



Caveat Emptor 2.0

Things to understand when buying armor

BY JON BECKER

An article published in the Winter 2018 edition of *The Tactical Edge* titled “Caveat Emptor: All ceramic ICW plates are not created equal,” discussed NIJ standards for ICW plates and stressed that it is essential to understand how armor is tested and rated to ensure safety for your team. Although somewhat controversial at the time, this article grew out of frustration with less-than-ethical armor vendors and directly addressed some of the mistruths commonly used to take advantage of agencies and their officers. The goal of that article was to educate the end user about terminology in the armor industry as well as help evaluate claims made by armor manufacturers.

This article goes one step further and looks at confusing aspects of the armor industry, points of ambiguity, and the specific way that less-scrupulous armor industry participants may take advantage of ambiguity to lead end users to draw erroneous inferences.

First, a disclaimer: None of these terms and practices are, in and of themselves, unethical or dishonest. There are many reasons why manufacturers or end users may choose to depart from industry norms. Rather, it is the way these terms are sometimes used to create false expectations and encourage erroneous inferences that are so reprehensible. One can argue that it is the consumer’s job to understand what they are purchasing, and that *caveat emptor* (buyer beware) applies. But when lives are at risk, there is a responsibility on the part of the industry to ensure that end users are very well informed and can make choices based on complete information. Thus, the goal of this article is to educate decision-makers and hopefully arm them to make better choices.

The NIJ Standards — A refresher course

The national standards for armor are articulated by the Body Armor Compliance Testing Program of the National Institute of Justice (NIJ). The current Ballistic Resistance

of Body Armor NIJ Standard is 0101.06 (adopted in July 2008).

The NIJ standards specify a testing protocol for independent laboratories to utilize when testing for compliance. To be found compliant with the 06 standard, each manufacturer must submit specific testing data obtained from an NIJ-approved independent lab. This test data, along with other specific product information, is then reviewed by NIJ before the product is found to be NIJ compliant and subsequently placed on the Compliant Products List (CPL).

While an extensive discussion of the NIJ standards and testing is beyond the scope of this article, there are several important things to know about the NIJ standards that have direct consequences to this discussion.

First, NIJ testing is voluntary. Manufacturers are not required to submit for NIJ certification to sell body armor. In fact, they do not have to submit for any testing. Although there are programs like the Bulletproof Vest Partnership that require NIJ certification to receive grant funding, outside of that context NIJ compliance is not required.

Second, it is not in the NIJ's purview to police the marketplace and shut down illegitimate manufacturers. In fact, their enforcement powers are limited to the specific use of their standards and their certification stamp. They do not have industry enforcement staff who are out shutting down products and companies that are not safe or do not meet NIJ standards. So, as long as the manufacturer doesn't claim their product is NIJ compliant, they are not subject to enforcement by NIJ.

Third, it is critical to understand that NIJ testing is intended solely to provide an industry standard against which products can be measured. It is not NIJ's job to test against every possible ammunition, nor is it their responsibility to test every product in the industry. In fact, NIJ does not test



products at all. They review the test results of independent labs to ensure compliance with a standard. As such, NIJ testing is limited solely to the specific ammunition in the standard. It does not include testing against any other rounds. It is not a guarantee that the product is a great product, rather it verifies the performance of the armor against very specific rounds in laboratory conditions. To some degree, NIJ certification is a bit like a driver's license. While it is true that everyone with a license has met a minimum standard, the fact that you have a license doesn't mean you are a good driver. Moreover, the fact that you are driving doesn't necessarily mean you even have a license. Remember, voluntary compliance means not everyone has a license or drives well.

With that said, let's dig into several areas of confusion and ambiguity and try to shine a light on them.





“Shot to NIJ protocols” does *not* mean NIJ compliant

There is a great deal of intentional ambiguity being used with regard to NIJ compliance testing. The NIJ has very clear guidelines for shooting armor which are covered by the current NIJ standards for soft and hard armor and can be found at their website. However, it is important to understand that testing to the NIJ standards does not mean armor complies with NIJ standards.

