel stud that facilitates accurate wheel positioning and quicker release/tightening of lug nuts. ARP's new "Speed Studs" (and companion "Speed Nuts") are so good that a large number of Nascar teams in Monster Energy Nascar Cup, Xfinity and Camping World Truck Series use them exclusively. They're made from heat-treated **190,000 psi** chrome moly steel and feature precision J-form threads (formed after heat-treat for improved fatigue strength), exclusive nut-starter and bullet shape radius that all but eliminates cross-threading, shot-peening, special baked-on dry film lubricant (reduces possibility of galling and assures consistent clamp loads), and double magnaflux inspection. A new head design is employed that fits the registers of all popular hubs without grinding, and studs are available in 31 underhead lengths to provide you with the optimum thread engagement for your particular setup. The finest studs available!

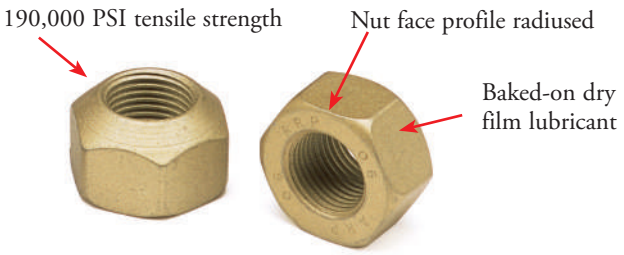


L1 - Thread Length	L2 - UHL	L3 - Knurl Length	Part No.
FINE THREAD (THREAD SPECS - 5/8-18, KNURL DIAMETER - .660)			
1.600	2.450	0.500	300-7710▲
1.700	2.550	0.600	300-7711▲
1.750	2.600	0.650	300-7725▲
1.800	2.650	0.700	300-7712▲
1.850	2.700	0.750	300-7726▲
1.900	2.750	0.675	300-7705▲
1.950	2.800	0.850	300-7727▲
2.000	2.850	0.900	300-7713▲
2.050	2.900	0.825	300-7706▲
2.100	2.950	1.000	300-7714▲
2.150	3.000	1.050	300-7728▲
2.200	3.050	1.100	300-7715▲
2.250	3.100	1.150	300-7734▲
2.300	3.150	1.200	300-7716▲
2.350	3.200	1.250	300-7729▲
2.400	3.250	1.200	300-7707▲
2.450	3.300	1.350	300-7730▲
2.500	3.350	1.400	300-7717▲
2.550	3.400	1.350	300-7708▲
2.600	3.450	1.500	300-7718▲
2.650	3.500	1.550	300-7731▲
2.700	3.550	1.600	300-7719▲
2.750	3.600	1.550	300-7709▲
2.800	3.650	1.700	300-7720▲
2.850	3.700	1.750	300-7732▲
2.900	3.750	1.800	300-7721▲
2.950	3.800	1.850	300-7733▲
3.000	3.850	1.900	300-7722▲
3.100	3.950	2.000	300-7723▲
3.200	4.050	2.100	300-7724▲
COARSE THREAD (THREAD SPECS - 5/8-11, KNURL DIAMETER - .685)			
1.900	2.650	0.500	300-7806*▲
1.850	2.650	0.950	300-7803*▲
3.220	4.031	0.750	300-7804*▲

Note: All Speed Stud™ applications fit Stock Car Products and Speedway Engineering Hubs without grinding or modifications.

SPEED NUTS™

Designed for professional racing environments where split-second improvements in pit stop times can make the winning difference, and "unbustable" reliability is an absolute must. ARP's Speed Nuts feature a profiled nut face for easy installation, quicker socket releases and resistance to jamming. They're made from premium heat-treated chrome moly that's nominally rated at **190,000 psi** tensile strength, shot-peened to remove stress risers and double magnafluxed after heat-treating and thread-forming to assure 100% metallurgical integrity. Coated with Alumotef III gold coating. Speed Nuts are ready for "instant" use (thread chasing not required).



Application	Thread	Part No.
NASCAR, 10-piece, fine	5/8-18	300-7801▲
IMCA Wide 5, 10-piece, coarse	5/8-11	300-7802▲

INTAKE MANIFOLD BOLT KITS

Not only will these premium quality ARP fasteners help prevent intake manifold leaks, but **one is drilled to allow for a seal wire**. What's more, they're nominally rated at **180,000 psi** and feature precision rolled threads for optimum engagement, to prevent galling and promote more consistent torque loading. Wide underhead flange design and companion flat washers provide even load distribution and facilitates optimum sealing of gasket surfaces. Made of corrosion resistant stainless steel. Washers included and bolt drilled for NASCAR inspector's wire seal.

Application	Part No.
CHEVROLET	
SB 2, drilled	334-2104●
SB 2, tall deck	334-2105●
Small block, 1.000˝, drilled	334-2102●
Small block, 1.250˝, drilled	334-2103●
V6 Chevy 90°, 1.000˝, drilled	333-2101●
FORD	
SVO 351 cid, Jack Roush design, drilled	354-2102●

DRILLED HEADER BOLTS

ARP offers special NASCAR header bolts that have been drilled for use of safety wire. They are made from heat-treated 8740 chrome moly steel with a black oxide finish or Stainless steel that is polished to a bright shine. Both materials are nominally rated at **180,000 psi** tensile strength – considerably stronger than Grade 8 hardware, and engineered to provide complete reliability in the most severe racing environments. They are available in hex or 12-point heads. Through use of safety wire, exhaust headers will maintain original tightness and can't back off!

Application	Qty	Dia.	UHL	Wrenching	Black Oxide		Stainless	
					Hex	12-Point	Hex	12-Point
CHEVROLET								
Chevy small block, drilled	12	3/8	0.750	3/8	100-1103▲	100-1203●	400-1103●	400-1203●
Chevy big block, drilled	16	3/8	0.875	3/8			400-1104●	400-1204●
UNIVERSAL								
Universal, drilled	16	3/8	0.750	3/8			400-1105●	400-1205●
Universal, drilled	12	3/8	0.875	3/8			400-1106●	400-1206●

Red part numbers indicate new items

DRILLED CARBURETOR STUDS

The best way to make sure that carburetors stay perfectly sealed to the intake manifold is through the use of ARP's carb studs, which feature J-form threads to resist loosening from vibration. They're offered in a variety of heights to accommodate most any combination of carb and spacer, and are available in 8740 chrome moly with a black oxide finish. Special NASCAR type studs have **one of the studs drilled** to facilitate sealing the carb by race officials. All carb studs include a nut starter nose (except where noted) and kits come with hex nuts and washers.

Application	Pieces	OAL	Part No.
Standard, drilled for NASCAR wire seal	4	1.700	300-2401 ●
Standard with Moroso #64919 return spring kit	4	1.700 (2) & 2.050 (2)	300-2421 ●
Standard with Moroso #64927 return spring kit	4	1.700 (3) & 2.050 (1)	300-2424 ●
1/2″ spacer, drilled for NASCAR wire seal	4	2.225	300-2402 ●
1″ spacer, drilled for NASCAR wire seal	4	2.700	300-2403 ●
2″ spacer, drilled for NASCAR wire seal	4	3.700	300-2404 ●
2″ spacer, drilled for NASCAR wire seal	8	1.700 (7) & 2.225 (1)	300-2406 ●
1″ Moroso spacer, drilled for NASCAR wire seal	4	2.700	300-2407 ●
1″ spacer with Moroso #64919 return spring kit	4	1.700 (2) & 2.050 (2)	300-2420 ●
1″ spacer with Moroso #64927 return spring kit	4	1.700 (3) & 2.050 (1)	300-2423 ●
1-1/4″ Moroso spacer, drilled for NASCAR wire seal	4	3.200	300-2408 ●
2″ Moroso spacer, drilled for NASCAR wire seal	8	1.250* (4) & 1.700 (1) & 1.700 (3)	300-2409 ●
2″ Moroso spacer with Moroso #64919 return spring kit	8	1.250* (4) & 1.700 (2) & 2.050 (2)	300-2419 ●
2″ Moroso spacer with Moroso #64927 return spring kit	8	1.250* (4) & 1.700 (3) & 2.050 (1)	300-2422 ●

*Does not have nut starter nose

ALTERNATOR STUDS

Strange as it may seem, there have been many races lost in oval track, off-road and endurance competition due to the OEM alternator stud failing and the subsequent loss of electrical power. To prevent this from ever happening, conscientious engine builders rely on ARP's "bulletproof" alternator studs. They're made from a premium grade 8740 chrome moly steel alloy and heat treated to a nominal **190,000 psi** tensile strength. They are very rigid and won't bend under the stress of competition, eliminating problems with alternator pulley alignment. Here's more reliable "insurance" from the innovators at ARP. Available in 5.000″ and 5.250″ lengths. Includes a 12-point nut and flat washer.

Description	OAL	Coarse Thread Length	Fine Thread Length	Part No.
7/16 stud	5.000	1.000	1.000	300-0501 ▲
7/16 stud	5.250	1.000	1.000	300-0502 ▲

FRONT MANDREL BOLTS

Get maximum reliability through the use of ARP's rugged 8740 chrome moly steel front mandrel bolts. They're undercut to provide the required stretch, shot-peened for extra durability and designed for full thread engagement. Nominally rated at **190,000 psi** tensile strength for durability you can count on! Available for GM and Ford applications.

Diameter	Length	Thread Length	Socket Size	Head Style	Part No.
CHEVROLET					
7/16	6.000	1.100	1/2	12-point	330-0701 ▲
1/2	6.000	1.100	9/16	12-point	330-0702 ▲
7/16	6.250	1.150	9/16	12-point	330-0703 ▲
1/2	4.000	0.750	15/16	Hex	330-0704 ●
1/2	4.000	0.625	15/16	Hex	330-0705 ●
1/2	3.750	0.625	15/16	Hex	330-0706 ●
1/2	3.250	0.750	15/16	Hex	330-0707 ●
7/16	5.000	1.000	1/2	12-point	330-0708 ▲
7/16	5.500	1.000	1/2	12-point	330-0709 ▲
FORD					
5/8	8.000	1.100	15/16	Hex	350-0701 ●
5/8	8.375	1.000	15/16	Hex	350-0702 ●
5/8	7.000	1.000	15/16	Hex	350-0703 ●

ARP DIESEL

It's a proven fact that OEM head bolts are the weak link in a diesel engine; especially if the engine has been modified. That's because Chevy Duramax, Dodge/Cummins and Ford Power Stroke engines are all assembled using "Torque To Yield" (TTY) bolts and preloaded to yield and beyond (typically 100-110%). Any increases in combustion pressure can lead to problems like blown head gaskets or catastrophic engine failure. And because TTY bolts are yielded by design, they should never be re-used.

ARP solves the problem by offering stronger head studs that are designed for higher clamping loads. They are available in several different strength materials to safely handle applications from performance street to all-out competition.

Similar improvements over factory TTY bolts are provided by high strength ARP main studs. And there's more. With increased performance you need the extra security that ARP flywheel and flexplate bolts can provide.

Given the growth in extreme diesel competition and street add-ons, ARP is continually developing additional diesel kits.

HEAD STUDS

Application	Part No.
CATERPILLAR	
C15 ARP2000	238-4201
CUMMINS	
C8.3 ARP2000	247-4209
ISL 12V ARP2000	247-4210
ISL 24V ARP2000	247-4211
ISV5.0 ARP2000	247-4302
CHEVROLET/GMC	
2.8L Duramax ARP2000	230-4203
6.2L GMC M12	130-4062
6.6L Duramax (2001 & later) LB7/LLY/LBZ/LMM ARP2000	230-4201
6.6L Duramax (2001 & later) LB7/LLY/LBZ/LMM Custom Age 625+	230-4202
6.6L Duramax (2017-2019) (L5P) ARP2000	230-4301
6.6L Duramax (2017-2019) (L5P) Custom Age 625+	230-4302
DODGE/RAM	
3.9L (4BT) Cummins ARP2000	247-4206
3.9L (4BT) Cummins Custom Age 625+	247-4207
5.9L 12V Cummins (1989-98) ARP2000	247-4203
5.9L 12V Cummins (1989-98) Custom Age 625+	247-4205
5.9L & 6.7L 24V Cummins (1998 & later) ARP2000	247-4202
5.9L & 6.7L 24V Cummins (1998 & later) Custom Age 625+	247-4204

Application	Part No.
FORD	
6.0L Power Stroke ARP2000 - inner row M8 head bolts sold separately	250-4202
6.0L Power Stroke - inner row M8 head bolts	250-4206
6.0L Power Stroke Custom Age 625+ - Inner row M8 head bolts included	250-4205
6.4L Power Stroke ARP2000 - Inner row M8 head bolts included	250-4203
6.7L Power Stroke ARP2000	250-4301
6.7L Power Stroke Custom Age 625+	250-4302
6.9L International	150-4069
7.3L International (1988-94) ARP2000	250-4204
7.3L Power Stroke (1993-03) ARP2000	250-4201
NISSAN	
2.5L (YD25) 4-cylinder ARP2000	202-4306
OLDSMOBILE	
5.7L (350 cid)	184-4003
VOLKSWAGEN/AUDI	
1.6L & 1.9L Turbo & Non-Turbo (1982-02) ARP2000	204-4706

Red part numbers indicate new items

HEAD BOLTS

Application	Part No.
Cummins ISF2.8 ARP2000	247-4301▲

MAIN STUDS

Application	Part No.
CHEVROLET/GMC	
2.8L Duramax	230-5403▲
6.6L Duramax (2005 & earlier) LB7/LLY	230-5401▲
6.6L Duramax (2006 & later) LBZ/LMM	230-5402▲
CUMMINS	
Cummins ISL ARP2000	247-5406▲
Cummins ISF2.8 ARP2000	247-5407▲
Cummins ISV5.0 ARP2000	247-5801▲
DODGE/RAM	
Dodge/Cummins 3.9L 4BT, 2 bolt	247-5404▲
5.9L 12V Cummins (1997 & earlier), 2 bolt	247-5402▲
5.9L 24V Dodge/Cummins 5.9L 24V Late '97-'06, 2-bolt	247-5401▲

