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HK

MR 556 A1

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BOOK OF THE AR-15

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HK

BY ERIC R. POOLE

EXPERIENCE CULMINATES IN THE LONG-ANTICIPATED HK MR556A1.

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The HK416 has been hailed the most significant development to ever come of the Stoner rifle system. It brought international attention to the benefits of a short-stroke gas-piston system, and this one has been proliferated for service by 16 nations and counting. The problem was that if you were not a U.S. SOCOM operator or part of a progressive and well-funded law enforcement agency, you couldn't get one. No more. A decade has passed since development of the HK416 began, and the long-awaited civilian variant has finally arrived. Everyone, please welcome the MR556A1.

THE FAMILY TREE

The MR556A1 is a direct descendant of the HK416, and the HK416 started life as a modified variant of the Colt M4. The most significant aspect of both the MR556A1 and the HK416 is a proprietary gas-piston operating system, which employs a piston and a solid operating push rod in place of the gas tube found on a direct-impingement AR. This short-stroke gas-piston system was derived from the HK G36, which was inspired by the ArmaLite AR-18 dating back to 1963. Although the AR-18 was never adopted by any nation, it is said to have influenced historically significant small arms, such as the British SA80 service rifle and Steyr AUG.

In response to complaints leveled against the SA80 family after the Persian Gulf War, the UK Ministry of Defence (MOD) commissioned a report that criticized 50 points on its standard-issue rifle. An extensive modification program was contracted in 2000 to HK, which at that time was owned by British small arms manufacturer Royal Ordnance. HK remanufactured more than 200,000 SA80-type rifles, which were designated the L85A2. Improvements included a new cocking handle, a modified bolt and extractor and a redesigned hammer assembly that improved reliability. The affected L85A2 rifles were branded with an "HK A2" mark on top of the rifle just forward of the buttplate. The improvements were well received among British troops. Two points are specifically relevant to the development of the HK 416: an improved HK steel 30-round magazine was created for the L85A2 and the fact that HK walked away with a coveted capabilities reputation for its successful fulfillment of a large-scale government contract.

Ernst Mauch, former HK CEO, is widely regarded as the father of the HK416, but the project started in 2000 with a team including Jim Schatz, Tom Kivlehan, Bruce Davidson and U.S. Special Forces operator Larry Vickers. At that time Vickers was still involved with the U.S. Special Forces Operations as a weapons research and development NCO, and during an unrelated visit, a discussion with Jim Schatz of HK arose regarding how to improve the M4 carbine. The M4 has always drawn criticism, but covert operators within U.S. SOCOM were using this carbine well beyond its design parameters.

DEVELOPMENT OF THE HK416

During my research for this article, I contacted Larry Vickers, and he referred me to a comprehensive article he wrote for hkpro.com in 2006. In it Vickers reported, "If you keep the M4 lubricated, use only Mil-Spec ball ammo (M855 and M193), use magazines in good condition and fire it on semiauto, it works very well. But as soon as you try to push it outside those limits, such as extreme firing conditions and extensive full-auto fire, as well as running it with little or no lube, you will have problems. In addition, trying to issue versions with shorter than 14½-inch barrels and suppressed fire are also big problem areas with the as-issued M4. The design is a carbine modification of the 20-inch-barreled AR-15/M16 weapon system. The M4 is pushing that design as far as it can go and still have an acceptable degree of service life and reliability. Any requirements beyond that design envelope will require a redesign or a new weapon."

Vickers' unit had been searching for an M4-style carbine that was smaller and more maneuverable in confined spaces. "This has been an ongoing effort to some degree ever since we had gone from MP5s to M4s," he said. "A lot of money had been spent on testing every short-barreled AR-style weapon we could find. At the end of the day, we came to the conclusion that none of them answered our needs. They may be fine for casual use, but they were not suitable for the demands we place on a weapon of that type."

But back then U.S. SOCOM did not have another viable weapon option. "In all honesty, none of them was even close," Vickers said. "At that time we began our search to other non-AR-style weapons, such as the G36C and the SIG SG552. Shortly after these other efforts began, we became aware of the HK offer of a product improvement program for the M4 carbine. HK had offered this to other key organizations in the U.S. military small arms community, with no takers. HK sought to borrow M4 carbines to analyze and begin an improvement process on, much like the SA80 program had proceeded. The program would be of no cost to the U.S. government with the understanding at the end of the program that the government had no obligation to purchase any product HK brought to the market."

The modifications process began with high-speed video of the M4 carbine while it functioned. After carefully analyzing the firing cycle, a series of modifications were put into motion to address the various issues associated with the M4. One key improvement had already been made: the HK steel magazine taken from the L85A2 program. At the time, these 30-round magazines were revolutionary and highly coveted. They featured a steel follower that wouldn't cant during the feeding process, however, the hard use in the field by influential operators ultimately brought on the more recent trend for polymer-body magazines with anti-cant followers. As an aside, an HK insider reports the company is actively exploring its own high-reliability polymer magazine.

