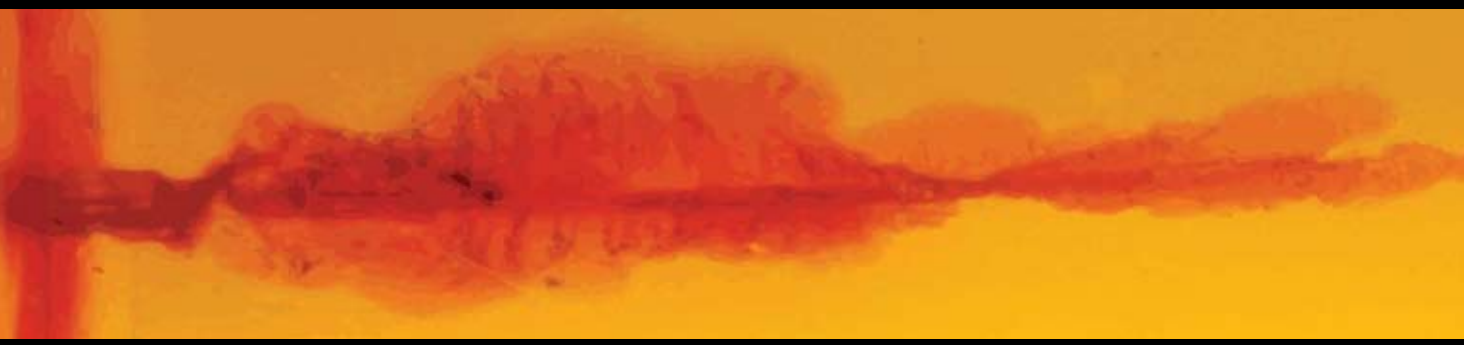
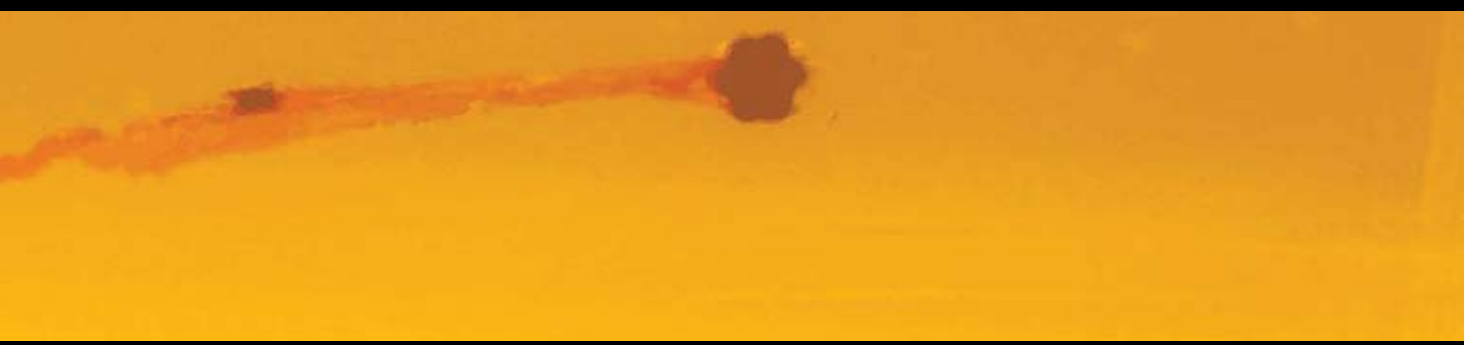
One Problem



Two Solutions

Photo courtesy of Hornady Mfg. Co.



Defensive handgun ammunition is a product that you literally stake your life on with each pull of the trigger. Winchester and Hornady have taken two decidedly different tacks on new products designed to meet such needs.

BY AARON CARTER, Managing Editor

"It is intended for across-the-room distances and last-ditch self-defense. Our reasoning was that if you were shooting through a barrier—car door, sheet metal, glass, et cetera—you're probably going to have legal ramifications."