Application	Part No.
5.9L 24V Dodge/Cummins (2004 & later) with factory block stiffener plate, 0.600" counter bore, 2 bolt	247-5403●
6.7L Dodge/Cummins (2007 & later) with factory block stiffener plate, 2 bolt	247-5405●
FORD	
6.0L Power Stroke, 4 bolt	150-5801●
6.4L Power Stroke, 4 bolt	150-5802●
6.7L Power Stroke, 4 bolt ARP2000	250-5802▲
7.3L Power Stroke (1993-03), 4 bolt	250-5801▲
NISSAN	
2.5L (YD25) 4-cylinder ARP2000	202-5803▲
OLDSMOBILE	
5.7L (350 cid)	184-5402▲

ROD BOLTS

Application	Part No.
CHEVROLET/GMC	
6.6L Duramax LB7/LLY/LBZ/LMM ARP2000	230-6301●
DODGE/RAM	
3.9L (4BT) Cummins (Angled cap rod) ARP2000	247-6304●
5.9L 12V/24V Cummins ARP2000	247-6303●

Application	Part No.
FORD	
6.0L & 6.4L Power Stroke ARP2000	250-6301●
7.3L Power Stroke PM rod (2001-2003) ARP2000	250-6302●
7.3L Power Stroke forged rod (1994-2000)	250-6303●
NISSAN	
2.5L (YD25) 4-cylinder ARP2000	202-6008●

VALVE COVER BOLTS

Application	Hex	12-Point
CHEVROLET/GMC		
6.6L Duramax LB7 (Black oxide)	100-7532▲	100-7531▲
6.6L Duramax LB7 (Stainless)	400-7532●	400-7531●

Application	Hex	12-Point
CHEVROLET/GMC		
6.6L Duramax LBZ/LLY/LML/LMM (Black oxide)	100-7534▲	100-7533▲
6.6L Duramax LBZ/LLY/LML/LMM (Stainless)	400-7534●	400-7533●

EXHAUST FASTENER KITS

Application		ARP Stainless Bolts		ARP Stainless Studs
		12 Pt	Hex	12 Pt
CHEVROLET/GMC				
Duramax 6.6 L (2001-2016)	OE exhaust manifold	430-1201	430-1101	430-1301
	aftermarket exhaust manifolds	430-1202	430-1102	430-1303
DODGE/RAM				
Cummins 5.9/6.7L	OE exhaust manifold, spacers not included, cannot use OE heat shield	447-1201	447-1101	
	OE exhaust manifold, spacers not included, can use OE heat shield			447-1301
	OE exhaust manifold, spacers included, cannot use OE heat shield	447-1202	447-1102	
	OE exhaust manifold, spacers included, can use OE heat shield			447-1303
	aftermarket exhaust manifold	447-1203	447-1103	447-1305
FORD				
Power Stroke 6.0L (2003-2007)	OE exhaust manifold, spacers not included	450-1202	450-1102	450-1303
	OE exhaust manifold, spacers included	450-1203	450-1103	450-1305
	aftermarket exhaust manifold	450-1204	450-1104	450-1307
Power Stroke 6.7L (2011 & later)	OE exhaust manifold, spacers not included			450-1309
	OE exhaust manifold, spacers included			450-1311
Power Stroke 7.3L (1994-2003)	OE exhaust manifold	450-1201	450-1101	450-1301

ROCKER PEDESTAL STUD KIT

Application	Part No.
Dodge Cummins 24V, 12pt	247-7201

HARMONIC DAMPER KITS

Application	Part No.
Chevy 6.6L Duramax - bolt	129-2503
Chevy Duramax - washer	200-8793
Dodge/Ram 5.9L 12V/24V Cummins (2007 & earlier) - bolt & washer	147-2502
Dodge/Ram 5.9L & 6.7L 24V Cummins (2008 & later) - bolt & washer	147-2503
Ford 6.0L & 6.4L Power Stroke - bolt & washer	150-2505
Ford 6.7L Power Stroke - bolt & washer	150-2504

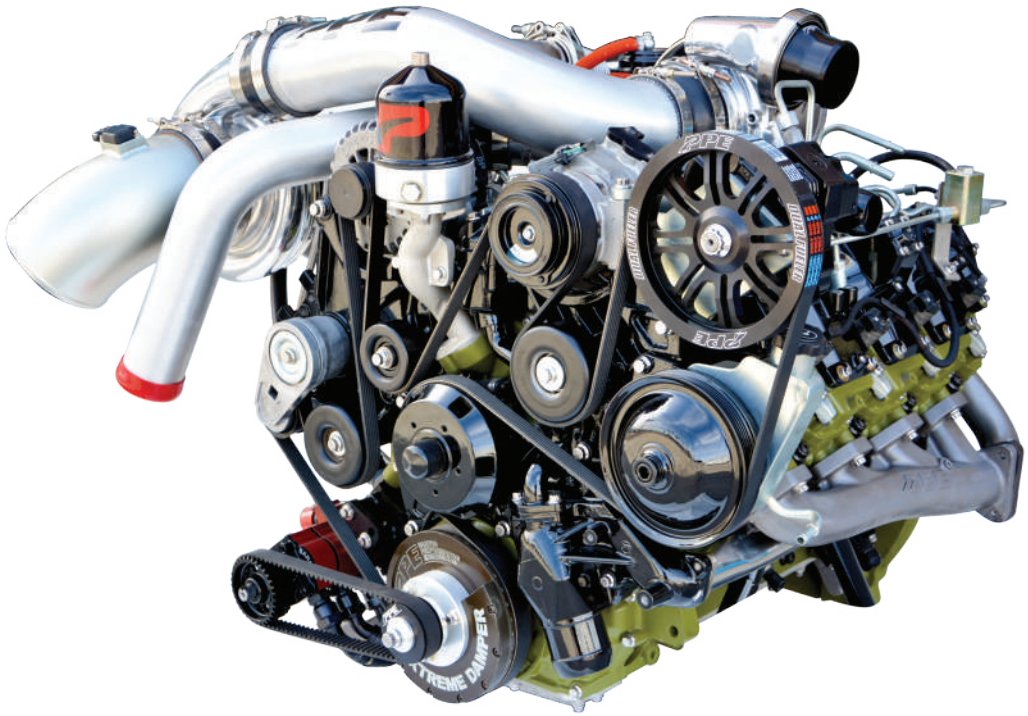
Red part numbers indicate new items

FLYWHEEL & FLEXPLATE BOLTS

Application	UHL	Thread Size	Part No.
FLYWHEEL BOLTS			
Chevy/GMC 6.6L Duramax	1.600	M16 x 1.5	230-2801 ●
Dodge/Ram 5.9L 12V/24V Cummins (2004 & earlier)	1.250	M12 x 1.25	147-2802 ▲
6.0L & 6.4L Power Stroke (single mass flywheel)	2.015	M10 x1.0	150-2802 ▲
Ford 6.4L Power Stroke Crank flange adapter bolt kit	2.425	M12 x 1.25	150-2506 ●
Ford 6.7L Power Stroke	1.825	M12 x 1.5	150-2801 ▲
FLEXPLATE BOLTS			
Chevy/GMC 6.6L Duramax	1.775	M16 x 1.5	230-2901 ●
Dodge/Ram 5.9L 12V & 24V Cummins	0.700	M12 x 1.25	147-2901 ●
Ford 6.0L & 6.4L Power Stroke	1.275	M10 x 1.0	150-2902 ▲
Ford 6.7L Power Stroke	1.825	M12 x 1.5	150-2901 ▲

RING COMPRESSORS

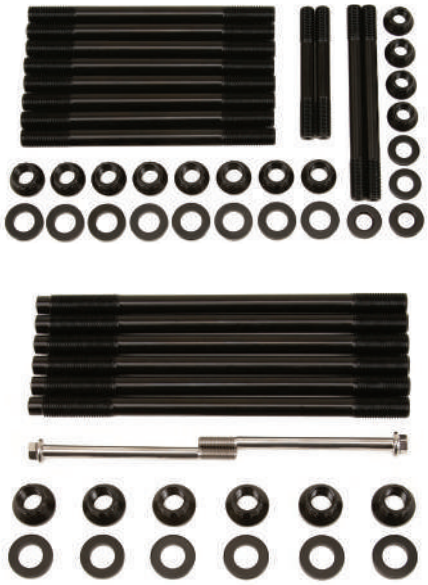
Size	Part No.
3.740	899-7400 ▲
3.750	899-7500 ▲
3.760	899-7600 ▲
4.060	900-0600 ▲
4.070	900-0700 ▲
4.075	900-0750 ▲
4.080	900-0800 ▲
4.090	900-0900 ▲
4.130	900-1300 ▲
4.140	900-1400 ▲
4.155	900-1550 ▲
4.212	900-2125 ▲



ARP is proud to sponsor these fine diesel performance series

DIESEL MOTORSPORTS

LUCAS OIL PRO PULLING LEAGUE



ARP POWERSPORTS

ARP's exploits in racing are common knowledge the world over. You'll find ARP® head and main studs, connecting rod bolts and valve train fasteners employed by leading race teams on land and water. What is not common knowledge, however, is ARP's involvement in the powersports market. Motorcycles, high speed carts and watercraft run at very high rpms and put tremendous stress on light-weight parts. ARP fasteners are up to the challenge.

Given the extreme enthusiam in the powersports market and newly developed power enhancements for these applications, ARP is continualy developing additional powersports kits.

ROD BOLTS

Application	Part No.
BMW S1000RR Motorcycle	201-6202 ●
Sea-Doo/Rotax RXP-X255	168-6001 ●
Suzuki GSX 1300 Hayabusa	271-6301 ●
Triumph Bonneville 650cc motorcycle (1956-72)	206-6009 ●

HEAD BOLTS

Application	Part No.
Harley Davidson - (1948-84) all Pan heads and Shovel heads	460-3601 ●
Harley Davidson - (1953-73) XL's	460-3602 ●

HEAD STUDS

Application	Part No.
BMW S1000RR Motorcycle	201-4306 ●
Polaris RZR 1000 ARP2000	288-4701 ●
Sea-Doo/Rotax RXP-X255	168-4201 ●
Suzuki GSX 1300 Hayabusa	271-4701 ●

MAIN BOLTS

Application	Part No.
BMW S1000RR Motorcycle	201-5201 ●

MAIN STUDS

Application	Part No.
Honda CBR 1000RR Motorcycle	208-5405 ▲
Polaris RZR 1000	188-5401 ▲
Sea-Doo/Rotax RXP-X255	168-5501 ▲
Suzuki GSX 1300 Hayabusa	271-5401 ▲

ENGINE & ACCESSORY BOLTS

Application	Stainless
Suzuki GSX 1300 Hayabusa - case half bolt kit	471-9501 ●
Suzuki GSX 1300 Hayabusa - accessory bolt kit	571-9501 ●

Red part numbers indicate new items

STAINLESS STEEL & CHROME MOLY 5-PACKS WITH WASHERS

NOTE:
Packed 5 on a card with washers

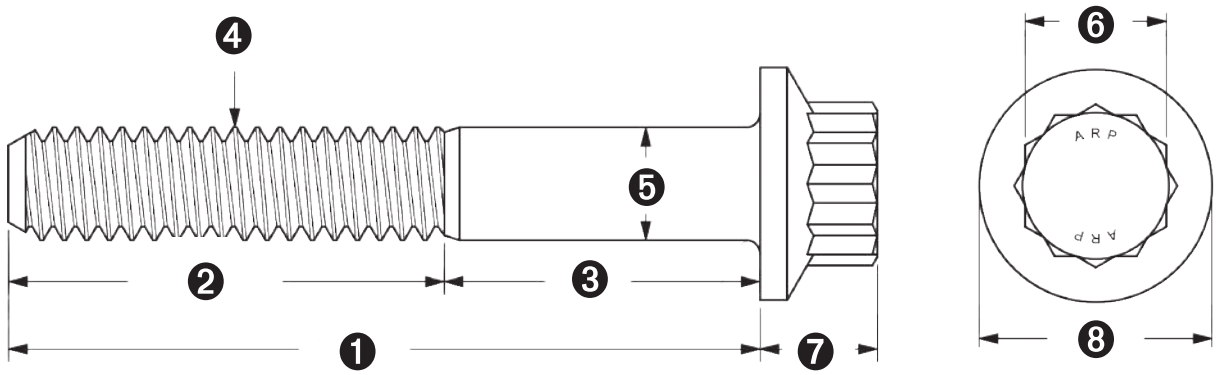
Stainless Steel & Chrome Moly Bolts Available in Standard Sizes From #10 to 1/2˝ and Metric Sizes From M6 to M12 With Underhead Lengths Ranging From 1/2˝ to 6˝. Hex or 12-Pt. Heads. Packaged In Convenient 5-Pack Cards.

Now you can use premium quality ARP stainless steel or chrome moly fasteners to install most anything on a car, boat or trailer. ARP's specially alloyed stainless steel bolts and heat-treated 8740 chrome moly bolts with black oxide finish are nominally rated at **180,000 psi** tensile strength to provide a substantial extra margin of safety over Grade 8 hardware.

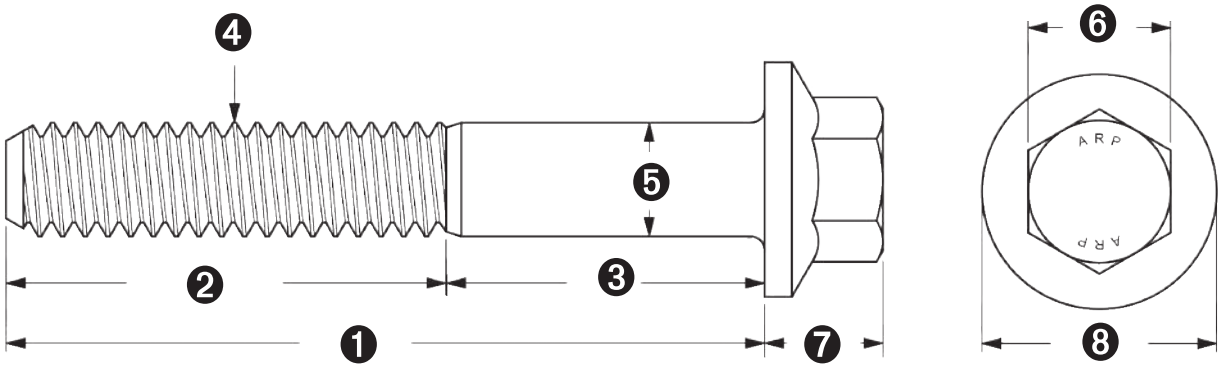
What's more, you can't beat the gorgeous looks of ARP's specially polished stainless steel fasteners, and their ability to resist rust. They're truly maintenance free!