The NIJ standards are far more complex and robust than simple laboratory testing. They require submission, review, fit audits and other assurances. The latest trend is for manufacturers to say they are “tested in accordance with NIJ,” “shot to NIJ protocols,” or “limited or abbreviated NIJ protocols.” All of these imply that the testing is very similar to NIJ and as a result, many people think it is the same. However, without providing context for the actual testing conducted, there is no way to know how close testing was to the NIJ standards. These non-NIJ testing standards may mean that they skipped the notoriously difficult drop test for plates, fired fewer rounds, shot fewer panels, skipped conditioning requirements, ignored backface deformation results, used lower velocities, etc.

This does not mean that all testing done outside of NIJ is bad or unethical. There are numerous reasons for using the NIJ protocols as a basis for testing without doing the entire protocols or submitting the results for NIJ review. These include but are not limited to, testing rounds that are not covered by the NIJ standards, testing ICW plates with multiple armor packages, testing specialty ammunition, or using velocities above the NIJ standards. The key thing to understand is that changing the test protocols can dramatically change the test results. The difference between shooting a plate six times and shooting it two times can be the difference between safety and failure in the real world. As a result, it is essential to make sure you understand the differences between NIJ compliance and just testing, and the specifics of each. The use of an NIJ-approved laboratory for testing does not guarantee that the results will be to the NIJ standards. For applications where NIJ compliance is required or desirable (e.g., BVP grant programs, patrol armor, etc.) ensure NIJ compliance has been achieved. If compliance is not necessary, understand how the armor was tested and how the testing varied from NIJ. Any resistance on the part of a vendor to share or discuss testing protocols and provide actual test reports should be a red flag to do more research about the product.

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Any ambiguity in terminology should be a red flag and encourage careful examination of testing results.

Outside of NIJ protocols, clear definitions matter

Much like the testing standards discussed above, it is essential to understand that inside the NIJ compliance program, terms have specific meanings that are defined in the standards and enforced. But outside of the NIJ certification program, these terms do not have a legal definition, and the use of these terms is not regulated by anyone. For example, “stand-alone,” “in conjunction with” and “level 3A” have very specific definitions in the NIJ standards with very clear protocols they must meet to use those terms. But outside of the NIJ context, these terms are being used to mean a broad range of things that sometimes conflict with or even contradict their NIJ meaning. As an example, the term “stand-alone” in an NIJ context means that a plate has been shot to the NIJ protocol and not only stopped the round, but also met the backface deformation standards and drop standards, and have been shot in the specified patterns with reference rounds and velocities. Yet recently this term is being used to describe plates that may only stop a specific round, but not with the number or velocity of rounds NIJ requires or within the backface deformation standards.

Worse yet, some manufacturers are testing only with non-NIJ rounds and using ambiguity in the NIJ standards to declare their plates or shields as a “Level III” without ever testing them to the full NIJ protocol. As an example, I recently saw a non-compliant plate marketed as a “Stand-alone Level 3,” yet it only stopped the M193 5.56 round as a stand-alone plate, which is not an NIJ standard round. As a result, the use of the term “stand-alone level 3” is very misleading and can cause confusion. Again, there is nothing wrong with testing just this round or testing outside of NIJ, unless you allow people to draw incorrect inferences that it is NIJ compliant as a stand-alone level 3 plate. Any ambiguity in terminology should be a red flag and encourage careful examination of testing results.

It's not just the bullet, velocity matters!

A recent trend is for manufacturers to list the specific rounds their armor has been tested against either without listing the velocities or burying the test velocities deep in their website. For example, a product description may say it is tested against the M855 5.56mm round, but not disclose that the velocities they stopped the round at were 300 to 500 fps below the velocity of factory ammunition (i.e., the velocities you would find on the street).

It is important to understand that the way laboratory testing is done on armor requires very specific velocities

that are usually outside the tolerances of factory ammunition. By loading the ammunition, manufacturers themselves can move bullet velocities up or down by very small increments ensuring accurate tests. As a result, virtually all labs and manufacturers load their own ammunition using factory bullets while adjusting the powder charge up or down to move the test velocities into the appropriate range. But, because they are not using factory ammo, it also means that they can shoot the bullet at whatever velocity they desire, even dramatically below factory speeds. So, simply saying that a particular plate was tested with an M855 only tells half the story.

To give an extreme example, a T-shirt will stop an M855 round if it is hand thrown at 5fps. This ambiguity is extremely dangerous in the hands of a less scrupulous vendor. By saying a particular plate or shield stops a particular round without specifying clearly that they used substandard velocities, false expectations are created in end users which can lead to bad purchasing decisions and endanger officers' lives.

