

Product Feature Guide





Manufactured in Italy, Vertex, the premier brand of OEM replacement pistons, is the OEM supplier to KTM and numerous European motorcycle and go-kart manufacturers. Vertex offers enthusiasts state-of-the-art, high-quality pistons for nearly any powersport use from motorcycles and ATVs to marine and karting. Manufactured to the highest standards in Japan, Vertex's piston rings are produced by the OEM suppliers so that they are direct OEM replacements. Vertex is the choice of those who truly seek the optimum in powersport performance in any application.



Cast vs. Forged What's better and why:

Vertex Two-stroke Pistons

Because of a cast piston's ability to contain higher silicon content compared to forged pistons, and because two-strokes have lower cylinder pressures when compared to four-strokes, cast pistons are ideal for two-stroke engines. Vertex pistons are gravity cast from an aluminum alloy with 18% silicon content. Silicon is important because:

- It decreases thermal expansion, which changes the geometry after the piston reaches operating temperature. With low thermal expansion characteristics, Vertex pistons can be run at tighter tolerances compared with forged pistons. This creates better power and performance, also making them less susceptible to rattling or breaking.
- Silicon gives the pistons better wear characteristics and prolongs piston life by decreasing wear on the piston skirt.





Vertex Four-stroke Pistons

Four-stroke engines have much higher cylinder pressures when compared to two-strokes and are generally manufactured from forgings. To handle the internal pressures of a four-stroke engine, Vertex's four-stroke pistons are forged from the highest quality 2618 aluminum alloy for superior strength and durability. Vertex uses unique piston profiles and compression ratios, offered in A, B, C and D sizes, to maximize power and performance while reducing blow-by and oil consumption.

Aiding in the break-in process and reducing wear, every Vertex piston has a Molybdenum Disulphide (MOS2) coating on the piston skirt.

Vertex Wrist Pin Features:

- KTM four-stroke wrist pins are DLC coated.
- Case hardened wrist pins are used with all Vertex pistons.
- Nitride coated pins are normally used for high performance four-stroke engines utilizing a bronze bushing or with engines using a steel connecting rod without bearings. This hardened surface is highly wear resistant and provides anti-galling properties.
- Nitriding is a highly specialized surface treatment that produces a highly wear resistant surface. The significant advantage of nitriding is that the surface hardness is developed without quenching and the attendant distortion problems with case hardening. Finishing operations can be eliminated or held to a minimum.



Vertex Piston Rings

Vertex's latest generation two-stroke and four-stroke piston rings are nitride coated or chrome plated, increasing wear resistance and extending durability. Vertex piston rings are exact OEM replacements.

All Vertex Pistons Feature:

- Standard pistons and components are OEM replacements.
- Kits include piston, rings, wrist pin and circlips.
- All pistons are heat treated with a T-5 or T-6 hardening and tempering cycle.
- Replacement rings are sold individually.



Additional Vertex Products

- OEM replacement cam chains
- OEM replacement gasket kits — available as a top end kit, complete kit without oil seals or an oil seals only kit
- OEM replacement valves — available in titanium and stainless steel.



As an alternative to costly OEM cylinders or the time consuming process of re-plating existing cylinders, Cylinder Works offers enthusiasts access to a complete line of OEM quality dirt bike and ATV replacement cylinder kits. In addition to standard bore, stock compression replacement cylinder kits, Cylinder Works also turns up the horsepower with a full line of high-compression and big bore cylinder kits that *look just like stock, but they're not*. Each kit comes complete with the piston, rings and gaskets to get back on the trail or track quickly.

Cylinder Works OEM Replacement Cylinder Kits (standard bore/stock compression)



Replating or repairing an OEM cylinder takes time. And replacing an OEM cylinder with another OEM cylinder takes money — plenty of it. But Cylinder Works has a better answer: Get new now, get Cylinder Works!

Gone is the wait associated with replating and repairing, and so is the price tag — all without sacrificing quality.