You can get **5-packs** of any diameter bolt from #10 to 1/2″ or M6 to M12 in lengths ranging from 1/2″ to 6″ in your choice of hex or 12-point heads with washers included. Matching nuts are also available *(see pages 126-128)*.

Red part numbers indicate new items



** threaded all the way to head*



** threaded all the way to head*

	UHL ❶	Thread Length ❷	Grip Length ❸	Black Oxide		Stainless	
				Hex	12 point	Hex	12 point
10-24 ❹ **0.190″** thread diameter **24** threads / inch ❺ **n/a** threaded to head ❻ **1/4″** wrenching ❼ **0.260″** head height ❽ **0.365″** collar diameter	0.500	0.500	n/a *				701-0500
	0.625	0.625	n/a *				701-0625
	0.750	0.750	n/a *				701-0750
	1.000	01.000	n/a *				701-1000

	UHL ❶	Thread Length ❷	Grip Length ❸	Black Oxide		Stainless	
				Hex	12 point	Hex	12 point
10-32 ❹ **0.190″** thread diameter **32** threads / inch ❺ **n/a** threaded to head ❻ **1/4″** wrenching ❼ **0.260″** head height ❽ **0.365″** collar diameter	0.500	0.500	n/a *				702-0500
	0.625	0.625	n/a *				702-0625
	0.750	0.750	n/a *				702-0750
	1.000	1.000	n/a *				702-1000

Red part numbers indicate new items

1/4-20

❹ **1/4″** thread diameter
20 threads per inch

❺ **1/4″** grip diameter

❻ **5/16″** wrenching

❼ **0.255″** head height

❽ **0.515″** collar diameter

UHL ❶	Thread Length ❷	Grip Length ❸	Black Oxide		Stainless	
			Hex	12 point	Hex	12 point
0.515	0.515	n/a *	650-0515▲	640-0515●	621-0515●	611-0515●
0.750	0.750	n/a *	650-0750▲	640-0750●	621-0750●	611-0750●
1.000	1.000	n/a *	650-1000▲	640-1000●	621-1000●	611-1000●
1.250	1.000	0.250	650-1250▲	640-1250●	621-1250●	611-1250●
1.500	1.000	0.500	650-1500▲	640-1500●	621-1500●	611-1500●
1.750	1.000	0.750	650-1750▲	640-1750●	621-1750●	611-1750●
2.000	1.000	1.000	650-2000▲	640-2000●	621-2000●	611-2000●
2.250	1.000	1.250	650-2250▲	640-2250●	621-2250●	611-2250●
2.500	1.000	1.500	650-2500▲	640-2500●	621-2500●	611-2500●
2.750	1.000	1.750	650-2750▲	640-2750●	621-2750●	611-2750●
3.000	1.000	2.000	650-3000▲	640-3000●	621-3000●	611-3000●
3.250	1.000	2.250	650-3250▲	640-3250●	621-3250●	611-3250●
3.500	1.000	2.500	650-3500▲	640-3500●	621-3500●	611-3500●
3.750	1.000	2.750	650-3750▲	640-3750●	621-3750●	611-3750●
4.000	1.000	3.000	650-4000▲	640-4000●	621-4000●	611-4000●
4.250	1.000	3.250	650-4250▲	640-4250●	621-4250●	611-4250●
4.500	1.000	3.500	650-4500▲	640-4500●	621-4500●	611-4500●
4.750	1.000	3.750	650-4750▲	640-4750●	621-4750●	611-4750●

1/4-28

❹ **1/4″** thread diameter
28 threads per inch

❺ **1/4″** grip diameter

❻ **5/16″** wrenching

❼ **0.255″** head height

❽ **0.515″** collar diameter

UHL ❶	Thread Length ❷	Grip Length ❸	Black Oxide		Stainless	
			Hex	12 point	Hex	12 point
0.515	0.515	n/a *	750-0515▲	740-0515●	721-0515●	711-0515●
0.750	0.750	n/a *	750-0750▲	740-0750●	721-0750●	711-0750●
1.000	1.000	n/a *	750-1000▲	740-1000●	721-1000●	711-1000●
1.250	1.000	0.250	750-1250▲	740-1250●	721-1250●	711-1250●
1.500	1.000	0.500	750-1500▲	740-1500●	721-1500●	711-1500●
1.750	1.000	0.750	750-1750▲	740-1750●	721-1750●	711-1750●
2.000	1.000	1.000	750-2000▲	740-2000●	721-2000●	711-2000●
2.250	1.000	1.250	750-2250▲	740-2250●	721-2250●	711-2250●
2.500	1.000	1.500	750-2500▲	740-2500●	721-2500●	711-2500●
2.750	1.000	1.750	750-2750▲	740-2750●	721-2750●	711-2750●
3.000	1.000	2.000	750-3000▲	740-3000●	721-3000●	711-3000●
3.250	1.000	2.250	750-3250▲	740-3250●	721-3250●	711-3250●
3.500	1.000	2.500	750-3500▲	740-3500●	721-3500●	711-3500●
3.750	1.000	2.750	750-3750▲	740-3750●	721-3750●	711-3750●
4.000	1.000	3.000	750-4000▲	740-4000●	721-4000●	711-4000●
4.250	1.000	3.250	750-4250▲	740-4250●	721-4250●	711-4250●
4.500	1.000	3.500	750-4500▲	740-4500●	721-4500●	711-4500●

5/16-18

❹ 5/16″ thread diameter
18 threads per inch

❺ 5/16″ grip diameter

❻ 3/8″ wrenching

❼ 0.300″ head height

❽ 0.620″ collar diameter

UHL ❶	Thread Length ❷	Grip Length ❸	Black Oxide		Stainless	
			Hex	12 point	Hex	12 point
0.560	0.560	n/a *	651-0560▲	641-0560●	622-0560●	612-0560●
0.750	0.750	n/a *	651-0750▲	641-0750●	622-0750●	612-0750●
1.000	1.000	n/a *	651-1000▲	641-1000●	622-1000●	612-1000●
1.250	1.250	n/a *	651-1250▲	641-1250●	622-1250●	612-1250●
1.500	1.000	0.500	651-1500▲	641-1500▲	622-1500●	612-1500●
1.750	1.000	0.750	651-1750▲	641-1750▲	622-1750●	612-1750●
2.000	1.000	1.000	651-2000▲	641-2000▲	622-2000●	612-2000●
2.250	1.000	1.250	651-2250▲	641-2250▲	622-2250●	612-2250●
2.500	1.000	1.500	651-2500▲	641-2500▲	622-2500●	612-2500●
2.750	1.000	1.750	651-2750▲	641-2750▲	622-2750●	612-2750●
3.000	1.000	2.000	651-3000▲	641-3000▲	622-3000●	612-3000●
3.250	1.000	2.250	651-3250▲	641-3250▲	622-3250●	612-3250●
3.500	1.000	2.500	651-3500▲	641-3500▲	622-3500●	612-3500●
3.750	1.000	2.750	651-3750▲	641-3750▲	622-3750●	612-3750●
4.000	1.000	3.000	651-4000▲	641-4000▲	622-4000●	612-4000●
4.250	1.000	3.250	651-4250▲	641-4250▲	622-4250●	612-4250●
4.500	1.000	3.500	651-4500▲	641-4500▲	622-4500●	612-4500●
4.750	1.000	3.750	651-4750▲	641-4750▲	622-4750●	612-4750●
5.000	1.000	4.000	651-5000▲	641-5000▲	622-5000●	612-5000●

5/16-24

❹ 5/16″ thread diameter
24 threads per inch

❺ 5/16″ grip diameter

❻ 3/8″ wrenching

❼ 0.300″ head height

❽ 0.620″ collar diameter

UHL ❶	Thread Length ❷	Grip Length ❸	Black Oxide		Stainless	
			Hex	12 point	Hex	12 point
0.560	0.560	n/a *	751-0560▲	741-0560●	722-0560●	712-0560●
0.750	0.750	n/a *	751-0750▲	741-0750●	722-0750●	712-0750●
1.000	1.000	n/a *	751-1000▲	741-1000●	722-1000●	712-1000●
1.250	1.250	n/a *	751-1250▲	741-1250●	722-1250●	712-1250●
1.500	1.000	0.500	751-1500▲	741-1500▲	722-1500●	712-1500●
1.750	1.000	0.750	751-1750▲	741-1750▲	722-1750●	712-1750●
2.000	1.000	1.000	751-2000▲	741-2000▲	722-2000●	712-2000●
2.250	1.000	1.250	751-2250▲	741-2250▲	722-2250●	712-2250●
2.500	1.000	1.500	751-2500▲	741-2500▲	722-2500●	712-2500●
2.750	1.000	1.750	751-2750▲	741-2750▲	722-2750●	712-2750●
3.000	1.000	2.000	751-3000▲	741-3000▲	722-3000●	712-3000●
3.250	1.000	2.250	751-3250▲	741-3250▲	722-3250●	712-3250●
3.500	1.000	2.500	751-3500▲	741-3500▲	722-3500●	712-3500●
3.750	1.000	2.750	751-3750▲	741-3750▲	722-3750●	712-3750●
4.000	1.000	3.000	751-4000▲	741-4000▲	722-4000●	712-4000●
4.250	1.000	3.250	751-4250▲	741-4250▲	722-4250●	712-4250●
4.500	1.000	3.500	751-4500▲	741-4500▲	722-4500●	712-4500●
4.750	1.000	3.750	751-4750▲	741-4750▲	722-4750●	712-4750●
5.000	1.000	4.000	751-5000▲	741-5000▲	722-5000●	712-5000●

Red part numbers indicate new items

3/8-16 Reduced Wrenching

❹ 3/8″ thread diameter
16 threads per inch

❺ 3/8″ grip diameter

❻ 3/8″ wrenching

❼ 0.300″ head height

❽ 0.620″ collar diameter

reduced wrenching and collar diameter for tight clearance applications

UHL ❶	Thread Length ❷	Grip Length ❸	Black Oxide		Stainless	
			Hex	12 point	Hex	12 point
0.500	0.500	n/a *	652-0500▲	642-0500●	623-0500●	613-0500●
0.750	0.750	n/a *	652-0750▲	642-0750●	623-0750●	613-0750●
1.000	1.000	n/a *	652-1000▲	642-1000●	623-1000●	613-1000●
1.250	1.250	n/a *	652-1250▲	642-1250●	623-1250●	613-1250●
1.500	1.100	0.400	652-1500▲	642-1500●	623-1500●	613-1500●
1.750	1.100	0.650	652-1750▲	642-1750●	623-1750●	613-1750●
2.000	1.100	0.900	652-2000▲	642-2000●	623-2000●	613-2000●
2.250	1.100	1.150	652-2250▲	642-2250●	623-2250●	613-2250●
2.500	1.100	1.400	652-2500▲	642-2500●	623-2500●	613-2500●
2.750	1.100	1.650	652-2750▲	642-2750●	623-2750●	613-2750●
3.000	1.100	1.900	652-3000▲	642-3000●	623-3000●	613-3000●
3.250	1.100	2.150	652-3250▲	642-3250●	623-3250●	613-3250●
3.500	1.100	2.400	652-3500▲	642-3500●	623-3500●	613-3500●
3.750	1.100	2.650	652-3750▲	642-3750●	623-3750●	613-3750●
4.000	1.100	2.900	652-4000▲	642-4000●	623-4000●	613-4000●
4.250	1.100	3.150	652-4250▲	642-4250●	623-4250●	613-4250●
4.500	1.100	3.400	652-4500▲	642-4500●	623-4500●	613-4500●
4.750	1.100	3.650	652-4750▲	642-4750●	623-4750●	613-4750●
5.000	1.100	3.900	652-5000▲	642-5000●	623-5000●	613-5000●

3/8-16 Standard Wrenching

❹ 3/8″ thread diameter
16 threads per inch

❺ 3/8″ grip diameter

❻ 7/16″ wrenching

❼ 0.360″ head height

❽ 0.700″ collar diameter

UHL ❶	Thread Length ❷	Grip Length ❸	Black Oxide		Stainless	
			Hex	12 point	Hex	12 point
0.750	0.750	n/a *	654-0750▲	644-0750▲	625-0750●	615-0750●
1.000	1.000	n/a *	654-1000▲	644-1000▲	625-1000●	615-1000●
1.250	1.250	n/a *	654-1250▲	644-1250▲	625-1250●	615-1250●
1.500	1.100	n/a *	654-1500▲	644-1500▲	625-1500●	615-1500●
1.750	1.100	0.650	654-1750▲	644-1750▲	625-1750●	615-1750●
2.000	1.100	0.900	654-2000▲	644-2000▲	625-2000●	615-2000●
2.250	1.100	1.150	654-2250▲	644-2250▲	625-2250●	615-2250●
2.500	1.100	1.400	654-2500▲	644-2500▲	625-2500●	615-2500●
2.750	1.100	1.650	654-2750▲	644-2750▲	625-2750●	615-2750●
3.000	1.100	1.900	654-3000▲	644-3000▲	625-3000●	615-3000●
3.250	1.100	2.150	654-3250▲	644-3250▲	625-3250●	615-3250●
3.500	1.100	2.400	654-3500▲	644-3500▲	625-3500●	615-3500●
3.750	1.100	2.650	654-3750▲	644-3750▲	625-3750●	615-3750●
4.000	1.100	2.900	654-4000▲	644-4000▲	625-4000●	615-4000●

