



# CONTROL THE FLOW

THE F&D DEFENSE .308 USES A PROPRIETARY GAS SYSTEM TO FINE-TUNE BARREL HARMONICS.

**JACOB GOTTFREDSON**

**B**rowning, Stoner, and Kalashnikov have dominated the modern assault style rifle genre for many decades. Will the name Corby Hall be labeled the next great innovator, giving the soldier and law enforcement personnel a more reliable, accurate, and capable rifle for the foreseeable future? His new rifle promises the reality of Fedor Tokarev's original vision.

Corby Hall, owner, designer, and builder, of F&D-Defense is a young engineer in possession of boundless energy, innovative thought, and an American entrepreneurial spirit. He

has spent enumerable hours in design and redesign and at the machines in his shop producing a rifle that promises greatness.

He supplied one of his rifles with

a Bushnell 3.5-21x50mm Elite Tactical Riflescope for testing. A Harris bipod came with it, and the scope was attached to the rail with a Spuhr mount.

The rifle was professionally packaged and shipped in two parts, lower and upper. Assembled, it is a machine with impressive lines and unique features.

Where to start? I urge you to bring up F&D's website and read it. I can't begin to get it all down here. If you have in mind to produce a best in class, there are some fundamentals to pursue. First was to choose cartridges used by both the military and LE proven to get



The heart of the system begins with the finely variable gas block. The knob at the forward end of the block can be turned for different bullet weights or for sluggish operation, but primarily for tuning barrel harmonics. How the gas drives the bolt carrier and how the gas is expelled required many months of design, redesign, and testing on the range to overcome what has been a challenge in previous DI systems. Note here also that additional accessory rails can be added to the forearm.



The charging handle is located on the left side of the upper receiver. From it protrudes a button, which is used as a forward assist. Place the big knuckle of your index finger on the button and depress it, grasp the handle, and with your thumb, move the charging handle forward.



Fit up of the forearm and barrel is unique. It is a major factor in the rifle's accuracy. The receiver also has a spent brass deflector.



The F&D Defense rifle will be manufactured in .308 (tested), .338 Lapua Magnum, and .260 Remington. A subsonic round is being designed as well. Except for accessories and the barrel, it is entirely designed and machined by Corby Hall in New Braunfels, Texas. Corby is currently using Lilja match-grade barrels. He chose to configure the operating system as a finely variable, gas-operated piston.

the job done. Thus, the rifle is offered in both .308 Winchester and .338 Lapua Magnum. From the competitive tactical genre, a .260 Remington will soon go into production as well as a subsonic cartridge.

The next obstacle was the choice of operating system. Although presented with problems in the past, the direct impingement piston system runs cleaner longer. The last decision was to use only the highest quality materials available and to both produce and oversee every part with the exception of the buttstock, pistol grip, and magazine. He is presently using Lilja match-grade competition barrels.

Now to solve the problems of past attempts: Corby recognized the piston semi-auto did not have the inherent accuracy of the bolt gun. The challenge was to discover why and make the necessary changes to overcome it. Primarily, this had to do with two problems. He used his engineering background to study the stresses, bending moments, shears, and torsion during the firing of gas-operated systems and began working on how to either overcome or redirect them. First was the gas block, a system that bends the barrel, causes differential barrel harmonics, and produces irregular gas flow during firing. He overcame these with the use of a proprietary, variable gas flow system that can be used much like a barrel tuner. Placement and the size of the gas hole were critical, as well as how and where that gas was directed. The block and gas hole are certainly not new. But how to configure them is key to taming barrel harmonics.

The finely adjustable gas valve allows the advanced operating system to reduce carbon fouling, excessive heat, and powder gases in the action,

ensuring reliability and function. The gas valve can be opened to increase gas flow when ammunition or adverse environmental conditions require more cycling energy. Gas flow can also be reduced or shut-off for use with suppressors to prevent stoppage or damage to the rifle when in the suppressor mode. The piston driven system also heats up more slowly. The gas valve can also be used to tune the rifle for different bullet weights. While all of the above is true, Corby's primary focus on the gas adjustment was directed at harmonics tuning.