"It is capable of penetrating a wide range of barriers and still providing the knockdown needed to stop a threat. If you think about a threat situation the bad guy will probably be looking for something to hide behind, not standing in the open letting you shoot at him or her. This is designed for many of those situations."

The former, from Hornady Mfg. Co. Chief Ballistics Scientist Dave Emary, and the latter, from Winchester Ammunition Centerfire Product Manager Glen Weeks, represent two starkly different approaches to a common goal—stopping a deadly threat from an assailant. The products, Hornady Critical Defense and Winchester Bonded PDX1, represent the most up-to-date personal-protection ammunition available, and are a "reinventing of the wheel," so to speak, to create superior products within each company's lines. In fact, the loads are likely to displace well-regarded offerings within the companies, as well as shake up the industry.

Hornady Critical Defense FTX

Since 1989, Hornady's foremost self-defense bullet, which pulls double-duty for handgun and muzzleloader hunting, has been the eXtreme Terminal Performance (XTP). In most offerings, the non-bonded XTP yields weight retention in excess of 95 percent by way of the company's patented Interlock groove, as well as jacket design. The XTP's drawn jacket, which progressively thickens along its length, works in conjunction with a swaged core that is uniform in density for controlled, balanced expansion through a range of velocities. A cavernous cavity and precise folds in the nose, the latter of which create six symmetrical sections, strategically weaken the jacket for "preprogrammed" performance, offering reliable expansion at low velocity, while also preventing fragmentation at high velocity. The bullet's jacket protects the XTP's nose and, as no lead is exposed at the meplat, terminal performance and function in semi-automatic handguns are enhanced. The XTP is recommended for muzzle velocities from 700 f.p.s. to 1500 f.p.s., while its stouter counterpart, the XTP Mag, is preferred for higher velocities—from 1200 f.p.s. to 2300 f.p.s.

So successful was the XTP in Hornady's Custom ammunition that in 2005 Hornady unveiled its TAP FPD line of self-defense-specific ammunition, which featured the XTP bullet in its handgun offerings. In addition to the XTP, TAP FPD ammunition features nickel-plated cases for improved feeding, and therefore reliability, as well as corrosion resistance—a particular concern for discreet carry handguns, which are oftentimes exposed to perspiration. With this, Hornady paired high-quality, load-specific primers with special propellants, the latter of which were designed to preserve night vision by minimizing muzzle flash.

But, as good as it is, like most hollow-point projectiles the XTP's cavity can clog with debris when penetrating clothing—particularly heavy garments. This can slow, minimize or prevent expansion, resulting in reduced energy dispersal and tissue damage, as well as increase the potential risk of over-penetration. This problem is worse in low-velocity cartridges—typical of what are found in many concealed-carry handguns. As such, Hornady "… sought to improve the terminal performance of marginally effective cartridges that don't generate enough velocity to give reliable expansion, especially when real-world barriers such as heavy clothing or a leather coat are encountered," reported Emary. The company also addressed the issue of recoil, as oftentimes these chamberings—.380 ACP, 9 mm Luger and .38 Spl.—are found in compact, lightweight handguns.The resulting product is Critical Defense. By combining prior technological advancements utilized in the LEVERevolution (March 2006, p. 30) and TAP FPD lines, Hornady engineers were able to create an ammunition superior in self-defense situations to its predecessors in both the Custom and TAP FPD lines.

From the company's LEVERevolution line, Emary borrowed Flex Tip eXpanding (FTX) bullet technology. Pre-filled in the Critical Defense bullets' cavities is a slightly different mixture of the proprietary red, elastomeric polymer, which Emary described as "a pseudo hydrostatic material," utilized in LEVERevolution projectiles. For Critical Defense, its primary purpose is to prevent the cavity from clogging with fabric, which would inhibit consistent expansion; however, not only does the rubber-like substance eliminate blockages, it aids expansion, imparting equal pressure across the entire bullet cavity for uniform expansion. Although performance varies with velocity, Emary reports 1.4- to 1.7-times-caliber expansion, with 99 percent weight retention—the FTX material, which weighs approximately 1 gr., is the only weight shed.