It is essential that you receive test reports and compare the velocities used for testing against the actual reference ranges for the factory rounds you will face on the street. If you notice a substantial downward difference between test velocities and factory velocities it should be a huge red flag.

In most cases a warranty is *not* a performance guarantee

Virtually all manufacturers in the industry offer warranties on their products. In soft armor, these are generally five years, and for hard armor, they range from five years to 25 years. While this seems impressive, it is important to understand that many manufacturers are providing much less of a warranty than they would lead you to believe.

First, material and workmanship warranties are *not* performance warranties. This is very important because a materials and workmanship warranty only provides a remedy when there is a problem with the materials the armor is made from or with the actual construction of the armor. For example, if the cover falls off your plate two years into a five-year materials and workmanship warranty, the manufacturer will likely provide a new cover for the plate. But this does not in any way guarantee that the armor will stop bullets, nor does it guarantee that the performance will remain at a certain level. Yet, most officers purchasing armor would rightfully assume that a warranty guarantees not only how armor is made but its performance.

Also, it is critical to read the manufacturer's warranty terms when purchasing armor. Although it is hard to believe, some warranties contain exclusionary clauses that virtually void the warranty almost immediately by including terms that the user will certainly violate even by accident. Some of the most insidious exclusionary clauses include that the armor never be left in a vehicle or trunk, that it never

gets wet, or that it be inspected by the factory at some interval. All of these are simply there to prevent warranty claims but, because no one reads the warranty terms, they leave the impression of a warranty where one may not exist. Sketchy warranty terms should send your agency running.

Specifications need to be read *very* carefully

It is always important to read specifications with great scrutiny and really pay attention to how things are specified and any qualifying language. A recent trend in armor is listing “very optimistic” weights and specs for products and then qualifying away those specifications with a footnote or a “margin of error” disclaimer elsewhere in the catalog, specifications sheet or website. This “disclaimer” allows products to create market buzz by being the “lightest in the market” and helps to deceive the consumer (in some cases to flat out lie about their products) by hiding behind the footnotes and margin of error to make the statement accurate. As a “non-industry example,” imagine if I said that I weigh exactly what I weighed in my freshman year of high school, plus or minus 20%. For a 200-pound male, this could mean a weight anywhere from 160 and 240 pounds.

What’s worse, some of the less scrupulous manufacturers will use broad margins of error in several different specifications to create an even bigger margin (e.g., size and weight). For example, imagine if the product specifications said that a plate is 10" x 12" and weighs three pounds. It then says that it has a .75lb +/- weight margin of error and a .5" +/- margin of error for dimensions. This would mean that a 10" x 12" plate might be anywhere from 9.5" to 10.5" x 11.5" to 12.5", a 17% range. Further, it could weigh between 2.5 and 3.5 pounds, which is almost a 30% range. This is especially true in ballistic shields where complicated shapes are the norm and measurements are often based on the largest portion of the shield rather than the smallest.

Making this worse, what some less scrupulous manufacturers will do to really game the system is produce a plate at the bottom end of the size specifications, weigh it, and then apply a margin of error to it for advertising which will yield a specification that no actual production plates will be sold at. Is that false advertising? No, it is technically within the margin of error and is therefore accurate. Is it deceptive and intentionally confusing? Yes, it is. But if you do not read the fine print and pay careful attention to margins of error it may fool you. When in doubt, verify the specifications yourself.

Always beware things that seem too good

The science of ballistics is the same for everyone. The available ballistic materials are quantitatively limited and the science of stopping a particular round does not vary

that much. Although there are certainly ballistic materials that are exclusive to certain manufacturers, and some materials that are more expensive and therefore lighter or better performing, there are no magic ballistic materials or magic configurations for ballistic packages.

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The result is that all products in the marketplace fall into a narrow range of performance and weight. If you took all the lightest 3A ballistic packages on the market and compared them, they would likely fall into a weight range of +/-15% and a thickness difference of +/- 10%. The top level 3 plates are likely within 10% of each other in weight when similarly sized. Yet, every year there is a new ballistic company that claims to have discovered a new way to make things and is 25% lighter. Certainly, this occasionally happens and is real. But often what it means is that the company has circumvented part of the NIJ standards or used testing inconsistencies to make their product lighter. There is no such thing as a free lunch. Dramatic weight differences almost always come at the expense of performance and safety.