3/8-24

Reduced Wrenching

❹ 3/8″ thread diameter
24 threads per inch

❺ 3/8″ grip diameter

❻ 3/8″ wrenching

❼ 0.300″ head height

❽ 0.620″ collar diameter

reduced wrenching and collar diameter for tight clearance applications

UHL ❶	Thread Length ❷	Grip Length ❸	Black Oxide		Stainless	
			Hex	12 point	Hex	12 point
0.500	0.500	n/a *	752-0500▲	742-0500●	723-0500●	713-0500●
0.750	0.750	n/a *	752-0750▲	742-0750●	723-0750●	713-0750●
1.000	1.000	n/a *	752-1000▲	742-1000●	723-1000●	713-1000●
1.250	1.250	n/a *	752-1250▲	742-1250●	723-1250●	713-1250●
1.500	1.100	0.400	752-1500▲	742-1500●	723-1500●	713-1500●
1.750	1.100	0.650	752-1750▲	742-1750●	723-1750●	713-1750●
2.000	1.100	0.900	752-2000▲	742-2000●	723-2000●	713-2000●
2.250	1.100	1.150	752-2250▲	742-2250●	723-2250●	713-2250●
2.500	1.100	1.400	752-2500▲	742-2500●	723-2500●	713-2500●
2.750	1.100	1.650	752-2750▲	742-2750●	723-2750●	713-2750●
3.000	1.100	1.900	752-3000▲	742-3000●	723-3000●	713-3000●
3.250	1.100	2.150	752-3250▲	742-3250●	723-3250●	713-3250●
3.500	1.100	2.400	752-3500▲	742-3500●	723-3500●	713-3500●
3.750	1.100	2.650	752-3750▲	742-3750●	723-3750●	713-3750●
4.000	1.100	2.900	752-4000▲	742-4000●	723-4000●	713-4000●
4.250	1.100	3.150	752-4250▲	742-4250●	723-4250●	713-4250●
4.500	1.100	3.400	752-4500▲	742-4500●	723-4500●	713-4500●
4.750	1.100	3.650	752-4750▲	742-4750●	723-4750●	713-4750●
5.000	1.100	3.900	752-5000▲	742-5000●	723-5000●	713-5000●

3/8-24

Standard Wrenching

❹ 3/8″ thread diameter
24 threads per inch

❺ 3/8″ grip diameter

❻ 7/16″ wrenching

❼ 0.360″ head height

❽ 0.700″ collar diameter

UHL ❶	Thread Length ❷	Grip Length ❸	Black Oxide		Stainless	
			Hex	12 point	Hex	12 point
0.750	0.750	n/a *	754-0750▲	744-0750▲	725-0750●	715-0750●
1.000	1.000	n/a *	754-1000▲	744-1000▲	725-1000●	715-1000●
1.250	1.250	n/a *	754-1250▲	744-1250▲	725-1250●	715-1250●
1.500	1.100	0.400	754-1500▲	744-1500▲	725-1500●	715-1500●
1.750	1.100	0.650	754-1750▲	744-1750▲	725-1750●	715-1750●
2.000	1.100	0.900	754-2000▲	744-2000▲	725-2000●	715-2000●
2.250	1.100	1.150	754-2250▲	744-2250▲	725-2250●	715-2250●
2.500	1.100	1.400	754-2500▲	744-2500▲	725-2500●	715-2500●
2.750	1.100	1.650	754-2750▲	744-2750▲	725-2750●	715-2750●
3.000	1.100	1.900	754-3000▲	744-3000▲	725-3000●	715-3000●
3.250	1.100	2.150	754-3250▲	744-3250▲	725-3250●	715-3250●
3.500	1.100	2.400	754-3500▲	744-3500▲	725-3500●	715-3500●
3.750	1.100	2.650	754-3750▲	744-3750▲	725-3750●	715-3750●
4.000	1.100	2.900	754-4000▲	744-4000▲	725-4000●	715-4000●

Red part numbers indicate new items

7/16-14 Reduced Wrenching

❹ **7/16″** thread diameter
14 threads per inch

❺ **7/16″** grip diameter

❻ **7/16″** wrenching

❼ **0.400″** head height

❽ **0.670″** collar diameter

reduced wrenching and collar diameter for tight clearance applications

UHL ❶	Thread Length ❷	Grip Length ❸	Black Oxide		Stainless	
			Hex	12 point	Hex	12 point
1.500	1.250	0.250	653-1500▲	643-1500▲	626-1500●	616-1500●
1.750	1.250	0.500	653-1750▲	643-1750▲	626-1750●	616-1750●
2.000	1.250	0.750	653-2000▲	643-2000▲	626-2000●	616-2000●
2.250	1.250	1.000	653-2250▲	643-2250▲	626-2250●	616-2250●
2.500	1.250	1.250	653-2500▲	643-2500▲	626-2500●	616-2500●
2.750	1.250	1.500	653-2750▲	643-2750▲	626-2750●	616-2750●
3.000	1.250	1.750	653-3000▲	643-3000▲	626-3000●	616-3000●
3.250	1.250	2.000	653-3250▲	643-3250▲	626-3250●	616-3250●
3.500	1.250	2.250	653-3500▲	643-3500▲	626-3500●	616-3500●
3.750	1.250	2.500	653-3750▲	643-3750▲	626-3750●	616-3750●
4.000	1.250	2.750	653-4000▲	643-4000▲	626-4000●	616-4000●
4.250	1.250	3.000	653-4250▲	643-4250▲	626-4250●	616-4250●
4.500	1.250	3.250	653-4500▲	643-4500▲	626-4500●	616-4500●
4.750	1.250	3.500	653-4750▲	643-4750▲	626-4750●	616-4750●
5.000	1.250	3.750	653-5000▲	643-5000▲	626-5000●	616-5000●

7/16-14 Standard Wrenching

❹ **7/16″** thread diameter
14 threads per inch

❺ **7/16″** grip diameter

❻ **1/2″** wrenching

❼ **0.345″** head height

❽ **0.740″** collar diameter

UHL ❶	Thread Length ❷	Grip Length ❸	Black Oxide		Stainless	
			Hex	12 point	Hex	12 point
1.500	1.250	0.250	655-1500▲	645-1500●	624-1500●	614-1500●
1.750	1.250	0.500	655-1750▲	645-1750●	624-1750●	614-1750●
2.000	1.250	0.750	655-2000▲	645-2000●	624-2000●	614-2000●
2.250	1.250	1.000	655-2250▲	645-2250●	624-2250●	614-2250●
2.500	1.250	1.250	655-2500▲	645-2500●	624-2500●	614-2500●
2.750	1.250	1.500	655-2750▲	645-2750●	624-2750●	614-2750●
3.000	1.250	1.750	655-3000▲	645-3000●	624-3000●	614-3000●
3.250	1.250	2.000	655-3250▲	645-3250●	624-3250●	614-3250●
3.500	1.250	2.250	655-3500▲	645-3500●	624-3500●	614-3500●
3.750	1.250	2.500	655-3750▲	645-3750●	624-3750●	614-3750●
4.000	1.250	2.750	655-4000▲	645-4000●	624-4000●	614-4000●
4.250	1.250	3.000	655-4250▲	645-4250●	624-4250●	614-4250●
4.500	1.250	3.250	655-4500▲	645-4500●	624-4500●	614-4500●
4.750	1.250	3.500	655-4750▲	645-4750●	624-4750	614-4750●
5.000	1.250	3.750	655-5000▲	645-5000●	624-5000●	614-5000●

7/16-20 Reduced Wrenching

❹ 7/16″ thread diameter
20 threads per inch

❺ 7/16″ grip diameter

❻ 7/16″ wrenching

❼ 0.400″ head height

❽ 0.670″ collar diameter

reduced wrenching and collar diameter for tight clearance applications

UHL ❶	Thread Length ❷	Grip Length ❸	Black Oxide		Stainless	
			Hex	12 point	Hex	12 point
1.000	1.000	n/a *	753-1000▲	743-1000●	724-1000●	714-1000●
1.250	1.250	n/a *	753-1250▲	743-1250●	724-1250●	714-1250●
1.500	1.250	0.250	753-1500▲	743-1500●	724-1500●	714-1500●
1.750	1.250	0.500	753-1750▲	743-1750●	724-1750●	714-1750●
2.000	1.250	0.750	753-2000▲	743-2000●	724-2000●	714-2000●
2.250	1.250	1.000	753-2250▲	743-2250●	724-2250●	714-2250●
2.500	1.250	1.250	753-2500▲	743-2500●	724-2500●	714-2500●
2.750	1.250	1.500	753-2750▲	743-2750●	724-2750●	714-2750●
3.000	1.250	1.750	753-3000▲	743-3000●	724-3000●	714-3000●
3.250	1.250	2.000	753-3250▲	743-3250●	724-3250●	714-3250●
3.500	1.250	2.250	753-3500▲	743-3500●	724-3500●	714-3500●
3.750	1.250	2.500	753-3750▲	743-3750●	724-3750●	714-3750●
4.000	1.250	2.750	753-4000▲	743-4000●	724-4000●	714-4000●
4.250	1.250	3.000	753-4250▲	743-4250●	724-4250●	714-4250●
4.500	1.250	3.250	753-4500▲	743-4500●	724-4500●	714-4500●
4.750	1.250	3.500	753-4750▲	743-4750●	724-4750●	714-4750●
5.000	1.250	3.750	753-5000▲	743-5000●	724-5000●	714-5000●

7/16-20 Standard Wrenching

❹ 7/16″ thread diameter
20 threads per inch

❺ 7/16″ grip diameter

❻ 1/2″ wrenching

❼ 0.345″ head height

❽ 0.740″ collar diameter

UHL ❶	Thread Length ❷	Grip Length ❸	Black Oxide		Stainless	
			Hex	12 point	Hex	12 point
0.500	0.500	N/A	756-0500▲	746-0500●	727-0500●	717-0500●
0.625	0.625	N/A	756-0625▲	746-0625●	727-0625●	717-0625●
0.750	0.750	N/A	756-0750▲	746-0750●	727-0750●	717-0750●
0.875	0.875	N/A	756-0875▲	746-0875●	727-0875●	717-0875●
1.000	1.000	N/A	756-1000▲	746-1000●	727-1000●	717-1000●
1.125	1.125	N/A	756-1125▲	746-1125●	727-1125●	717-1125●
1.250	1.250	N/A	756-1250▲	746-1250●	727-1250●	717-1250●
1.375	1.250	0.125	756-1375▲	746-1375●	727-1375●	717-1375●
1.500	1.250	0.250	756-1500▲	746-1500●	727-1500●	717-1500●
1.625	1.250	0.375	756-1625▲	746-1625●	727-1625●	717-1625●
1.750	1.250	0.500	756-1750▲	746-1750●	727-1750●	717-1750●
1.875	1.250	0.625	756-1875▲	746-1875●	727-1875●	717-1875●
2.000	1.250	0.750	756-2000▲	746-2000●	727-2000●	717-2000●
2.125	1.250	0.875	756-2125▲	746-2125●	727-2125●	717-2125●
2.250	1.250	1.000	756-2250▲	746-2250●	727-2250●	717-2250●
2.375	1.250	1.125	756-2375▲	746-2375●	727-2375●	717-2375●
2.500	1.250	1.250	756-2500▲	746-2500●	727-2500●	717-2500●
2.625	1.250	1.375	756-2625▲	746-2625●	727-2625●	717-2625●
2.750	1.250	1.500	756-2750▲	746-2750●	727-2750●	717-2750●
2.875	1.250	1.625	756-2875▲	746-2875●	727-2875●	717-2875●
3.000	1.250	1.750	756-3000▲	746-3000●	727-3000●	717-3000●
3.125	1.250	1.875	756-3125▲	746-3125●	727-3125●	717-3125●
3.250	1.250	2.000	756-3250▲	746-3250●	727-3250●	717-3250●
3.375	1.250	2.125	756-3375▲	746-3375●	727-3375●	717-3375●

Red part numbers indicate new items

(CONTINUED) 7/16-20

Standard Wrenching

❹ **7/16″** thread diameter
20 threads per inch

❺ **7/16″** grip diameter

❻ **1/2″** wrenching

❼ **0.345″** head height

❽ **0.740″** collar diameter

UHL ❶	Thread Length ❷	Grip Length ❸	Black Oxide		Stainless	
			Hex	12 point	Hex	12 point
3.500	1.250	2.250	756-3500▲	746-3500●	727-3500●	717-3500●
3.625	1.250	2.375	756-3625▲	746-3625●	727-3625●	717-3625●
3.750	1.250	2.500	756-3750▲	746-3750●	727-3750●	717-3750●
3.875	1.250	2.625	756-3875▲	746-3875●	727-3875●	717-3875●
4.000	1.250	2.750	756-4000▲	746-4000●	727-4000●	717-4000●
4.125	1.250	2.875	756-4125▲	746-4125●	727-4125●	717-4125●
4.250	1.250	3.000	756-4250▲	746-4250●	727-4250●	717-4250●
4.375	1.250	3.125	756-4375▲	746-4375●	727-4375●	717-4375●
4.500	1.250	3.250	756-4500▲	746-4500●	727-4500●	717-4500●
4.625	1.250	3.375	756-4625▲	746-4625●	727-4625●	717-4625●
4.750	1.250	3.500	756-4750▲	746-4750●	727-4750●	717-4750●
4.875	1.250	3.625	756-4875▲	746-4875●	727-4875●	717-4875●
5.000	1.250	3.750	756-5000▲	746-5000●	727-5000●	717-5000●
5.125	1.250	3.875	756-5125▲	746-5125●	727-5125●	717-5125●
5.250	1.250	4.000	756-5250▲	746-5250●	727-5250●	717-5250●
5.375	1.250	4.125	756-5375▲	746-5375●	727-5375●	717-5375●
5.500	1.250	4.250	756-5500▲	746-5500●	727-5500●	717-5500●
5.625	1.250	4.375	756-5625▲	746-5625●	727-5625●	717-5625●
5.750	1.250	4.500	756-5750▲	746-5750●	727-5750●	717-5750●
5.875	1.250	4.625	756-5875▲	746-5875●	727-5875●	717-5875●
6.000	1.250	4.750	756-6000▲	746-6000●	727-6000●	717-6000●