According to Emary, "FTX technology provides 100-percent-reliable and -consistent expansion and lowers the velocity threshold at which the bullet will expand." This was especially apparent in low-velocity cartridges such as the .380 ACP and .38 Spl.—the

Photos courtesy of Hornady Mfg. Co.

Traditional hollow-point handgun bullets typically produce erratic, if any, expansion when clogged by clothing (l.). Critical Defense's FTX bullet (center) eliminates this variable, resulting in reliable, consistent expansion (r.).

Hornady

chamberings of many compact, lightweight semi-automatic pistols and short-barreled revolvers that shooters of smaller-stature, and women in particular, favor. "In testing, we found that no existing design provided adequate, let alone consistent, performance in the .380 ACP and .38 Spl. when fired through clothing barriers from short-barreled handguns," reported Emary. Critical Defense technology changed that.

Surprisingly, the elastomeric polymer material proved equally helpful in the faster 9 mm Luger. "The bullet design provided greater terminal performance, reliability and uniformity of performance than traditional hollow points. Also, most existing 9 mm Luger designs optimized for barrier penetration that we tested provided too much penetration for a self-defense application," explained Emary. As such, Emary mandated that Critical Defense ammunition not exceed 12" of penetration.

With the exception of the elastomeric polymer tip and thin jacket (at the meplat), outwardly the FTX resembles the XTP—six precise folds for "preprogrammed" performance and a jacket that protects the lead at the nose. Internally, though, the two vary slightly. Like the XTP, the non-bonded FTX features a drawn jacket and swaged lead core; however, the jacket profile and taper are different. High weight retention, which Emary reports as an easily attained goal at low velocity, is controlled solely by jacket taper—the jacket progressively thickens approaching the bullet's base. Additionally, each jacket is custom-tailored for optimal performance in a given cartridge and velocity, and a light cannelure is applied for crimping the *semi-automatic* offerings.

Concealed-carry handguns are generally short-barreled, compact and lightweight, resulting in significant recoil and muzzle flip and blast. "We wanted to try to optimize ammunition to provide good terminal performance without excessive muzzle blast, flash or recoil in these types of firearms," said Emary. Hornady addressed these issues, and some in interesting ways.

"FTX technology allows us to reduce the recoil of compact handguns yet still achieve consistently very high terminal performance levels, " explained Emary. "We don't need to drive bullets at high velocities to get good terminal performance; therefore, we chose to use the lighter bullets for each caliber in order to reduce recoil."

To further reduce recoil, as well as limit muzzle flash and blast, Emary selected fast-burning powders with a flash suppressant added—a concept originating in TAP FPD. According to Emary, "Each load has a custom-blended propellant to provide the performance desired, and Hornady controls the actual propellant blend at the factory." The selected propellants are also clean-burning and stable, the latter of which is important in different climates. Reliability was a major concern, so Hornady used nickel-plated cases, much like in TAP FPD, to enhance feeding, extraction and corrosion-resistance.

Currently, Critical Defense loads are available in .380 ACP, 9 mm Luger, .38 Spl. and .38 Spl. +P in 90-gr., 115-gr., 110-gr. and 110-gr. weights, respectively—chamberings typically found in concealed-carry handguns.

Although the XTP is currently available in Custom and TAP FPD offerings, Critical Defense represents a better choice for personal protection than its sibling in the chamberings for which it is offered.