A recent example of this can be seen in rifle plates. The NIJ standards do not allow plates to be hit within 2" of their edge. As a result, this area is never shot in laboratory testing, which has led some manufacturers to eliminate ballistic material in this area as a way of saving weight and providing them with a marketing advantage. This may take the form of tapering edges, placing non-ballistic material around the edges of the plate, or even placing smaller ceramic tiles onto larger polyethylene backers (i.e., 8.5" x 10" ceramic tiles on a 10" x 12" backer). In all these cases, the performance of the plate will be sacrificed to save weight. This may make sense for some applications, but in many cases, the end user is never told about this or never has the potential consequences of choosing this approach explained to them. Always view with suspicion “new breakthrough technologies,” fancy marketing names for materials or processes, and products that are dramatically different from the market leaders’ products.

Conclusion

The NIJ standards are not perfect. Like any standard, there are things I wish NIJ would fix and clarify, and hopefully these will be addressed with the next standard.

However, the guidelines provide a common reference against which all products can be compared. In a market where no one is specifically tasked to police the market and charge deceitful companies, the responsibility lies with you as the end user to pay attention.

A few basic principles that may help you develop your own methodology for selecting armor include:

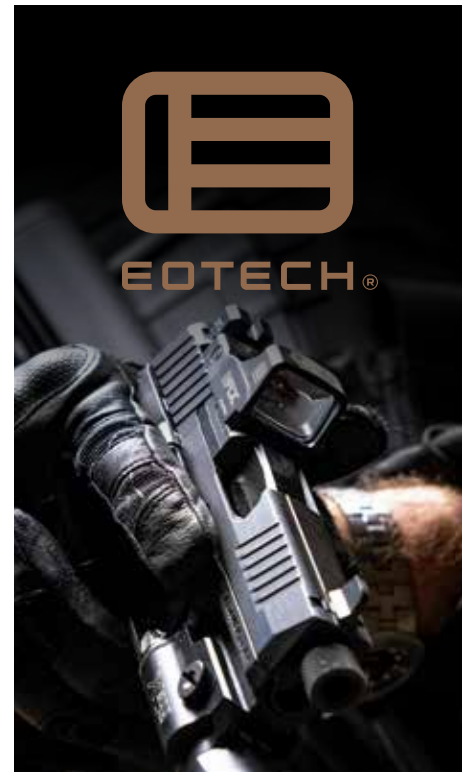
1. It is critical that you take control of defining your needs for armor and making sure the industry meets those needs. Take the time to get educated on the standards and how armor is tested. It is too important a decision to simply trust that the sales guy you are dealing with is telling you the truth or even understands your needs.
 2. Whenever possible, use NIJ guidelines as a floor and not a ceiling. Look for products that exceed the standards, not those that depart from the standards, are below the standards or just barely meet them.
 3. Look very carefully at the terminology being used by a manufacturer. If they say a product is “stand-alone” or “ICW” and the product is not NIJ compliant, then get a clear definition of what terms mean before making a decision. Be sure to look at footnotes, disclaimers and margins of error.
 4. Ask for test results and review them carefully. Pay attention to what the armor was shot with, what test protocols were used and the velocities of the rounds. If NIJ-specified rounds are not used, ask why. In fact, it is not a bad practice to have manufacturers provide you with a clear written document that shows their test methodology and gives clarifications as to how they have departed from the standard.
 5. Finally, consider the company that made the armor, who made the raw materials, and who will be standing there with you if you have a failure or a recall. How long have they been around, what insurance do they carry and what are their warranty policies? Body armor, like brain surgeons and condoms, is *not* a place to look for bargains. An unregulated marketplace means some fly-by-night manufacturers exist who may not be here in three to five years.
- Perhaps most importantly, caveat emptor. Your lives depend on it, so get educated and choose wisely.

About the author

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Photos courtesy of Jason Herring

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The EFLX Mini Reflex Sight was designed with EOTECH's holographic sights in mind. Its ruggedized aluminum housing, ultra-clear glass and wide field of view make it simple and easy to get onto target fast. EFLX is the ideal choice for Law Enforcement professionals.



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