The main feature on the gas valve is the design's ability to eliminate irregular gas flow turbulence. Pictures of this can be seen on F&D's website in the FD308 gallery section. That means Corby has been able to reduce the port size by 30 percent, which in turn means that the system uses approximately 25 percent less gaseous mass volume to cycle the firearm than other DI and Piston systems, resulting in lower felt-recoil, muzzle rise, and cleaner/smooth barrel harmonic patterns.

Lock up between the forearm, barrel, and receiver have been reinvented. "... bolt-on barrel/rail configuration for quick and repeatable barrel swaps and inspection; maintains higher rigidity than barrel-nut designs, and consolidates the absolute lowest and most compact rail-height available to any piston system. The F&D barrel interface maintains 8,200 pounds of rigid axial force against the upper receiver compared to 6,700 pounds with barrel nuts utilized across the industry. Other "quick-change" barrel systems maintain little to no axial force against the upper receiver (LMT). Axial barrel retaining force is one of the most significant structural contributors to accuracy and consistency of AR-style rifles."

F&D Defense manufactures their bolt and extensions in matching pairs, using the highest-grade material per MIL-S-7393. They are heat treated for maximum core strength; lugs are high-intensity shot-peened to increase fatigue life and resistance to stress-corrosion and then NP3-Plus coated. Corby's proprietary manufacturing process ensures 100 percent contact between all bolt and extension lugs to within 0.00005-inch, allowing a balanced distribution of force to each bolt lug, which significantly increases bolt/extension cycle life.

Excess gas in the self-cleaning system is vented out in the forward portion of the handguard just to the rear of the rifle's gas block through two vent holes in the piston rod.

The bolt and bolt carrier staying clean through hundreds of rounds,



A Geissele High Speed National Match Trigger is supplied with the rifle.



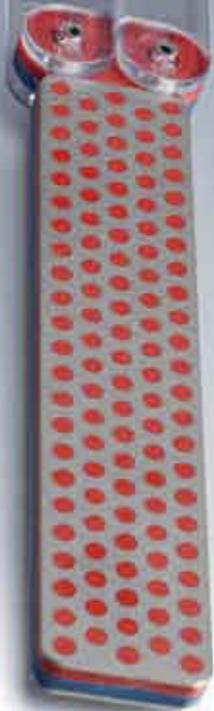
The integral striker plate is machined into the bolt carrier versus being screwed to the bolt carrier like a traditional AR. Grooves in the bolt carrier allow sand and other foreign matter to pass through without jamming or producing sluggish operation, which translates to greater reliability in adverse conditions. The charging rod can be seen here in the rearward position. The charging handle is located on the left side of the rifle.

lubricant not drying out, plus the advantage of being able to regulate the stroke of the piston in dirty, sandy conditions will significantly help in adverse environments.

I shot ammo from 10 different manufacturers: Focchi Match 168 and 175 grain, ASYM Precision 168 and 175 grain, Winchester Match 168 grain, Black Hills Match 168 and 175 grain, M118, Sellier & Bellot Match 168, and Lapua Scenar 167 grain. I also shot five different handloads. After mounting the scope and sighting in, all shots through many shooting sessions held point of impact inside a 1.5 inch circle. The ammo it did not like shot groups inside that circle of about 1.2 inches. The bulk of the ammo shot 0.75 inch, and the ammo it liked the best shot about 0.45 inch. I never touched the scope's dial at 100 yards after sighting in that first time. Think about the potential benefits of that. It suggests that no matter what ammo or lot of ammo your department issues you on the spur of the moment, it will deliver. But if you have time, a bit of tuning with the variable gas block, and it may shoot even better.

I shot four mornings per week for several weeks. Temperature was 70 to 80 degrees F, elevation 60 feet, and little or no wind. I cleaned the bore after every 30 rounds, but I did not clean the interior, the carrier, or the bolt. The rifle

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continued to shoot flawlessly with no malfunctions, and the carrier and bolt remained clean without the lubricant becoming dry or the carrier being full of powder dust.