Winchester Supreme Elite Bonded PDX1

Prior to Winchester's January 2009 announcement of the Bonded PDX1, the company's premier self-defense-specific bullet was the SXT. Introduced in 1995, the non-bonded SXT typically offered 80 to 90 percent weight retention, excluding impacts into glass. According to Weeks, this was achieved without bonding by "…using the reverse-taper jacket and hollow point specifically designed for the caliber, weight and velocity." As its name suggests, a reverse-taper jacket is thicker at the nose than the base—a design utilized on the bullet's predecessor, the Black Talon. The SXT featured an immense, though optimized, nose cavity, and precision folds and notches. These notches "preprogrammed" the bullet to expand at a variety of velocities into eight symmetrical petals. A feed-friendly profile and a swaged, pure-lead core rounded out the bullet's features.

However good the design, in terms of terminal performance the SXT simply cannot compete with the company's newest offering, the Bonded PDX1. As such, the former is set to be discontinued.

According to Winchester Ammunition's website, "The Bonded PDX1 is engineered to maximize terminal ballistics, as defined by the demanding FBI ammunition tests, which simulate real-world threats." Requirements for the tests were specific. For example, the bureau, which fields Glock 22, 23 and 27 and SIG Sauer P229 service pistols, called for a projectile that would "weigh no less than 155 grains, nor exceed 200 grains, and ensure expansion at 25 yds. from a 3.5" barrel." According to Weeks, "[The 180-gr., .40 S&W] Bonded PDX1 load (Winchester Ranger Bonded/Q4355), scored higher in every measure of terminal performance in FBI testing than any other."

Listed in the FBI Technical Evaluation Plan (TEP) are eight penetration tests for "Service" ammunition: (1) bare gelatin (10 percent; 1 lb. gelatin/9 lbs. water) at 10 ft.; (2) heavy clothing and gelatin at 10 ft.; (3) steel (two sheets of hot-rolled 20-ga. automotive sheet metal with galvanized finish spaced 3" apart); (4) wallboard at 10 ft. (two pieces 1/2" gypsum board spaced 3½" apart); (5) plywood at 10 ft. (one piece of 3/4" AA fir plywood); (6) auto glass at 10 ft. (A.S.1, 1/4" laminated safety glass is angled at 45 degrees to the horizontal to simulate a windshield's angle, and the shot is fired with a 15-degree offset); (7) repeat of test 2 at 20 yds.; and (8) auto glass at 20 yds. (repeat of test 6, except fired straight on at 20 yds.). Tests 3 through 6 and 8 have a gelatin block covered with light clothing 18" behind the barrier. The gelatin is stored at 39° F, and the calibrated block is shot within 20 minutes of removal from cooling. Each event requires five shots, and a new block and test materials are used after each test to maintain integrity. According to the TEP, "It is desirable that the service projectile consistently penetrate an average of 12" to 18" throughout gelatine tests, with no shot less than 12" and no shot greater than 18", expand to at least twice its original diameter, and retain all of its weight."

Phase I "Service" ammunition testing also includes muzzle velocity and accuracy—measured contemporaneously—as well as pressure, ammunition malfunctions, muzzle flash, defects/quality control and cleanliness. Phase II testing includes ammunition velocity performance in FBI firearms, environmental evaluation—sustained immersion in water and high/low temperature exposure—and ammunition function and field suitability.

Although the Ranger Bonded/Q4355 [Bonded PDX1] has served as the FBI's primary service round for more than a year, only recently did it become available to the public. The Bonded PDX1 is currently available in 9 mm Luger, 147 gr.; 9 mm Luger +P, 124 gr.; .40 S&W, 165 gr. and 180 gr.; .45 ACP, 230 gr.; and .38 Spl. +P, 130 gr.

Unlike the SXT, the Bonded PDX1's reverse-taper, copper-alloy jacket is bonded to the lead core via a proprietary process, which controls expansion and aids weight retention. Jacket thickness varies with caliber, bullet weight and the velocity at which a given caliber/bullet weight operates, and is contoured for maximum upset. Typical weight retention of the Bonded PDX1 is

Photos courtesy of Winchester Ammunition

Winchester's Bonded PDX1 (l.) met the FBI requirements for penetration, which calls for at least 12" after encountering barriers (center). Typical expansion is 1.5 times the original diameter (r.), and weight retention is near 100 percent.

near 100 percent, except through glass, in which 85 to 90 percent retained weight is commonplace.