"The main effort from the start of the project was to adapt the HK gas tappet system used

Former Master Technician Robert Hirt of HK GmbH was the primary demonstrator in the Over The Beach (OTB) testing of the HK416. The impressive results of these tests at Yuma Proving Grounds in 2003 immediately caught the attention of the small arms community after pictures and video were accidentally leaked to the Internet.

PHOTO COURTESY HK USA

in the G36 to the M4 carbine," Vickers said. "Engineers at HK Oberndorf had high regard for several design features in the AR-type weapon system, and they vowed to retain as many positive features as possible. However, HK engineers felt the direct-impingement gas system common in the AR community was less than optimum for military service. It was felt that the G36 gas system would be a perfect solution if it could be made to work within the M4 platform."

By working directly with U.S. SOCOM operators, HK engineers discovered the hidden killer of critical components, such as the bolt and extractor. Heat from the gases funneled into the bolt carrier through its gas key dries out lubricant and deposits carbon fouling. Carbon fouling is especially egregious with military ball ammunition, which uses filthy powders to achieve its high velocities. This reality shortens the service life of key operating components. With the HK G36 gas system, the operating parts stay much cooler and display a prolonged service life. Further, carbon fouling is significantly reduced because in the HK416 operating system there is no gas tube channeling gas into the chamber area.

"I have seen HK416-style weapons with over 26,000 rounds fired through them with no parts breakages of any kind and plenty of serviceable barrel life," Vickers said. "As I have demonstrated many times, the lack of heat transfer through the pusher rod of the gas tappet system and into the operating group is so dramatic that you can easily touch the pusher rod return spring and handle the bolt carrier in your bare hands after several magazines of full-auto fire. The distinct advantages of this gas system over the original gas-direct system are very impressive and have to be seen to be fully appreciated."

After working through several prototypes (a couple still reside on a wall in the HK Grey Room, in Sterling, Va.), HK finalized the adaptation of the gas system and fabricated the key internal bolt carrier components. Engineers then focused attention on the removable free-float rail system. A small unit within U.S. SOCOM had a requirement that the rail system allow access to the gas system for maintenance and return to zero for any rail-mounted devices, such as IR lasers.

Interestingly, the HKM4 did not feature a dust cover protecting the ejection port because HK engineers considered the fact that the G36 operates reliably without one. But concerns about American customers' perception about cutting corners overrode this decision, and dust covers were included. (The MR556A1 features a unique polymer ejection-port cover.) Innovations that did make it to the HK416 included a heavier buffer filled with tungsten powder riding within a stronger recoil spring and a lower receiver redesigned to included a beveled magazine well.

The resulting HK416 impressed the end-users, especially after witnessing an early HK416 fitted with a 10-inch barrel survive a 15,000-round endurance test. Vickers' unit placed the very first order for several hundred HK416s with 10-inch barrels.

The HK proprietary gas-piston operating system was developed from the HK G36. It uses a short-stroke piston that drives an op rod to force the bolt carrier to the rear and cycle the action. This design prevents hot gas from entering the receiver.

DoD PHOTO

PHOTO BY SEAN UTLEY

"M4"

The HK416 program was first designated the HKM4, but Colt filed a lawsuit against HK for patent infringement on the rifle design and trademark infringement on the term "M4." The suit was settled out of court under undisclosed terms. Interestingly, Bushmaster won a similar suit in 2005 when the court system ruled that the term "M4" is not proprietary to Colt and could not be claimed as such.

"No assault rifle in modern history has gone from development, testing, production and sustained combat operations more quickly than the HK416," Vickers said.

In 2006 U.S. Special Operations units in Joint Special Operations Command (JSOC) began fielding the HK416 as their primary carbine.

MR556A1: IT'S HERE!

Word of the success experienced by the HK416 in the military spread and quickly resulted in a surprising demand for a commercial model. For the last half decade, the standard HK response to inquiries was: "It's coming."

Vickers presented a familiarization lecture on the HK416 to select members of the press during the 2004 SHOT Show. At that event, he operated the HK416 without its upper handguard so spectators could view its operation, and after dumping several magazines through the rifle, he quickly removed the piston rod and bolt carrier assembly to illustrate physically how clean and cool the components were. Unfortunately, HK wasn't ready for the demand caused by the American reception it received in the weeks that followed.