I had to wait out a weather system that was blowing through, but once it moved out, the wind dropped to near zero. I took the rifle to 400 yards, set out a LaRue steel silhouette target, moved the dials and began shooting. Although a bit on the heavy side, it is small rifle. Yet, the recoil is slight, and I could see splash. Without a spotter, that is critical. I spray paint the steel white with a 3-inch orange aiming point in the middle of the chest. This allows me to see hits in the white at long range with ease. I saw the hit from the first bullet in the white just to the left of the orange dot. No problem. But I could not see the 5 subsequent shots. I thought I must have been missing the target. I drove to the LaRue to see and discovered that all the FIOCCHI Match 168-grain bullets fired were in almost the same spot. That brought a smile to my face. I changed to the Sellier & Bellot 168 Match ammo and fired three more shots that I could not see well, but it appeared that they might have hit the orange dot. Once again I drove to the target. What I saw was a very pleasing little group. The result was so beautiful, that I packed up the rifle and went back to work. Some of you will grumble at the 3-shot groups, and I would not blame you. However, I shot many rounds through this rifle over a 4-month period. I tried to keep the rifle cool during these outings and not return a barrel to Corby with a burned lead. The question is: Are the results representative of the rifle's accuracy? I believe so. They repeated

### FD308

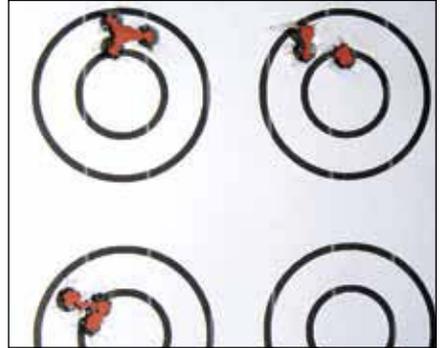
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**Action:** High-efficiency adjustable gas-piston system, **Caliber:** .308 Win, match chambered, **Capacity:** 20, **Barrel:** Lilja 416 stainless, 1:11" twist, **Barrel Length:** 17", 21", **Finish:** Hardcoat Anodized, **Trigger:** Geissele High Speed National Match, **Weight:** 9.4 pounds, **Price:** \$3,195

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**Power Range:** 3.5X, 21X, **Objective Diameter:** 50mm, **Click Adjustments:** .34", **Tube Diameter:** 34mm, 1-piece, **Overall Length:** 13.2", **Finish:** Matte black, **Reticle:** G2 or Mil-Dot, **Price:** \$2,119.95



Jacob put several different manufacturers' ammo through the rifle as well as handloads and this barrel liked several rounds. FIOCCHI 168-grain Match, Sellier & Bellot 168-grain Match from the Czech Republic, and Jacob's handloads did well at 100 yards (above). Jacob did not try the variable gas adjustment to "tune" the ammo if it did not shoot well. Jacob took the rifle to 400 yards and tried both the FIOCCHI and the Sellier & Bellot 168-grain match ammo. Again, both did exceptionally well. Shown is the group (below) with the Sellier & Bellot. The LaRue steel is 11.75 inches wide by 24 inches tall. The orange circle is 2.88 inches in diameter, and the group measures 1.2 inches. Working backwards, that would translate to 0.3 inch at 100 yards.



themselves over and over with my handloads and two of the manufacturer's ammo. Could I have "tuned" the ammo that shot 1.2-inch groups at 100 yards, using the variable gas block? Maybe, but I did not try since I my hands were full as it was.

Bottom line: The F&D-Defense FD308 is pleasant to shoot, operates reliably, needs little cleaning, is machined beautifully, sports a competition match-grade barrel and trigger, is innovatively engineered, and I wish I owned it. Are there any cons? Let me think ... well no. The trigger had way too much travel for my taste, but that can be easily removed, since the trigger is fully adjustable. If the charging handle is to the rear when you decide to hit the release, don't have your hand in the way. And finally, it is a bit out of my price range or I would own it. **GRK**

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