Each Cylinder Works replacement cylinder kit is:

- Stock in appearance
- Precision honed
- Nickel silicon carbide plated
- OEM quality without the OEM price
- Pistons are hand matched for precision fitment

Cylinder Works High-Compression Kits (standard bore/high-compression)

As we all know, higher compression equals more horsepower and that's exactly what Cylinder Works high compression cylinder kits provide. Just like our OEM replacement cylinders, our high-compression cylinder kits *look like stock, but they're not*.

In addition to their stock appearance, Cylinder Works high-compression cylinder kits also feature precision honing, nickel silicon carbide plating and a price that's hard to beat.



Cylinder Works Big Bore Kit



With the exception of a mechanic, the Cylinder Works big bore kits provide everything you need to transform a bike or ATV from modest to monster in one box.

In addition to the stock appearing, nickel silicon carbide plated, precision honed, big bore cylinder, each kit contains:

- All needed gaskets and seals to complete the installation
- A Vertex big bore piston, complete with piston rings, wrist pin and circlips.

Why we use nickel silicon carbide plating

Nickel silicon carbide plating is used on the cylinder bore of every cylinder, standard and big bore, in the Cylinder Works line up.

The reasons for using nickel silicon carbide, as opposed to cast iron or chrome plating, are simple. Nickel silicon carbide allows for tighter tolerances between the piston and cylinder in larger bores, provides a low friction surface, is extremely durable and allows for greater heat dissipation to the water jacket.

All and all, the end result is a cylinder that not only yields higher performance, but will provide enthusiasts with a durable and reliable upgrade to their bike or ATV.





As the leader in innovation, design and development of aftermarket dirt bike and ATV high-performance camshafts, a set of Hot Cams is certain to give the added boost that dirt bike and ATV enthusiasts are looking for. CNC crafted from billet steel and with multiple stages to choose from for many applications, Hot Cams delivers the performance and feel of a custom cam for a fraction of the price. Ease of installation is also a big benefit when it comes to Hot Cams, as nearly all cams require no additional machine work and utilize the stock valve springs. And, as has always been the policy at Hot Cams, you can keep your original cams since a core exchange is never required.

Hot Cams Performance Camshafts

Designed, dyno proven and made in the USA, Hot Cams performance camshafts are one of the most economical, reliable and easy to install ways to add a 5-10% power gain to dirt bikes or ATVs. Additionally, every Hot Cams cam is:

- CNC machined for an exact fit and lobe profile.
- Created from 8620, billet, case-hardened steel.
- Engineered by utilizing state-of-the-art valvetrain software.
- Engineered to be drop-in cams that use stock valve springs.



Hot Cams Shim Kits and Refill Packs

For value and convenience, Hot Cams shim kits are the perfect addition to any tool box, garage or shop. With complete kits for modern Japanese 250 and 450Fs, as well as the new 8.90mm shim for KTM bikes, these shims make valvetrain maintenance a snap.

Plus, for those with existing shim kits that might be running low, Hot Cams also offers shim refill packages to keep the kit complete and always at the ready.



Hot Cams Builder Series Cams and Gold Series Cams and Springs



The newest additions to the already impressive array of Hot Cams performance camshafts are the Builder Series Cams. The Builder Series Cams, like the standard line of cams, are rooted around ease of installation and genuine, usable performance increases. However, these cams take it a few steps further.

The new Builder Series and Gold Series cams are aimed at enthusiasts and engine builders that are looking for the optimum in performance, flexibility and reliability. More importantly, Gold Series cams are designed to compliment modified engines using such things as big bore cylinders, high compression pistons and performance exhausts. Additionally, many applications will see a wide variety of cams to transform and tune your engine to your specific needs. Whether it's endurocross or flat track racing, there's a Gold Series or Builder Series cam to hone the powerband just as it's needed.