Why does the Bonded PDX1 work so well through the diverse range of barriers, particularly those listed in the FBI TEP? "The jacket, hollow point, notching and bonding process work together as a system to help ensure consistent upset even when the hollow point is plugged with barrier materials," reported Weeks. "Additionally, the [jacket/nose's profile, notching, folds and cavity] work in conjunction with the bonding process to provide the widest range of upset window for range/velocity …." The Bonded PDX1 typically expands 1.5 times the size of the bullet's original diameter and exhibits six—as opposed to eight on the SXT—symmetrical segments—a result of the bullet's folds/notches, which provide "preprogrammed" expansion.

Like the former SXT offerings, Supreme Elite's Bonded PDX1 loads feature nickel-plated cases. The plating makes the cases more corrosion-resistant and visible in low-light conditions—for chamber and magazine checks—than non-plated cases, and according to Weeks, "… plating helps to a small extent with functioning in semi-automatic handguns." It is also listed as a requirement in the FBI TEP. With this, Winchester selected reduced-flash propellants, another FBI requirement.

According to Weeks, the PDX1 "… has all the latest technology incorporated into it. It represents the 'state of the art' when talking personal-protection ammunition." No wonder he deems the SXT "obsolete."

Testing Critical Defense FTX And Supreme Elite Bonded PDX1

By definition, self-defense ammunition must be reliable, both in functioning and terminal performance; however, accuracy is important, too. To determine the worthiness of Hornady Critical Defense and Winchester Bonded PDX1 ammunition for personal protection, I subjected each to a host of tests. Terminal ballistics and accuracy results are from Hornady's 115-gr. Critical Defense and Winchester's 147-gr. Bonded PDX1 9 mm Luger loads, while only Hornady's 110-gr. .38 Spl. +P round was tested for accuracy because its counterpart, Winchester's 130-gr. Bonded PDX1, was unavailable.

The first tests revealed the accuracy potential of the two ammunition brands. Fired from a ported, 4"-barreled Springfield Armory Service Model XD, Critical Defense averaged 2.10" for five consecutive, five-shot groups at 25 yds., which was slightly better than the Bonded PDX1's 2.25" average. Hornady's .38 Spl.+P load, from a Smith & Wesson Model 681 (.357 Mag.), proved to be the most accurate, averaging 2.08" from the revolver's 4" barrel.

To examine the terminal ballistics of the bullets, I subjected them to several barriers resembling those listed in the TEP; however, instead of the FBI's "… four layers of clothing: one layer of cotton T-shirt material (48 threads per inch); one layer of cotton shirt material (80 threads per inch); one layer of Malden Mills Polartec 200 fleece (50 threads per inch); and one layer of 13-oz. cotton denim (50 threads per inch)" for "Heavy Clothing," and … one layer of the above described cotton T-shirt material and one layer of the above described cotton shirt material …" for light clothing, the entire evaluation utilized a printed-design lightweight T-shirt and an insulated, flannel shirt. I included modified versions of FBI ammunition tests No. 2 (Heavy Clothing), No. 4 (Wallboard) and No. 5 (Plywood) —all of which could be encountered in self-defense situations. The materials—two pieces of 1/2" gypsum for test No. 4, and one piece of 3/4" plywood for test No. 5—were 18" in front of the wax media, which was draped with the shirts.

A wax-like test media replaced the 10-percent gelatin. Granted the replacement is not exactly like gelatin, and therefore bullets don't perform the same as in gelatin, the material nonetheless provided a consistent testing platform. One may expect deeper penetration in ballistic gelatin. Each test was performed from 10 ft. away. In some cases, the recovered bullet's slightly heavier weight reflects commonly encountered manufacturing variations.