1/2-13

❹ **1/2″** thread diameter
13 threads per inch

❺ **1/2″** grip diameter

❻ **9/16″** wrenching

❼ **0.450″** head height

❽ **0.850″** collar diameter

UHL ❶	Thread Length ❷	Grip Length ❸	Black Oxide		Stainless	
			Hex	12 point	Hex	12 point
1.000	1.000	n/a *	617-1000▲	627-1000▲	646-1000●	656-1000●
1.250	1.250	n/a *	617-1250▲	627-1250▲	646-1250●	656-1250●
1.500	1.250	0.250	617-1500▲	627-1500▲	646-1500●	656-1500●
1.750	1.250	0.500	617-1750▲	627-1750▲	646-1750●	656-1750●
2.000	1.250	0.750	617-2000▲	627-2000▲	646-2000●	656-2000●
2.250	1.250	1.000	617-2250▲	627-2250▲	646-2250●	656-2250●
2.500	1.250	1.250	617-2500▲	627-2500▲	646-2500●	656-2500●
2.750	1.250	1.500	617-2750▲	627-2750▲	646-2750●	656-2750●
3.000	1.250	1.750	617-3000▲	627-3000▲	646-3000●	656-3000●
3.250	1.250	2.000	617-3250▲	627-3250▲	646-3250●	656-3250●
3.500	1.250	2.250	617-3500▲	627-3500▲	646-3500●	656-3500●
3.750	1.250	2.500	617-3750▲	627-3750▲	646-3750●	656-3750●
4.000	1.250	2.750	617-4000▲	627-4000▲	646-4000●	656-4000●
4.250	1.250	3.000	617-4250▲	627-4250▲	646-4250●	656-4250●
4.500	1.250	3.250	617-4500▲	627-4500▲	646-4500●	656-4500●
4.750	1.250	3.500	617-4750▲	627-4750▲	646-4750●	656-4750●
5.000	1.250	3.750	617-5000▲	627-5000▲	646-5000●	656-5000●
5.250	1.250	4.000	617-5250▲	627-5250▲	646-5250●	656-5250●
5.500	1.250	4.250	617-5500▲	627-5500▲	646-5500●	656-5500●
5.750	1.250	4.500	617-5750▲	627-5750▲	646-5750●	656-5750●
6.000	1.250	4.750	617-6000▲	627-6000▲	646-6000●	656-6000●

1/2-20

❹ **1/2″** thread diameter
20 threads per inch

❺ **1/2″** grip diameter

❻ **9/16″** wrenching

❼ **0.450″** head height

❽ **0.850″** collar diameter

UHL ❶	Thread Length ❷	Grip Length ❸	Black Oxide		Stainless	
			Hex	12 point	Hex	12 point
1.000	1.000	n/a *	716-1000▲	726-1000▲	745-1000●	755-1000●
1.250	1.250	n/a *	716-1250▲	726-1250▲	745-1250●	755-1250●
1.500	1.250	0.250	716-1500▲	726-1500▲	745-1500●	755-1500●
1.750	1.250	0.500	716-1750▲	726-1750▲	745-1750●	755-1750●
2.000	1.250	0.750	716-2000▲	726-2000▲	745-2000●	755-2000●
2.250	1.250	1.000	716-2250▲	726-2250▲	745-2250●	755-2250●
2.500	1.250	1.250	716-2500▲	726-2500▲	745-2500●	755-2500●
2.750	1.250	1.500	716-2750▲	726-2750▲	745-2750●	755-2750●
3.000	1.250	1.750	716-3000▲	726-3000▲	745-3000●	755-3000●
3.250	1.250	2.000	716-3250▲	726-3250▲	745-3250●	755-3250●
3.500	1.250	2.250	716-3500▲	726-3500▲	745-3500●	755-3500●
3.750	1.250	2.500	716-3750▲	726-3750▲	745-3750●	755-3750●
4.000	1.250	2.750	716-4000▲	726-4000▲	745-4000●	755-4000●
4.250	1.250	3.000	716-4250▲	726-4250▲	745-4250●	755-4250●
4.500	1.250	3.250	716-4500▲	726-4500▲	745-4500●	755-4500●
4.750	1.250	3.500	716-4750▲	726-4750▲	745-4750●	755-4750●
5.000	1.250	3.750	716-5000▲	726-5000▲	745-5000●	755-5000●
5.250	1.250	4.000	716-5250▲	726-5250▲	745-5250●	755-5250●
5.500	1.250	4.250	716-5500▲	726-5500▲	745-5500●	755-5500●
5.750	1.250	4.500	716-5750▲	726-5750▲	745-5750●	755-5750●
6.000	1.250	4.750	716-6000▲	726-6000▲	745-6000●	755-6000●

M6 x 1.00

❹ **M6** thread diameter
1.00 thread pitch

❺ **6mm** grip diameter

❻ **8mm** wrenching

❼ **6.5mm** head height

❽ **11.6mm**
collar diameter

UHL ❶	Thread Length ❷	Grip Length ❸	Black Oxide		Stainless	
			Hex	12 point	Hex	12 point
12	12	n/a *	660-1016▲	670-1016▲	760-1016●	770-1016●
16	16	n/a *	660-1017▲	670-1017▲	760-1017●	770-1017●
20	20	n/a *	660-1001▲	670-1001▲	760-1001●	770-1001●
25	25	n/a *	660-1002▲	670-1002▲	760-1002●	770-1002●
30	18	12	660-1003▲	670-1003▲	760-1003●	770-1003●
35	18	17	660-1004▲	670-1004▲	760-1004●	770-1004●
40	18	22	660-1005▲	670-1005▲	760-1005●	770-1005●
45	18	27	660-1006▲	670-1006▲	760-1006●	770-1006●
50	18	32	660-1007▲	670-1007▲	760-1007●	770-1007●
55	18	37	660-1008▲	670-1008▲	760-1008●	770-1008●
60	18	42	660-1009▲	670-1009▲	760-1009●	770-1009●
65	18	47	660-1010▲	670-1010▲	760-1010●	770-1010●
70	18	52	660-1011▲	670-1011▲	760-1011●	770-1011●
75	18	57	660-1012▲	670-1012▲	760-1012●	770-1012●
80	18	62	660-1013▲	670-1013▲	760-1013●	770-1013●
90	18	72	660-1014▲	670-1014▲	760-1014●	770-1014●
100	18	82	660-1015▲	670-1015▲	760-1015●	770-1015●
135	18	117	660-1018▲	670-1018▲	760-1018●	770-1018●

Red part numbers indicate new items

M8 x 1.25

❹ **M8** thread diameter
1.25 thread pitch

❺ **8mm** grip diameter

❻ **10mm** wrenching

❼ **7.4mm** head height

❽ **15.0mm** collar diameter

UHL ❶	Thread Length ❷	Grip Length ❸	Black Oxide		Stainless	
			Hex	12 point	Hex	12 point
12	12	n/a *	661-1016▲	671-1016▲	761-1016●	771-1016●
16	16	n/a *	661-1017▲	671-1017▲	761-1017●	771-1017●
20	20	n/a *	661-1001▲	671-1001▲	761-1001●	771-1001●
25	25	n/a *	661-1002▲	671-1002▲	761-1002●	771-1002●
30	22	8	661-1003▲	671-1003▲	761-1003●	771-1003●
35	22	13	661-1004▲	671-1004▲	761-1004●	771-1004●
40	22	18	661-1005▲	671-1005▲	761-1005●	771-1005●
45	22	23	661-1006▲	671-1006▲	761-1006●	771-1006●
50	22	28	661-1007▲	671-1007▲	761-1007●	771-1007●
55	22	33	661-1008▲	671-1008▲	761-1008●	771-1008●
60	22	38	661-1009▲	671-1009▲	761-1009●	771-1009●
65	22	43	661-1010▲	671-1010▲	761-1010●	771-1010●
70	22	48	661-1011▲	671-1011▲	761-1011●	771-1011●
75	22	53	661-1012▲	671-1012▲	761-1012●	771-1012●
80	22	58	661-1013▲	671-1013▲	761-1013●	771-1013●
85	22	63	661-1018▲	671-1018▲	761-1018●	771-1018●
90	22	68	661-1014▲	671-1014▲	761-1014●	771-1014●
100	22	78	661-1015▲	671-1015▲	761-1015●	771-1015●
115	22	93	661-1019▲	671-1019▲	761-1019●	771-1019●

M10 x 1.25

❹ **M10** thread diameter
1.25 thread pitch

❺ **10mm** grip diameter

❻ **12mm** wrenching

❼ **9.0mm** head height

❽ **18.5mm** collar diameter

UHL ❶	Thread Length ❷	Grip Length ❸	Black Oxide		Stainless	
			Hex	12 point	Hex	12 point
20	20	n/a *	663-1001●	673-1001●	763-1001●	773-1001●
25	25	n/a *	663-1002●	673-1002●	763-1002●	773-1002●
30	30	n/a *	663-1003●	673-1003●	763-1003●	773-1003●
35	35	n/a *	663-1004●	673-1004●	763-1004●	773-1004●
40	26	14	663-1005●	673-1005●	763-1005●	773-1005●
45	26	19	663-1006●	673-1006●	763-1006●	773-1006●
50	26	24	663-1007●	673-1007●	763-1007●	773-1007●
60	26	34	663-1008●	673-1008●	763-1008●	773-1008●
70	26	44	663-1009●	673-1009●	763-1009●	773-1009●
80	26	54	663-1010●	673-1010●	763-1010●	773-1010●
90	26	64	663-1011●	673-1011●	763-1011●	773-1011●
100	26	74	663-1012●	673-1012●	763-1012●	773-1012●

M10 x 1.50

❹ **M10** thread diameter
1.50 thread pitch

❺ **10mm** grip diameter

❻ **12mm** wrenching

❼ **9.0mm** head height

❽ **18.5mm** collar diameter

UHL ❶	Thread Length ❷	Grip Length ❸	Black Oxide		Stainless	
			Hex	12 point	Hex	12 point
20	20	n/a *	662-1001 ●	672-1001 ●	762-1001 ●	772-1001 ●
25	25	n/a *	662-1002 ●	672-1002 ●	762-1002 ●	772-1002 ●
30	30	n/a *	662-1003 ●	672-1003 ●	762-1003 ●	772-1003 ●
35	35	n/a *	662-1004 ●	672-1004 ●	762-1004 ●	772-1004 ●
40	26	14	662-1005 ●	672-1005 ●	762-1005 ●	772-1005 ●
45	26	19	662-1006 ●	672-1006 ●	762-1006 ●	772-1006 ●
50	26	24	662-1007 ●	672-1007 ●	762-1007 ●	772-1007 ●
60	26	34	662-1008 ●	672-1008 ●	762-1008 ●	772-1008 ●
65	26	39	662-1013 ●	672-1013 ●	762-1013 ●	772-1013 ●
70	26	44	662-1009 ●	672-1009 ●	762-1009 ●	772-1009 ●
80	26	54	662-1010 ●	672-1010 ●	762-1010 ●	772-1010 ●
90	26	64	662-1011 ●	672-1011 ●	762-1011 ●	772-1011 ●
100	26	74	662-1012 ●	672-1012 ●	762-1012 ●	772-1012 ●

M12 x 1.50

❹ **M12** thread diameter
1.50 thread pitch

❺ **12mm** grip diameter

❻ **14mm** wrenching

❼ **11.7mm** head height

❽ **21.6mm** collar diameter

UHL ❶	Thread Length ❷	Grip Length ❸	Black Oxide		Stainless	
			Hex	12 point	Hex	12 point
25	25	n/a *	664-1001 ▲	674-1001 ▲	764-1001 ●	774-1001 ●
30	30	n/a *	664-1002 ▲	674-1002 ▲	764-1002 ●	774-1002 ●
35	30	5	664-1003 ▲	674-1003 ▲	764-1003 ●	774-1003 ●
40	30	10	664-1004 ▲	674-1004 ▲	764-1004 ●	774-1004 ●
45	30	15	664-1005 ▲	674-1005 ▲	764-1005 ●	774-1005 ●
50	30	20	664-1006 ▲	674-1006 ▲	764-1006 ●	774-1006 ●
60	30	30	664-1007 ▲	674-1007 ▲	764-1007 ●	774-1007 ●
70	30	40	664-1008 ▲	674-1008 ▲	764-1008 ●	774-1008 ●
80	30	50	664-1009 ▲	674-1009 ▲	764-1009 ●	774-1009 ●
90	30	60	664-1010 ▲	674-1010 ▲	764-1010 ●	774-1010 ●
100	30	70	664-1011 ▲	674-1011 ▲	764-1011 ●	774-1011 ●

M12 x 1.75

❹ **M12** thread diameter
1.75 thread pitch

❺ **12mm** grip diameter

❻ **14mm** wrenching

❼ **11.7mm** head height

❽ **21.6mm** collar diameter

UHL ❶	Thread Length ❷	Grip Length ❸	Black Oxide		Stainless	
			Hex	12 point	Hex	12 point
25	25	n/a *	665-1001 ▲	675-1001 ▲	765-1001 ●	775-1001 ●
30	30	n/a *	665-1002 ▲	675-1002 ▲	765-1002 ●	775-1002 ●
35	30	5	665-1003 ▲	675-1003 ▲	765-1003 ●	775-1003 ●
40	30	10	665-1004 ▲	675-1004 ▲	765-1004 ●	775-1004 ●
45	30	15	665-1005 ▲	675-1005 ▲	765-1005 ●	775-1005 ●
50	30	20	665-1006 ▲	675-1006 ▲	765-1006 ●	775-1006 ●
60	30	30	665-1007 ▲	675-1007 ▲	765-1007 ●	775-1007 ●
70	30	40	665-1008 ▲	675-1008 ▲	765-1008 ●	775-1008 ●
80	30	50	665-1009 ▲	675-1009 ▲	765-1009 ●	775-1009 ●
90	30	60	665-1010 ▲	675-1010 ▲	765-1010 ●	775-1010 ●
100	30	70	665-1011 ▲	675-1011 ▲	765-1011 ●	775-1011 ●

Red part numbers indicate new items

FASTENER BULK BINS – STOCK OR CUSTOM

Professional builders everywhere know what it means to have the right fastener always on hand. Whether you're a race team, hot rod shop, engine builder or just a weekend hobbyist that wants to do it right. ARP Bulk Bins offer you the convenience of having the right fasteners at the right time and can be customized for any work you do.

Troy Trepanier
Rad Rides by Troy

Bryan Fuller
Fuller Hot Rods

Steve Watt
Speed Demon &
Maxwell Industries

EIGHT STOCK BINS TO CHOOSE FROM

There are eight stock bins to choose from based on what you normally use around the shop. The finish options include ARP stainless or black oxide and wrenching options of either hex or 12-point. Each is available in either standard or metric. Each drawer has the contents printed on the inside of the lid to make reordering easy.