The "MR" designation stands for "Match Rifle," and HK eventually used this prefix to label semiauto-only prototypes—the MR223 and MR308. Sightings of these rifles at SHOT Show only intensified the commercial demand. Not long after the BATF provided HK with written permission to sell upper receivers commercially in 2004, a few upper receivers found their way into the civilian market, drawing unprecedented prices—nearly $5,000 in a few cases—for years to follow.

Until the production of the MR556A1 began in 2010, not many upper receivers had made it to the American market due to import restrictions on the commercial sales of uppers.

PHOTO BY SEAN UTLEY

The MR556A1 includes the tungsten-filled buffer that is partly responsible for the high reliability of the HK416. It is designed to slow the bolt carrier during operation and reduce the recoil impulse.

DoD PHOTO

The HK416N went into service with Norway's armed forces in 2010 and replaced the Kongsberg AG-3 (aka HK G3A5) that had been in service since 1967. With its 16½-inch barrel, the HK416N closely resembles the MR556A1 and is typically issued with an Aimpoint CompM4.

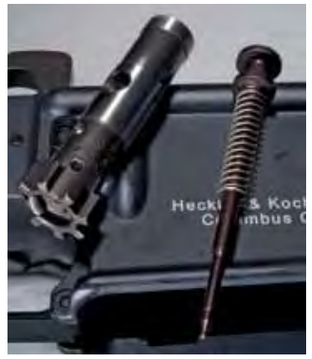
Until these restrictions were met, HK uppers remained a controlled item that could only be readily married to certain select-fire lowers. To adhere to U.S. government regulations, HK postponed introduction of the MR556A1 until it could be manufactured in the U.S. using American- and German-made components. HK set up production in Columbus, Ga., where the barrel blanks, bolt assemblies, machined handguards and fire-control groups arrive from Germany.

To the satisfaction of those in the know, the heavy barrel installed on the MR556A1 is the same German-manufactured product produced by the company's legendary cold-hammer-forging process. But unlike the HK416, the MR556A1 does not use a chrome-lined barrel. HK's position is, "Chrome lining can sometimes mask bore imperfections and negatively affect accuracy." Another insider's take is: "They don't want Americans screwing with the bores of its barrels. That's why they only allow Americans to machine and turn them."

The MR556A1 barrel is the heaviest of all HK416 profiles, to include the recently adopted M27 used by the Marine Corps. It still features a 1:7-inch twist suited for popular bullet weights ranging between 55 and 77 grains and is moderately swaged with a slightly smaller internal diameter at the muzzle. This feature is designed to impart a positive effect on bullet accuracy and velocity.

The 16½-inch barrel is capped with an A2 birdcage compensator that was designed decades ago to help minimize rise of the muzzle during sustained firing and reduce the dust signature experienced with the A1 flash hider on the M16 when fired from the prone position.

PHOTOS BY SEAN UTLEY



The bolt carrier group features all of the updates from the HK416 development, including a proprietary plated finish and an enlarged rear to address carrier tilt. Carrier tilt is often encountered with piston conversions when a standard bolt carrier is driven rearward and binds as it tries to enter the buffer tube at a slight angle.

On the inside of the bolt carrier assembly, the firing pin utilizes a spring and a captive firing pin retaining pin. Each of these features improves field maintenance by making parts easier to clean and more difficult to lose. Unique to the MR556A1 is a new firing pin safety system. An arm locks the firing pin in place and prevents it from coming into contact with the primer through the boltface unless the trigger is pressed. The top of the hammer disengages the firing pin safety as it rotates forward and allows the firing pin to strike the primer. This development was necessary because it was discovered that a heavy buffer and strong action spring can produce slamfires from the inertia imparted on the firing pin as the bolt moves to close and lock.

The bolt is loaded by a coil spring. As the bolt travels out of battery and moves to the rear for extraction and ejection, this spring helps influence the bolt to remain in a forward position and the cam pin vertical just after the bolt unlocks. Normally, gas passed violently through a gas tube and through the bolt carrier gas key to the bolt pushes the bolt forward from the rear. HK has determined that short-stroke piston systems need a system like this to ensure reliable operation.

The HK Free Floating Rail System (FFRS) never comes in contact with the barrel. The FFRS is a unique vented handguard featuring four MIL-STD Picatinny rails for the attachment of accessories. HK states, "The HK rail system can be installed and removed with simple tools and returns to zero when reinstalled." (The FFRS is removed and reinstalled with a 5mm Allen wrench.) An index integral to its top rail achieves a tight and uniform fit with the upper receiver.

Delivered with the MR556A1 is the classic HK-proprietary diopter sight system. Most notably, it features a rear sight drum with a V-notch for targets within 100 meters and three apertures ready to address point targets at 200, 300 and 400 meters.