In the "Heavy Clothing" evaluation, the Critical Defense's 115-gr. FTX penetrated approximately 5.77", measured 0.548" in diameter and weighed 115.7 grs. Considering the FTX wasn't designed for penetrating barriers outside of clothing, or vie for the FBI contract, it performed well in the "Wallboard" and "Plywood" tests. Through two pieces of 1/ 2" gypsum and clothing, the FTX penetrated roughly 5.54" of the wax-like substance, expanded to 0.515" and weighed 114.6 grs. In the "Plywood" test, the projectile penetrated about 6.09" of material, expanded, though somewhat irregularly, to 0.580" and had a retained weight of 115.1 grs. With the exception of the "Plywood" test, the FTX produced six identical petals.

In testing identical to that of Critical Defense's FTX, the Bonded PDX1 also performed well—as it should considering it was selected by the FBI as the agency's primary service round. Through heavy clothing alone, the Bonded PDX1 penetrated approximately 7.00"of the test media, expanded to 0.567" and weighed 147.9 grs. In the "Wallboard" test, the projectile penetrated about 6.48", measured

FTX Clothing | FTX Wallboard | FTX Plywood | PDX1 Clothing | PDX1 Wallboard | PDX1 Plywood

CRITICAL DEFENSE AND BONDED PDX1 PENETRATION/EXPANSION TESTS (INCHES)

Cartridge 9 mm Luger*	Heavy Clothing		Wallboard		Plywood	
	Penetration	Expansion	Penetration	Expansion	Penetration	Expansion
Hornady Critical Defense 115-gr. FTX	5.77	0.548	5.54	0.515	6.09	0.580
Winchester Supreme Elite 147-gr. Bonded PDX1	7.00	0.567	6.48	0.525	7.17	0.520

Notes: The results represent a single shot at 10 ft. The test media was a reusable, wax-like material, not ordnance gelatin, and therefore terminal performance varies from that typically obtained in the latter. *0.355" bullet diameter

SHOOTING RESULTS (25 YDS.)

Cartridge 9 mm Luger	Muzzle Vel. (f.p.s)	Energy (ft.-lbs.)	Group Size In Inches Smallest	Largest	Average
Hornady CD 115-gr. FTX	1123 Avg. 14 Sd	322	1.5	2.75	2.10
Winchester 147-gr. Bonded PDX1	956 Avg. 10 Sd	298	1.88	2.75	2.25
Cartridge .38 Spl. +P					
Hornady CD 110-gr. FTX	1033 Avg 29 Sd	261	1.63	2.5	2.08
Average Extreme Spread					2.14

Measured average velocity for 10 rounds from a 4" barrel (both Springfield Armory Service Model XD and Smith & Wesson Model 681). Range temperature 90° F. Humidity 42%. Accuracy for five consecutive, five-shot groups at 25 yds. from a sandbag rest. Abbreviations: CD (Critical Defense), FTX (Flex Tip eXpanding), Sd (Standard Deviation).

0.525" in diameter and weighed 147.2 grs. In the "Plywood" test, the projectile penetrated roughly 7.17" of the wax-like substance, expanded to 0.520" and weighed 147.4 grs. All Bonded PDX1s featured perfect six-petal post-expansion configurations.

Through the course of testing, which consisted of more than a hundred rounds, I encountered no malfunctions. And although both loads performed reliably, Critical Defense was especially fun to shoot, as it produced minimal recoil—certainly an asset in lightweight, compact, short-barreled handguns. As Winchester's Bonded PDX1 was conceived for FBI testing and defeating a variety of barriers, and the tested load featured a heavier projectile than did the Hornady, it's understandable recoil was stouter; however, it was by no means intolerable.

So, which one is best? Ultimately, ammunition selection for self-defense applications comes down to personal preference. Offered here, though, are two different—and very good—solutions to a single problem, and a look at the loads at the forefront of personal-protection-projectile technology. Now the hard part: selecting one.

Sources:

Hornady Mfg. Co. (Dept. AR)
3625 Old Potash Highway
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www.hornady.com

Winchester Ammunition (Dept. AR)
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