STANDARD Bulk Bins

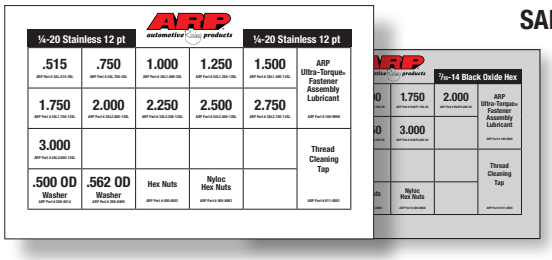
998-0500 - ARP Stainless 12 pt ●
998-0501 - Black Oxide 8740 12 pt ▲
998-0502 - ARP Stainless Hex ●
998-0503 - Black Oxide 8740 Hex ▲

Drawer	Dia.-Pitch	Lengths	Bolts	Nuts	Washers
A	1/4-20	0.515-3.000	240	100	100
B	5/16-18	0.560-3.000	160	100	100
C	3/8-16	0.500-3.000	185	100	150
D	7/16-14	1.000-3.000	85	100	100

METRIC Bulk Bins

998-0504 - ARP Stainless 12 pt ●
998-0505 - Black Oxide 8740 12 pt ▲
998-0506 - ARP Stainless Hex ●
998-0507 - Black Oxide 8740 Hex ▲

Drawer	Dia.-Pitch	Lengths	Bolts	Nuts	Washers
A	M6 x 1.00	20-70mm	240	100	100
B	M8 x 1.25	20-70mm	185	100	100
C	M10 x 1.25	20-70mm	85	100	150
D	M10 x 1.50	20-70mm	90	100	100



SAMPLE DRAWER LABELS

OR CREATE YOUR OWN CUSTOM BIN

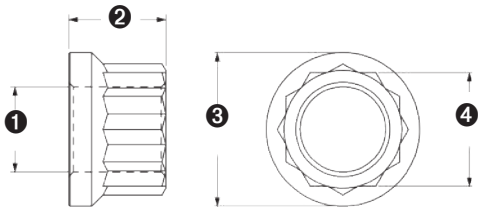
If the configuration of our stock bins doesn't suit your needs, you have the complete freedom to build your own, customized to the way you work.

Choose any ARP bulk fasteners – bolts, studs, nuts and washers – an endless combination for your shop.

You can even order a custom-printed wrap with your logo or car image.

12-POINT NUTS

Available in a variety of sizes to suit your needs, all ARP 12-point nuts are constructed from 8740 chrome moly steel or ARP Stainless, and meet ARP's highest standards of quality. Rated at **180,000 psi** tensile strength, ARP 12-point nuts are manufactured in thick wall versions for optimum strength and rigidity and thin wall versions for applications with limited space requirements. All 8740 chrome moly steel nuts are black oxide finished and all ARP Stainless nuts are polished to a briliant luster.



SAE 12-POINT NUTS

❶ Diameter	❶ Thread Size	❷ Head Height	❸ Collar Diameter	❹ Socket Size	12-Point 8740 Black Oxide Finish			12-Point ARP Polished Stainless Steel		
					1 PC Bulk	2 PC-Pack	10 PC-Pack	1 PC Bulk	2 PC-Pack	10 PC-Pack
	threads / inch	inch	inch	inch						
1/4	20	0.300	0.433	5/16	301-8300	301-8320	301-8340	401-8300	401-8320	401-8340
	28	0.300	0.433	5/16	300-8300	300-8320	300-8330	400-8300	400-8320	400-8330
5/16	18	0.348	0.526	3/8	301-8303	301-8323	301-8343	401-8303	401-8323	401-8343
	24	0.348	0.526	3/8	300-8301	300-8321	300-8331	400-8301	400-8321	400-8331
11/32	24	0.388	0.644	7/16	300-8373	300-8383	300-8393			
3/8	16	0.390	0.625	7/16	301-8301	301-8321	301-8341	401-8301	401-8321	401-8341
	24	0.390	0.625	7/16	300-8302	300-8322	300-8332	400-8302	400-8322	400-8332
	24	0.420	0.700	1/2	300-8371	300-8381	300-8391			
	24	0.390	0.645	1/2	300-8372	300-8382	300-8392			
7/16	14	0.433	0.700	1/2	301-8306	301-8326	301-8346	401-8306	401-8326	401-8346
	20	0.432	0.700	1/2	300-8303	300-8323	300-8333	400-8303	400-8323	400-8333
	20	0.362	0.600	1/2	300-8375	300-8385	300-8395			
	20	0.475	0.800	1/2	301-8316	301-8336	301-8356			
	20	0.504	0.823	9/16	300-8374	300-8384	300-8394			
	20	0.504	0.823	5/8	301-8314	301-8334	301-8354			
1/2	13	0.510	0.823	9/16	301-8302	301-8322	301-8342	401-8302	401-8322	401-8342
	20	0.510	0.823	9/16	300-8304	300-8324	300-8334	400-8304	400-8324	400-8334
	20	0.530	0.873	5/8	300-8306	300-8326	300-8336			
	20	0.640	0.875	11/16	301-8313▲	301-8333▲	301-8353▲			
9/16	12	0.620	0.965	11/16	301-8307	301-8327	301-8347			
	18	0.620	0.965	11/16	300-8305	300-8325	300-8335	400-8305	400-8325	400-8335
5/8	18	0.700	1.225	13/16	300-8309	300-8329	300-8339			

METRIC 12-POINT NUTS

❶ Diameter	❶ Thread Size	❷ Head Height	❸ Collar Diameter	❹ Socket Size	12-Point 8740 Black Oxide Finish			12-Point ARP Polished Stainless Steel		
					1 PC Bulk	2 PC-Pack	10 PC-Pack	1 PC Bulk	2 PC-Pack	10 PC-Pack
	thread pitch	mm (in.)	mm (in.)	mm						
M6	1.00	6.1 (0.241)	10.5 (0.413)	8	300-8370	300-8380	300-8390	400-8370	400-8380	400-8390
M7	1.00	7.0 (0.275)	12.0 (0.472)	9	300-8346	300-8356	300-8366	400-8346	400-8356	400-8366
M8	1.00	8.1 (0.320)	15.9 (0.625)	10	300-8340	300-8350	300-8360	400-8340	400-8350	400-8360
	1.25	8.1 (0.320)	13.6 (0.535)	10	300-8310	300-8311	300-8312	400-8310	400-8311	400-8312

Red part numbers indicate new items

METRIC 12-POINT NUTS (CONTINUED)

❶ Diameter	Thread Size	❷ Head Height	❸ Collar Diameter	❹ Socket Size	12-Point 8740 Black Oxide Finish			12-Point ARP Polished Stainless Steel		
					1 PC Bulk	2 PC-Pack	10 PC-Pack	1 PC Bulk	2 PC-Pack	10 PC-Pack
M9	1.00	9.5 (0.375)	15.6 (0.615)	11	300-8341 ●	300-8351 ●	300-8361 ●	400-8341 ●	400-8351 ●	400-8361 ●
	1.00	8.4 (0.330)	18.2 (0.720)	13	301-8308 ●	301-8328 ●	301-8348 ●			
	1.25	8.0 (0.316)	15.6 (0.615)	11	300-8342 ●	300-8352 ●	300-8362 ●			
M10	1.00	10.2 (0.400)	17.8 (0.700)	12	301-8311 ●	301-8331 ●	301-8351 ●	401-8311 ●	401-8331 ●	401-8351 ●
	1.00	10.2 (0.400)	14.0 (0.550)	12	301-8319 ●	301-8339 ●	301-8359 ●			
	1.25	10.2 (0.400)	15.9 (0.625)	12	300-8343 ●	300-8353 ●	300-8363 ●			
	1.25	10.2 (0.400)	17.8 (0.700)	12	300-8344 ●	300-8354 ●	300-8364 ●	400-8344 ●	400-8354 ●	400-8364 ●
	1.25	8.1 (0.320)	15.0 (0.590)	12	301-8310 ●	301-8330 ●	301-8350 ●			
	1.25	11.4 (0.450)	20.7 (0.815)	16	301-8312 ●	301-8332 ●	301-8352 ●			
	1.25	9.5 (0.375)	20.6 (0.810)	16	301-8315 ●	301-8335 ●	301-8355 ●			
	1.50	10.2 (0.400)	17.8 (0.700)	12	300-8345 ●	300-8355 ●	300-8365 ●	400-8345 ●	400-8355 ●	400-8365 ●
M11	1.25	11.0 (0.432)	17.8 (0.700)	13	301-8361 ●	301-8381 ●	301-8401 ●	401-8361 ●	401-8381 ●	401-8401 ●
	1.25	13.0 (0.501)	20.9 (0.823)	14	301-8362 ●	301-8382 ●	301-8402 ●	401-8362 ●	401-8382 ●	401-8402 ●
M12	1.00	12.8 (0.504)	19.1 (0.750)	14	300-8347 ●	300-8367 ●	300-8387 ●	400-8347 ●	400-8367 ●	400-8387 ●
	1.25	12.8 (0.504)	20.9 (0.823)	14	300-8307 ●	300-8327 ●	300-8337 ●	400-8307 ●	400-8327 ●	400-8337 ●
	1.25	12.8 (0.540)	19.1 (0.750)	14	300-8308 ●	300-8328 ●	300-8338 ●	400-8308 ●	400-8328 ●	400-8338 ●
	1.25	13.5 (0.530)	22.2 (0.873)	16	301-8318 ●	301-8338 ●	301-8358 ●			
	1.25	10.8 (0.425)	23.5 (0.925)	16	301-8309 ●	301-8329 ●	301-8349 ●			
	1.25	9.5 (0.375)	20.7 (0.815)	16	301-8360 ▲	301-8380 ▲	301-8400 ▲			
	1.50							401-8363 ●	401-8383 ●	401-8403 ●
	1.75	12.8 (0.504)	20.9 (0.823)	14	300-8376 ●	300-8386 ●	300-8396 ●	400-8376 ●	400-8386 ●	400-8396 ●

HEX NUTS

Constructed from the finest aerospace-quality materials, these hex nuts are available in most sizes to meet your needs. All hex nuts meet ARP's exacting quality control standards and are black oxided. All hex nuts are rated **180,000 psi** tensile strength.

Thread Size	Socket Size	Hex (1 PC-Bulk)	Hex (2 PC-Pack)	Hex (10 PC-Pack)	Hex SS (1 PC-Bulk)
1/4-28 (2)	7/16	200-8601 ●	200-8621 ●	200-8631 ●	
5/16-18 (2)	1/2	301-8304 ●	301-8324 ●	301-8344 ●	401-8304 ●
5/16-24	3/8	200-8614 ●	200-8644 ●	200-8674 ●	400-8614 ●
5/16-24	1/2	200-8602 ●	200-8622 ●	200-8632 ●	
11/32-24	1/2	200-8603 ●	200-8623 ●	200-8633 ●	
3/8-16 (2)	9/16	200-8704 ●	200-8724 ●	200-8734 ●	400-8704 ●
3/8-24	9/16	200-8604 ●	200-8624 ●	200-8634 ●	400-8604 ●
7/16-14 (2)	5/8	301-8305 ●	301-8325 ●	301-8345 ●	401-8305 ●
7/16-20	5/8	200-8605 ●	200-8625 ●	200-8635 ●	400-8605 ●
7/16-20	11/16	200-8606 ●	200-8626 ●	200-8636 ●	
1/2-20	3/4	200-8607 ●	200-8627 ●	200-8637 ●	400-8607 ●
9/16-18	7/8	200-8608 ●	200-8628 ●	200-8638 ●	

STANDARD & NYLOC 5-PACKS

To compliment ARP "bulk" 5-pack chrome moly and stainless steel fasteners we have assembled matching groups of nuts. They, too, come in convenient 5-pack skin cards. Take your pick from stainless steel and black oxide finished standard nuts or stainless steel Nyloc and cad plated Nyloc self-locking nuts.

Thread Size	Stainless Hex	Black Oxide Hex	Stainless Nyloc Hex	Cad Plated Nyloc Hex
STANDARD THREAD				
1/4-20	400-8651 ●	200-8651 ●	400-8661 ●	200-8661 ▲
5/16-18	400-8652 ●	200-8652 ●	400-8662 ●	200-8662 ▲
3/8-16	400-8654 ●	200-8654 ●	400-8664 ●	200-8664 ▲
7/16-14	400-8656 ●	200-8656 ●	400-8666 ●	200-8666 ▲
1/2-13	400-8657 ●	200-8657 ●	400-8667 ●	200-8667 ▲
FINE THREAD				
1/4-28	400-8751 ●		400-8761 ●	400-8771 ▲
5/16-24	400-8752 ●		400-8762 ●	
3/8-24	400-8754 ●		400-8764 ●	
7/16-20	400-8756 ●		400-8766 ●	
1/2-20	400-8757 ●		400-8767 ●	

SERRATED FLANGE NUTS

These serrated hex nuts with flanged collars are available especially for carburetor, valve cover, front cover, oil pan studs and windage tray studs. Made from premium-quality material, they are cad-plated. All general purpose nuts are rated **150,000 psi** tensile strength.

Note: Do not use on cylinder heads, mains, or rods!

Thread Size	Socket Size	Hex (1 PC bulk)	Hex (2 PC-Pack)	Hex (10 PC-Pack)	Hex SS (1 PC bulk)
1/4-28	7/16	200-8609 ●	200-8629 ●	200-8639 ●	400-8609 ●
5/16-24	1/2	200-8610 ●	200-8620 ●	200-8630 ●	400-8610 ●
5/16-24 (4)	1/2	200-8645 ●	200-8655 ●	200-8665 ●	
3/8-24	9/16	200-8600 ●	200-8640 ●	200-8650 ●	
M10 x 1.25	14mm	200-8663 ●	200-8673 ●	200-8683 ●	

(4) non-serrated

SELF-LOCKING NUTS

For high stress, high temperature and severe vibration – all metal six point Jet-nuts and 12-point K-nuts are ideal for use practically everywhere. Features include elliptically offset, light weight, temperature resistant, positive locking and almost indefinitely reusable. The upper portion of the nut is distorted or offset elliptically. The elastic deformation creates a friction hold sufficient to lock the nut. Made of carbon-alloy steel, cadmium and chromate finish.

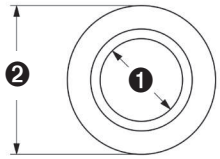
Size	NAS	Part No.
HEX (JET NUT)		
10-32	-3	200-8101 ▲
1/4-28	-4	200-8102 ▲
5/16-24	-5	200-8103 ▲
3/8-24	-6	200-8104 ▲

Size	NAS	Part No.
12-POINT REDUCED WRENCHING		
10-32	-3	200-8201 ▲
1/4-28	-4	200-8202 ●
5/16-24	-5	200-8203 ●
3/8-24	-6	200-8204 ●

Red part numbers indicate new items

SAE WASHERS

A true high performance washer from ARP, available in a variety of sizes and thicknesses, and with or without I.D. (inside diameter) chamfers. Our washers are constructed from either premium chrome moly with a black oxide finish or polished ARP stainless steel and are hardened.