To aid accuracy and consistent function, the MR556A1 features a precision-machined, two-stage trigger with minimal creep and overtravel. It requires an average of 7.6 pounds of pressure before the hammer is allowed to fall forward and strike the firing pin. To facilitate loading from a closed bolt, each rifle carries a charging handle wearing an extended latch (that can be switched to the opposite side) for easier manipulation when operating a rifle wearing a low-mounted optic.

The six-position retractable stock and stippled grip have become visual identifiers to many thirsty consumers looking through thousands of military action photos online. The stock features a unique arched recoil-reducing pad for a more intuitive and optimal shoulder fit, while a lock release lever engages the buffer tube to prevent any play with the stock when mounted.

PHOTO BY SEAN UTLEY

PHOTO BY SEAN UTLEY

USMC M27 IAR

DoD PHOTO

VICKERS' TAKE

"I don't necessarily believe that a piston AR is the right platform for everyone, but I still think that for short-barrel applications, the piston AR has a lot of merit. [The HK416] is without question the one piston AR that has seen the most combat and service use. The HK is the golden yardstick that everyone compares another piston system to—and for good reason. Now we have numerous piston systems offered by nearly all AR manufacturers. And this all started with the HK416. This is the gun used to kill bin Laden, and it's now the M27 IAR chosen for service with the U.S. Marines. If you have a need for a piston gun, the HK will always be the standard."

With the firing hand wrapped around the tactile grip, classic AR-style controls are familiarly located. The grip features a waterproof trapdoor at the bottom for storage of small items, such as batteries, small tools or other accessories.

Once you get past the color-keyed safety/selector pictograms often seen on HK small arms, you might notice that, unlike other ARs, the selector can be engaged to the "safe" position whether or not the hammer is cocked. This is sure to please a number of carbine instructors.

Unlike earlier prototypes and variants observed at industry trade shows and HK training events, the MR556A1 subassemblies are fully interchangeable with other high-quality AR-style firearms. Therefore, a forthcoming MR556A1 upper receiver kit can be used to retrofit other AR legacy systems. The lower will accept aftermarket stocks assemblies and pistol grips, as well as other Mil-Spec magazines.

A LONG-TERM RELATIONSHIP

I've been in a unique position to see the evolution of the HK416 and have had exclusive access to a significant number of them as the U.S. government considered them for military and civilian contracting service. I graduated from the very first HK416 armorer school put on by HK USA in 2006. Blackwater USA assumed training responsibilities for HK that year, so this country's largest inventory of HK416 variants were kept in the care of the armory where I worked. At the time, HK permanently located a custodian to accompany a cross-section of HK products and oversee their use by U.S. SOCOM operators and VIPs. I came to know these rifles quite intimately. At Blackwater, the HK416 family performed extremely well in training and required noticeably less maintenance than their M4 counterparts and impressed each operator that came through the North Carolina facility to train with it.

I've had one of these rifles on personal order for three years and finally got the call about a year ago that one was inbound. I wasn't about to rush to finish the assignment in a few weeks just to beat some other gun rag's questionable review to the newsstand. Like any other true enthusiast who has waited years for something special, I took it out to the range the same morning it arrived and chronographed a variety of loads before firing a baseline set of 100-yard accuracy results for reference.

In the course of the last year, I've fired 4,000 rounds of surplus M855 green tip through my MR556A1. It has never malfunctioned. Even after firing that many rounds, velocity still averages 3,100 fps, and five-shot, 100-yard accuracy results still float between .90 and 1.3 MOA using this ammunition and a Trijicon TA31. (Of course, I achieve consistent sub-MOA results when I attach a high-power optic and use Federal Gold Medal 69-grain ammunition.) I haven't even begun to near the end of this rifle's barrel life.

Fit and finish of the MR556A1 are superb—quite fitting of the stereotype seemingly applied to everything German. This rifle shoots tight and feels right. I've gone through the entire system many times and can find nothing to complain about. My conclusion, therefore, is simple: If ever a single carbine was worth $3,300, the MR556A1 is it. It has no rivals. AR-15

SPECIFICATIONS
HK MR556A1

TYPE	Gas-operated, short-stroke piston, semi-automatic
CALIBER	5.56 NATO
CAPACITY	20, 30 rds.
BARREL	16.5 in., cold-hammer-forged, 1:7 twist
OVERALL LENGTH	37.68 in. (extended) 33.9 in. (collapsed)
WIDTH	3.07 in.
HEIGHT	9.45 in.
WEIGHT	9.04 lbs.
STOCK	6-position, collapsible
FINISH	Matte Black anodized (aluminum), phosphate (steel)
TRIGGER	Two stage; 7 lbs., 6 oz. (tested)
SIGHTS	Elevation-adjustable post (front), windage and elevation-adjustable diopter (rear)
MSRP	$3,295
MANUFACTURER	Heckler & Koch hk-usa.com 706-568-1906