Unlike the standard Hot Cams, the Gold Series cams utilize the new line of Gold Series springs. These springs,

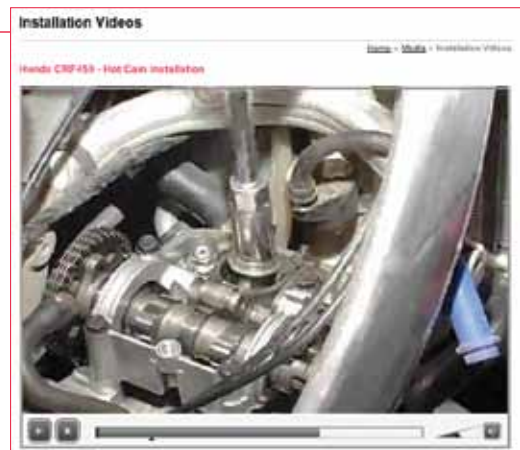
crafted from premium quality Japanese spring steel, allow for greater flexibility in the cam design and ensure that the valvetrain will remain at its peak performance and trouble-free.

Simply stated, Hot Cams Builder Series and Gold Series cams are modified cams that are specifically tailored to *unleash the power within* modified engines.

Online Installation Videos and Dyno Charts

Need a little brushing up on how to install cams or just curious what all is involved in doing so? From removing that first bolt to breaking in newly installed cams, Hot Cams has free, detailed, step by step videos available online at hotcamsinc.com.

Also online, is an extensive library of Hot Cams dyno charts so you can see exactly where the power gains are coming from and what Hot Cam is best for you.





Pivot Works is the fast, easy and complete solution when it comes to rebuilding a dirt bike or ATV chassis or suspension. Each Pivot Works kit contains all the necessary components (bearings, seals, pins, spacers, collars, thrust washers and thrust bearings) needed to finish the job without ordering a laundry list of parts. Better yet, all Pivot Works kits meet or exceed the quality of the OEM parts they replace and at a fraction of the cost. And, for those looking for a little assistance in getting their kit installed, Pivot Works posts assembly drawings and installation videos online.



A A-Arm Upper & Lower Kits

- Will replace both left and right sides
- Restores steering control

B Fork Rebuild Kits

- Only complete fork rebuild kit on the market
- Includes every wear item in one package
- Restores plush fork action
- Seals exceeded 1,000,000 strokes during R&D testing

C Fork Seal Kits

- One kit does both fork legs
- Oil seal and dust wiper set

D Front Wheel Bearing & Seal Kits

- ATV kits will do both front wheels
- Restores steering and handling

E Linkage Kits

- Restores rear suspension action and handling
- Contains all bearings, seals, pins, collars to save time and money
- Does not include lower shock bearing

F Rear Wheel Kits

- ATV kits will repair both rear wheels or the axle carrier bearings
- Includes all bearings and seals

G Shock Bearing Kits

- Both upper and lower shock mount bearings
- Eliminates the play of a worn out shock mount

H Steering Stem Kits

- Tapered needle roller bearings to replace both upper and lower steering stem bearings
- Restores smooth steering response
- Exact OEM replacement kit for top and bottom bearings, seals and races

I Swingarm Kits

- Restores smooth swingarm action
- Needle bearing upgrade for mini bikes



New From Pivot Works



1 Watertight Wheel Collars

To extend the life of the wheel bearing, these collars are specially designed to prevent water from entering between the collar and axle.



3 Shock Rebuild Kits

Complete kit to rebuild the internal components of the rear shock.



2 Shock Preload Thrust Bearings

To help prevent rear shock spring binding during compression and preload setting, Pivot Works now offers a new line of thrust bearings to smooth the ride.



4 ATV Front Hub Conversion Kits

Replaces ball bearings with tapered bearings for an upgrade in front wheel bearing durability and performance.

Also new...

New Gas Gas & Husqvarna Kits

Chassis and suspension rebuilding kits for these European brands.

Street Applications

Building on the success of our complete kits for off-road applications, now sport, cruiser and touring bike riders have front and rear wheel bearing kits available to them.