❶ Inside Diameter	❷ Outside Diameter (in.)	❸ Thickness (in.)	❹ Chamfer	Other Details	1 PC-Bulk	2 PC-Pack	10 PC-Pack
1/4	0.500	0.063		Stainless	200-8414 ●		
	0.500	0.063		Cad Plated	200-8416 ▲		
	0.550	0.075	Yes	Black Oxide	200-8648 ▲	200-8658 ▲	200-8668 ▲
				Black Oxide	200-8649 ▲	200-8659 ▲	200-8669 ▲
			Yes	Stainless	400-8505 ●	400-8515 ●	400-8525 ●
				Stainless	400-8506 ●	400-8516 ●	400-8526 ●
5/16	0.550	0.095		Black Oxide	200-8593 ▲	200-8578 ▲	200-8584 ▲
			Yes	Black Oxide	200-8594 ▲	200-8579 ▲	200-8585 ▲
	0.563	0.063		Cad Plated	200-8417 ▲		
	0.625	0.063		Stainless	200-8411 ▲		
		0.120	Yes	Stainless	400-8530 ●	400-8540 ●	400-8550 ●
	0.655	0.075	Yes	Black Oxide	200-8431 ▲	200-8441 ▲	200-8451 ▲
				Black Oxide	200-8432 ▲	200-8442 ▲	200-8452 ▲
			Yes	Stainless	400-8431 ●	400-8441 ●	400-8451 ●
				Stainless	400-8432 ●	400-8442 ●	400-8452 ●
	0.675	0.120		Black Oxide	200-8595 ▲	200-8580 ▲	200-8586 ▲
			Yes	Black Oxide	200-8575 ▲	200-8581 ▲	200-8587 ▲
	0.812	0.120		Black Oxide	200-8576 ▲	200-8582 ▲	200-8588 ▲
			Yes	Black Oxide	200-8577 ▲	200-8583 ▲	200-8589 ▲

SAE WASHERS *(CONTINUED)*

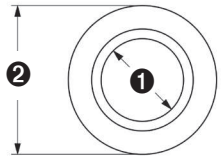
❶ Inside Diameter	❷ Outside Diameter (in.)	❸ Thickness (in.)	❹ Chamfer	Other Details	1 PC-Bulk	2 PC-Pack	10 PC-Pack
3/8	0.625	0.063	Yes	Black Oxide	200-8505▲	200-8675▲	200-8685▲
				Stainless	200-8405●		
				Cad Plated	200-8418▲		
		0.120		Black Oxide	200-8504▲	200-8544▲	200-8554▲
			Yes	Black Oxide	200-8611▲	200-8612▲	200-8613▲
	0.655	0.090	Yes	Black Oxide	200-8764▲	200-8774▲	200-8784▲
				Black Oxide	200-8765▲	200-8775▲	200-8785▲
			Yes	Stainless	400-8423●	400-8433●	400-8443●
				Stainless	400-8765●	400-8775●	400-8785●
	0.675	0.120		Black Oxide	200-8506▲	200-8546▲	200-8556▲
	0.688	0.075		Black Oxide	200-8412▲		
				Stainless	200-8413●		
	0.715	0.120		Stainless	400-8501●	400-8504●	400-8508●
	0.725	0.090	Yes	Black Oxide	200-8453▲	200-8463▲	200-8473▲
				Black Oxide	200-8454▲	200-8464▲	200-8474▲
			Yes	Stainless	400-8453●	400-8463●	400-8473●
				Stainless	400-8454●	400-8464●	400-8474●
	0.750	0.120		Black Oxide	200-8507▲	200-8677▲	200-8687▲
			Yes	Stainless	400-8507●	400-8527●	400-8537●
			Yes	Black Oxide	200-8517▲	200-8547▲	200-8557▲
	0.875	0.150		Black Oxide, O.D. Chamfer	200-8508▲	200-8678▲	200-8688▲
	1.200	0.120	Yes	Black Oxide	200-8713▲	200-8733▲	200-8763▲
7/16	0.660	0.120	Yes	Black Oxide	200-8718▲	200-8738▲	200-8768▲
	0.675	0.062	Yes	Black Oxide, rod bolt washer	200-8501▲	200-8671▲	200-8681▲
	0.705	0.090	Yes	Black Oxide	200-8770▲	200-8780▲	200-8790▲
				Black Oxide	200-8771▲	200-8781▲	200-8791▲
			Yes	Stainless	400-8770●	400-8780●	400-8790●
				Stainless	400-8772●	400-8782●	400-8792●

Red part numbers indicate new items

SAE WASHERS *(CONTINUED)*

❶ Inside Diameter	❷ Outside Diameter (in.)	❸ Thickness (in.)	❹ Chamfer	Other Details	1 PC-Bulk	2 PC-Pack	10 PC-Pack
7/16	0.750	0.063		Cad Plated	200-8419▲		
		0.073	Yes	Black Oxide, rod bolt washer	200-8502▲	200-8672▲	200-8682▲
		0.120		Black Oxide	200-8511▲	200-8521▲	200-8531▲
			Yes	Black Oxide	200-8518▲	200-8548▲	200-8558▲
	0.765	0.090	Yes	Black Oxide	200-8776▲	200-8786▲	200-8796▲
				Black Oxide	200-8778▲	200-8788▲	200-8798▲
			Yes	Stainless	400-8776●	400-8786●	400-8796●
				Stainless	400-8707●	400-8727●	400-8747●
	0.812	0.120	Yes	Black Oxide	200-8509▲	200-8529▲	200-8539▲
			Yes	Stainless	400-8509●	400-8529●	400-8539●
				Black Oxide	200-8510▲	200-8520▲	200-8530▲
	0.875	0.120		Black Oxide	200-8707▲	200-8727▲	200-8747▲
			Yes	Black Oxide	200-8512▲	200-8522▲	200-8532▲
	0.995	0.120		Black Oxide	200-8708▲	200-8728▲	200-8748▲
	1.300	0.120		Black Oxide	200-8429▲	200-8439▲	200-8449▲
	2.000	0.275	Yes	Black Oxide	200-8717●		
1/2	0.875	0.063		Cad Plated	200-8407▲		
		0.120	Yes	Black Oxide	200-8513▲	200-8523▲	200-8533▲
				Black Oxide	200-8514▲	200-8524▲	200-8534▲
	1.300	0.120		Black Oxide	200-8702▲	200-8722▲	200-8742▲
	1.350	0.245	Yes	Black Oxide	200-8703▲		
	2.000	0.275	Yes	Black Oxide	200-8749●		
9/16	1.000	0.120		Black Oxide	200-8515▲	200-8525▲	200-8535▲
			Yes	Black Oxide	200-8719▲	200-8739▲	200-8769▲
5/8	1.300	0.120		Black Oxide	200-8753▲		
	1.600	0.275		Black Oxide	200-8754●		
	2.000	0.275	Yes	Black Oxide	200-8755●		
3/4	1.750	0.275	Yes	Black Oxide	200-8714●		
	2.000	0.275	Yes	Black Oxide	200-8715●		

METRIC WASHERS



❶ Inside Diameter	❷ Outside Dia. mm (in.)	❸ Thickness mm (in.)	❹ Chamfer	Other Details	1 PC-Bulk	2 PC-Pack	10 PC-Pack
M6	22.6 (0.890)	4.2 (0.165)		Black Oxide	200-8711▲	200-8741▲	200-8761▲
				Stainless	400-8711●		
	25.1 (0.990)	1.7 (0.065)		Black Oxide	200-8676▲	200-8686▲	200-8696▲
M8	14.5 (0.575)	1.6 (0.060)		Black Oxide	200-8641▲	200-8642▲	200-8643▲
M9	17.0 (0.670)	3.0 (0.120)		Black Oxide	200-8757▲	200-8777▲	200-8797▲
	20.6 (0.812)	3.0 (0.120)		Black Oxide	200-8712▲	200-8732▲	200-8762▲
			Yes	Black Oxide	200-8729▲	200-8759▲	200-8789▲
M10	15.0 (0.591)	2.0 (0.078)	Yes	Black Oxide	200-8716▲	200-8736▲	200-8766▲
	16.0 (0.630)	1.9 (0.075)	Yes	Stainless	400-8503●	400-8523●	400-8533●
	19.1 (0.750)	3.0 (0.120)	Yes	Black Oxide	200-8705▲	200-8725▲	200-8745▲
				Black Oxide	200-8519▲	200-8679▲	200-8689▲
			Yes	Stainless	400-8519●	400-8520●	400-8521●
				Stainless	400-8524●	400-8534●	400-8544●
	19.2 (0.755)	2.3 (0.090)	Yes	Black Oxide	200-8455▲	200-8465▲	200-8475▲
			Yes	Stainless	400-8455●	400-8465●	400-8475●
	21.6 (0.850)	3.0 (0.115)		Black Oxide	200-8590▲	200-8591▲	200-8592▲
	22.0 (0.865)	4.1 (0.160)	Yes	Stainless	400-8502●	400-8522●	400-8532●
		3.2 (0.155)	Yes	Black Oxide	200-8706●	200-8726●	200-8746●
M12	19.1 (0.750)	3.0 (0.120)		Black Oxide	200-8516▲	200-8526▲	200-8536▲
			Yes	Black Oxide	200-8710▲	200-8740▲	200-8760▲
	22.2 (0.875)	2.3 (0.090)	Yes	Black Oxide	200-8428▲	200-8438▲	200-8448▲
		3.0 (0.120)	Yes	Black Oxide	200-8549▲	200-8550▲	200-8551▲
		2.3 (0.090)	Yes	Stainless	400-8428●		
		3.0 (0.120)		Black Oxide	200-8500▲	200-8527▲	200-8537▲
	25.3 (0.995)	3.0 (0.120)		Black Oxide	200-8752▲	200-8772▲	200-8792▲
	37.6 (1.480)	5.1 (0.200)	Yes	Black Oxide	200-8750●		
	39.4 (1.550)	7.0 (0.275)	Yes	Black Oxide	200-8751●		
M14	39.4 (1.560)	7.0 (0.275)	Yes	Black Oxide	200-8756●		
M18	73.7 (2.900)	11.4 (0.450)	Yes	Black Oxide	200-8793▲		

Red part numbers indicate new items

INSERT WASHERS

These handy washers are made to protect the top of holes from galling or collapsing around studs or bolts. They're ideal for head bolt holes, mid-motor plates, or any other high-wear area that requires a washer. Easy to install by just oversizing hole and pressing in washer. ARP Insert Washers are fully CNC machined from premium thru-hardened 8740 stock.

Note: Insert washers for Ford applications also listed in head bolts on page 58.

Insert ID	Insert OD	OD Size	1 PC-Bulk	2 PC-Pack	10 PC-Pack
1/4	0.318	0.562	200-8560	200-8565	200-8570
5/16	0.380	0.625	200-8561	200-8566	200-8571
3/8	0.443	0.750	200-8562	200-8567	200-8572
7/16	0.571	0.812	200-8563	200-8568	200-8573
7/16	0.529	0.875	200-8596	200-8597	200-8598
1/2	0.567	0.875	200-8564	200-8569	200-8574
M10*	0.500	0.790	400-8551		

* Stainless steel

WELD BUNGS

ARP has introduced a line of premium quality weld-in bungs. The parts are CNC machined from solid aluminum billet (6061) or 1018 mild steel. Applications include, but are not limited to: oil or fuel tanks, radiators, valve covers, manifolds, and rear axle housings. Fittings are available with female pipe threads, male AN, and female O-ring types. The fittings come in sizes: 1/4, 3/8, 1/2, 3/4, and 1 inch sizes; NPT -6 thru -20 AN; and -6 thru -20 O-ring sizes.

NPT

Aluminum		Steel	
Size	Part No.	Size	Part No.
1/4	800-8101	1/4	800-8201
3/8	800-8102	3/8	800-8202
1/2	800-8103	1/2	800-8203
3/4	800-8104	3/4	800-8204
1	800-8105	1	800-8205

AN Male

Aluminum		Steel	
Size	Part No.	Size	Part No.
AN6	800-8106	AN6	800-8206
AN8	800-8107	AN8	800-8207
AN10	800-8108	AN10	800-8208
AN12	800-8109	AN12	800-8209
AN16	800-8110	AN16	800-8210
AN20	800-8111	AN20	800-8211

AN O-Ring

Aluminum		Steel	
Size	Part No.	Size	Part No.
-6	800-8112	-6	800-8212
-8	800-8113	-8	800-8213
-10	800-8114	-10	800-8214
-12	800-8115	-12	800-8215
-16	800-8116	-16	800-8216
-20	800-8117	-20	800-8217

FASTENER ASSEMBLY LUBRICANT

ARP Ultra-Torque® fastener assembly lubricant has been specifically designed to reduce tension pre-load scatter and eliminate the need to cycle high performance engine fasteners before final installation. ARP Ultra-Torque® is a premier blend of extreme pressure lubricants combined with incredible anti-seize characteristics that perform amazingly well with all high performance engine fasteners.

Benefits of ARP Ultra-Torque®

• OBTAINS: 95%-100% of all ARP recommended installation pre-loads on the first pull, without cycling fasteners before final installation.

• MAINTAINS: all ARP recommended installation pre-loads within 5% on all remaining cycles, ensuring consistent and repeatable housing bores and/or cylinder bore dimensions (when using a honing plate) during machining, mock-up and assembly procedures.

• STABILIZES: all ARP fastener installation pre-loads within 5% between a group of fasteners such as the deck surface of a cylinder block, the main web of a cylinder block or across the cap of a connecting rod.

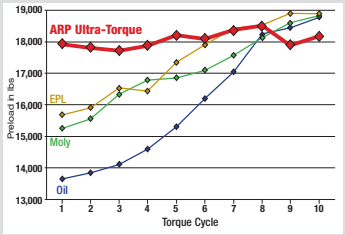
No matter what torque cycle you're on…ARP Ultra-Torque® delivers more consistent, more repeatable fastener tension pre-loads than any other lubricant on the market today!