Hot Rods, the “Original Cranks and Rods,” has been making the best aftermarket crankshafts and connecting rods for over a decade. Customers have come to recognize that there is no substitute for the quality of Hot Rods products. Moreover, all Hot Rods cranks and rods can be had for considerably less money than OEM, but without any sacrifice to quality. And, for those dirt bike and ATV riders seeking added performance from their mount, Hot Rods offers a full line of stroker crankshafts. These cranks will not only provide the power that riders seek, but do so without additional machine work or spacer plates — and most utilize the stock piston.

Hot Rods Connecting Rods

One single connecting rod is where it all began for Hot Rods and, now, with over a decade of experience, continuously improved designs and an ever expanding line of applications; Hot Rods has continued to be, not only “The Original” aftermarket replacement rod, but the best aftermarket replacement rod.

All of our rods are created from 8620 case hardened steel. But, in addition to that, our rods also undergo a process of double forging which helps to improve grain flow as well as dimensional consistency — and that means a rod of uncompromising strength.

To improve fatigue durability, all of our rods are also shot peened. This process, utilizing a stainless steel shot, helps to remove stress risers and creates more smoothly blended radiuses. And, in the end, a Hot Rods connecting rod is one of the most durable rods that enthusiasts and engine builders can buy.

However, a rod is only as good as its supporting parts and that’s why a Hot Rods kit features only the most advanced and durable bearings, crank pins and thrust washers. Case hardened, silver coated, flat profile KU bearings are used throughout our entire line and high-quality, long shouldered KZ bearings are used in our two-stroke wrist pin bearing applications. In short, our bearings are just as tough and reliable as our rods.

Even our crank pins are subjected to the same rigorous standards as our rods and bearings. Each Hot Rods crank pin is created from hot-rolled ASTM 4115 steel and case-hardened to a level of 58–62 Rc.



Additional Hot Rods connecting rod features:

- Double-honed bearing surfaces to provide a reliable, high RPM rod
- Double-drilled small ends for increased lubrication
- Bronze bushings in the small end of all four-stroke rods to maximize durability under high-loads.
- Specially designed vent slots in the large end of all two-stroke rods for improved lubrication
- Side scalloping on large end to minimize high RPM rod distortion

Hot Rods Crankshafts

Building on the success of high-quality, OEM replacement rods, Hot Rods introduced the perfect place to showcase them — in a Hot Rods OEM replacement crankshaft. Since that time, Hot Rods crankshafts have been regarded as the premier alternative to costly manufacturer cranks. But, in addition to being a cost effective alternative, Hot Rods crankshafts also bring a level of uncompromising quality, design and innovation not seen in its competitors.

One such innovation would be the Hot Rods line of drop-in stroker crankshafts. Not only do these stroker cranks bring about a heightened level of performance, but do so without costly case machining, custom cam chains and spacer plates. Better yet, many Hot Rods stroker cranks even utilize the engine's stock piston.

Additional Hot Rods crankshaft features:

- All crankshafts are sold complete and ready for installation with the original proven Hot Rods Connecting Rods, top end bearings, and crankshaft webs
- Factory assembled and trued to OEM specifications, Hot Rods Cranks will meet or surpass the OEM in performance and durability
- Crankshafts are fully rebuildable with genuine Hot Rods connecting rods and bearings
- Multi-cylinder applications are sold complete with main bearings (unless specified otherwise).
- Two and four-stroke applications available



Hot Rods Main Bearings and Seals

To compliment Hot Rods full line of OEM replacement and stroker crankshafts are Hot Rods complete main bearing and seal kits. Like other Hot Rods products, these main bearing and seal kits are built to the highest quality standards that meet or exceed those of OEM.

Additionally, not only will Hot Rods main bearing and seal kits work in rebuilding a Hot Rods crankshaft; but, they also work in rebuilding OEM cranks as well.



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Hot Rods, Inc.
hotrodsproducts.com



Hot Cams, Inc.
hotcamsinc.com



Vertex Pistons, Inc
vertexpistons.com



Cylinder Works, Inc.
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