- Prevents seizing and galling on all threaded fasteners.
- Prevents rust and corrosion during the life of the lubricant.
- 360˚F melting point.
- Metal Free

Product	Part #
ARP Ultra-Torque - (0.5 oz. pouch)	100-9908
ARP Ultra-Torque - (1.0 oz. pouch)	100-9913
ARP Ultra-Torque - (1.69 oz. squeeze tube)	100-9909
ARP Ultra-Torque - (10 oz. brush top container)	100-9910
ARP Ultra-Torque - (20 oz. brush top container)	100-9911

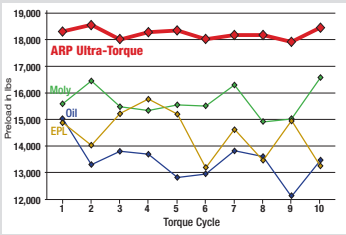
Lubricant Comparison Data

Installation Preload Scatter Comparison
(Target Preload 18,000 LBS @ 120 FT-LBS)



1	2	3	4	5	6	7	8	9	10
13,655	13,854	14,111	14,603	15,304	16,203	17,035	18,237	18,452	18,806
15,262	15,559	16,338	16,788	16,859	17,093	17,565	18,121	18,603	18,838
15,688	15,906	16,533	16,450	17,340	17,906	18,430	18,517	18,902	18,893
17,928	17,819	17,736	17,883	18,202	18,099	18,356	18,494	17,906	18,163

Fastener to Fastener Preload Comparison
(Target Preload 18,000 LBS @ 120 FT-LBS)



1	2	3	4	5	6	7	8	9	10
15,027	13,305	13,793	13,687	12,810	12,945	13,813	13,591	12,110	13,462
15,593	16,451	15,477	15,336	15,554	15,506	16,290	14,908	15,014	16,576
14,876	14,031	15,207	15,766	15,197	13,173	14,619	13,462	14,944	13,247
18,321	18,549	18,025	18,282	18,353	18,028	18,176	18,182	17,929	18,443

THREAD SEALER

ARP THREAD SEALER is a premium grade thread sealer that is designed for use on all wet deck cylinder block applications in order to prevent coolant leakage past the head bolt threads, while duplicating the recommended installation pre-loads associated with all ARP cylinder head bolts and studs. ARP thread sealer can also be used on pipe plugs, pipe fittings, fuel line fittings or any fitting that requires a flexible leak proof seal. ARP thread sealer is designed for use on aluminum, steel, stainless steel and plastic materials against coolants, water, gasoline, oil, natural gas and LPG.

- PTFE based formula w/rust & corrosion inhibitors.
- Effective range: -30˚ to 550˚F.
- Application: delivers a flexible leak-proof seal in aluminum, steel, stainless steel and plastic against coolants, water, gasoline, natural gas and LPG.
- Sealant range: 10,000 psi (pressure).
- Designed for use with bolts

Product	Part #
Thread Sealer (1.69 fl. oz.)	100-9904▲

Red part numbers indicate new items

ROD BOLT STRETCH GAUGE

We highly recommend using a stretch gauge when installing rod bolts and other fasteners where it is possible to measure the length of the bolt after tightening. It is the most accurate way to determine the correct pre-load in the rod bolt. Simply follow manufacturer's instructions, or *use the chart on page 30 of this catalog* for ARP fasteners. Measure the fastener prior to starting, and monitor overall length during installation. When the bolt has stretched the specified amount, the correct preload, or torque, has been applied. We recommend you maintain a chart of all rod bolts, and copy down the length of the fastener prior to and after installation. If there is a permanent increase of .001″ in length or more, or if there is deformation, the bolt should be replaced immediately. Don't chance it! A sample chart is as follows:

ARP offers a highly accurate stretch gauge with a dial indicator that reads in increments of .0005″. Features extra heavy springs for consistent repetition. Comes with a heavy-duty, insulated plastic carrying case for protection. A "must" for any serious engine builder.

Product	Part #
Stretch Gauge	100-9941
Stretch Gauge, billet-style	100-9942
Stretch Gauge, digital	100-9943

ROD BOLT EXTENSIONS

A long taper and full radius prevents nicking and scratching of crankshaft journals during connecting rod installation. ARP rod bolt extensions act as a guide during piston and rod installation – they will also hold the bearing shell in position in some applications. Available in 5/16″, 3/8″ and 7/16″ extensions are packaged in pairs and are hard anodize color coded for ease of identification.

Size	Part No.
5/16	910-0001
3/8	910-0003
7/16	910-0004
Set of 3	910-0005

ARP ROD VISE

Professional engine builders know that the best way to correctly install connecting rods is to resize the rods prior to installing them on the crankshaft. This involves installing the rod bolts using ARP Ultra-Torque and the correct stretch or torque value for your application. Once the rod bolts are properly installed, the rod journal is measured and machined to the proper size and tolerance providing correct bearing and oil clearance.

ARP's anodized aluminum rod vise securely holds the connecting rod while the bolts are being installed - without damaging the rod.

Size	Part No.
Rod Vise	100-9944

THREAD CLEANING CHASERS

ARP's handy thread cleaning chaser taps are designed with correct thread pitch and diameter to clean dirty blind or thru holes. Taps come in five USS sizes: 1/4″, 5/16″, 3/8″, 7/16″ and 1/2″, as well as metric. They are sold individually or in sets. Please note that these are strictly *cleaning* taps and are **not** designed to cut thread. They are a handy addition to the tool box of any serious engine builder and an essential aid to preparing any block for final assembly. Don't take a chance on weakening block and cylinder head threads. Use these handy thread cleaning chasers whenever possible!

Size	Part No.
1/4-20	911-0001
5/16-18	911-0002
3/8-16	911-0003
7/16-14	911-0004
1/2-13	911-0005
M6 x 1.00	912-0012

Size	Part No.
M8 x 1.25	912-0001
M10 x 1.25	912-0002
M10 x 1.50	912-0003
M10 x 2.00	912-0014
M11 x 1.25	912-0004
M11 x 1.50	912-0005

Size	Part No.
M11 x 1.50 x 152mm	912-0013
M11 x 2.00	912-0011
M12 x 1.25	912-0006
M12 x 1.50	912-0007
M12 x 1.75	912-0008

Combination Sets	Part No.
USS Combo Pack (5-pc) - 1/4, 5/16, 3/8, 7/16, 1/2	911-0006
Metric 1.25 Pitch Combo Pack (4-pc) - M8, M10, M11, M12	912-0009
Metric Combo Pack (4-pc, std. length) - M10, M11, M12 (1.50, & 1.75)	912-0010

SPARK PLUG INDEXER

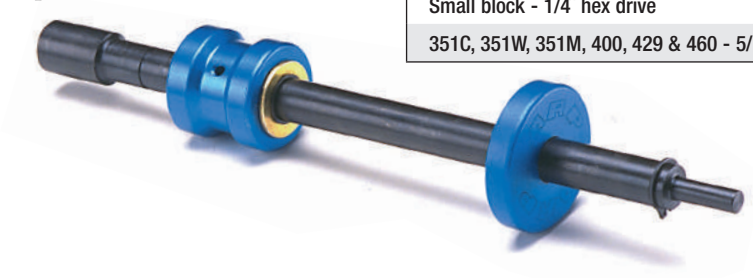
By allowing you to consistently position spark plug ground electrodes out of harm's way, the ARP indexing tool takes the guess-work out of installing spark plugs where the combustion chamber and high dome piston clearances is critical. Designed to fit in the palm of your hand, this tool eliminates the need to perform cylinder head calibration. Best of all, the ARP indexer is made from aluminum alloy with precision machined threads that allows you to proof the quality of spark plug threads before installation in expensive cylinder heads. Anodized for protection and quick recognition. For use with tapered gasket 14mm plugs.

Product	Part No.
Spark Plug Indexer	920-0001

OIL PUMP PRIMER KITS

Those first moments an engine runs prior to building oil pressure are when damage can easily occur. ARP's Oil Pump Primer Kit lets you spin the oil pump with a drill motor and bring up the oil pressure prior to starting the engine. This prevents any unnecessary wear or damage to rotating, reciprocating and valve train components. ARP's rugged primer shafts are rated at **170,000 psi** to ensure extended service life of this valuable tool. They feature a special billet aluminum sleeve that accurately positions the shaft and keeps it from wobbling.

Application	Part No.
CHEVROLET	
SB & BB and 90° V6 - 9.00″ O.A.L.	130-8802
FORD	
Small block - 1/4″ hex drive	150-8801
351C, 351W, 351M, 400, 429 & 460 - 5/16″ hex drive	150-8802



Red part numbers indicate new items

TAPERED RING COMPRESSORS

ARP's new ring compressors are CNC machined from 6061-T6 billet tube material and feature a true radius for each different bore diameter. What's more, they are relieved for wire O-rings on bottom. Type 3 anodizing is used for long life, and the bore size is prominently engraved in 3/4″ high numbers for easy identification. Standard stocking sizes from 3.552″ to 4.750″ (SAE) and 75mm to 100mm (metric). The true radius design is far superior to conventional "tapered" devices, and widely acclaimed by professional engine builders! This is truly the very best piston ring compressor on the market today.

SAE Sizes

Size	Part No.
3.552	899-5520
3.572	899-5720
3.630	899-6300
3.640	899-6400
3.650	899-6500
3.660	899-6600
3.740	899-7400
3.750	899-7500
3.760	899-7600
3.770	899-7700
3.780	899-7800
3.800	899-8000
3.830	899-8300
3.870	899-8700
3.880	899-8800
3.890	899-8900
3.900	899-9000
4.000	900-0000
4.005	900-0050
4.010	900-0100
4.016	900-0160
4.020	900-0200
4.030	900-0300

Size	Part No.
4.036	900-0360
4.040	900-0400
4.055	900-0550
4.056	900-0560
4.060	900-0600
4.065	900-0650
4.070	900-0700
4.075	900-0750
4.080	900-0800
4.090	900-0900
4.095	900-0950
4.100	900-1000
4.105	900-1050
4.110	900-1100
4.115	900-1150
4.125	900-1250
4.130	900-1300
4.135	900-1350
4.140	900-1400
4.145	900-1450
4.155	900-1550
4.165	900-1650
4.170	900-1700

Size	Part No.
4.175	900-1750
4.180	900-1800
4.185	900-1850
4.187	900-1870
4.212	900-2125
4.220	900-2200
4.232	900-2325
4.235	900-2350
4.250	900-2500
4.255	900-2550
4.260	900-2600
4.270	900-2700
4.280	900-2800
4.290	900-2900
4.300	900-3000
4.310	900-3100
4.320	900-3200
4.330	900-3300
4.350	900-3500
4.360	900-3600
4.375	900-3750
4.390	900-3900
4.400	900-4000

Size	Part No.
4.440	900-4400
4.470	900-4700
4.500	900-5000
4.530	900-5300

Size	Part No.
4.560	900-5600
4.600	900-6000
4.625	900-6250
4.675	900-6750

Size	Part No.
4.700	900-7000
4.720	900-7200
4.750	900-7500

Metric Sizes

Size (mm)	Part No.
70.00	901-7000
75.00	901-7500
75.50	901-7550
76.00	901-7600
76.50	901-7650
77.00	901-7700
77.50	901-7750
78.00	901-7800
78.50	901-7850
79.00	901-7900
79.50	901-7950
80.00	901-8000
80.50	901-8050
81.00	901-8100
81.50	901-8150
82.00	901-8200

Size (mm)	Part No.
82.50	901-8250
83.00	901-8300
83.50	901-8350
84.00	901-8400
84.50	901-8450
85.00	901-8500
85.50	901-8550
86.00	901-8600
86.50	901-8650
87.00	901-8700
87.25	901-8725
87.50	901-8750
87.75	901-8775
88.00	901-8800
88.50	901-8850
89.00	901-8900

Size (mm)	Part No.
89.50	901-8950
90.00	901-9000
90.50	901-9050
91.00	901-9100
91.50	901-9150
92.00	901-9200
92.50	901-9250
93.00	901-9300
93.50	901-9350
94.00	901-9400
94.50	901-9450
95.00	901-9500
95.50	901-9550
99.50	901-9950
99.75	901-9975
100.00	901-1000

RING SQUARING TOOLS

Part No.	Side 1		Side 2	
	mm	inch	mm	inch
902-8086	80	3.150	86	3.386
902-8793	87	3.425	93	3.661
902-9400	94	3.700	100	3.937
902-0107	101	3.976	107	4.212
902-0815	108	4.252	115	4.527
902-1622	116	4.567	122	4.800

Six new dual size ring squaring tools designed to make fitting piston rings as accurate as possible. These tools are CNC machined from 6061-T6 billet tube material and Black Anodized to a brilliant finish. The bore sizes are prominently engraved for easy identification and range in bore sizes from 3.150″ to 4.800″ SAE and 80mm to 122mm Metric.

SHIRTS & SWEATSHIRTS

ARP Red Logo Pocket T-shirt
100% cotton black T-shirt with small logo on pocket and large logo on back
S, M, L, XL, XXL

ARP White Logo Pocket T-shirt
100% cotton black T-shirt with small logo on pocket and large logo on back
S, M, L, XL, XXL

ARP Logo Bolt Graphic T-shirt
100% cotton T-shirt with small logo on left breast, large graphic on back
S, M, L, XL, XXL
White, Heather Grey, Black

ARP Logo Sweatshirt
Cotton/Poly blend sweatshirt with embroidered logo on front
S, M, L, XL, XXL
White, Heather Grey, Black

ARP Logo Zip Hoodie
Cotton blend hooded sweathshirt with embroidered ARP logo
S, M, L, XL, XXL
Heather Grey

ARP Logo Zip Hoodie
100% cotton T-shirt with embroidered ARP logo
S, M, L, XL, XXL
Black

Red part numbers indicate new items

ARP Logo Golf Shirt
100% polyester golf shirt with embroidered logo
S, M, L, XL, XXL

ARP Logo Silk Button Up Shirt
100% silk with embroidered logo, roomy and meant to be worn untucked
S, M, L, XL, XXL

HATS

ARP Adjustable Fit Ball Cap
embroidered logo
one size fits most

ARP Flex Fit Ball Cap
embroidered logo
S/M or L/XL

ARP Knit Beanie
embroidered logo
one size fits most

WORK WEAR

ARP Logo Work Jacket
fully lined work jacket with zip front and front pocket, embroidered logo
S, M, L, XL, XXL

ARP Embroidered Logo Patch

ARP Logo Shop Apron
Cotton polyester blend shop apron with three pockets and embroidered logo
one size fits most

Red part numbers indicate new items