# Dragon Skin Flexible Scalar Body Armor Defeats Rifle Threats

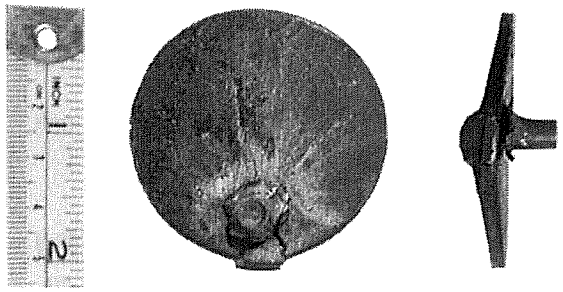
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Pinnacle Armor Inc., out of Fresno, California, is currently producing some of the most advanced hard and soft ballistic armor solutions in the world. This includes Pinnacle's flexible hard armor systems, which employ a combination of highly advanced ballistic ceramic composite and titanium composite technology and ballistic fiber technology.

The Pinnacle Armor Inc.SOV-1000 titanium composite and SOV-2000 ceramic composite flexible hard armor system ballistic vests are particularly interesting. They feature something called DRAGON SKIN®. DRAGON SKIN® is basically significantly enhanced multi-hit Level III and (pending) Level IV flexible "scalar" hard armor that's significantly superior, ballistically and durability-wise (more on this latter aspect, later), to conventional NIJ Level III and NIJ Level IV ceramic hard armor multi-hit SAPI plates, and consists of silver dollar-sized (perhaps slightly larger) circular ballistic ceramic or titanium discs that are configured like scales (think fish or snake) over a given area. SOV-1000 and SOV-2000 multi-hit Level III "+" and pending Level IV "+" flexible hard body armor/ballistic vests can be...



custom-configured in terms of the area of coverage, all the way up to *complete* torso coverage. If someone needs complete front, rear, and side protection over the entire area of the vest, Pinnacle Armor Inc. can provide this to them. If the customer wants (Pinnacle's) multi-hit Level III or pending Level IV ballistic (a.k.a. anti-ballistic) protection (or a combination of the two) on the front and sides, with just Level IIIa and Mil-Std fragmentation protection on the back of the vest, they can do that, too. The customer can also have Level III or Level IV anti-ballistic/ballistic protection on the entire front and rear of the vest with level IIIa/fragmentation ballistic protection on the shoulder straps and sides. Any combination/configuration is possible.

So, what kind of threats can the Level III SOV-1000 (titanium composite) and SOV-2000 (ceramic composite) flexible hard armor systems protect against? This is from the Pinnacle Armor Inc. website:

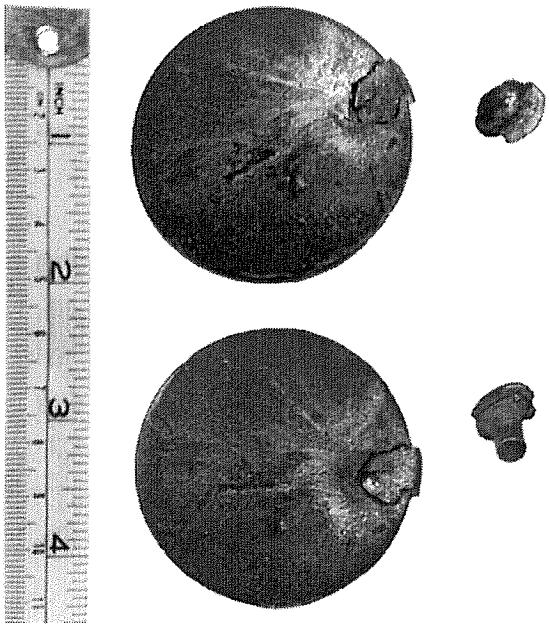
"The MIL-STD SOV-1000 and 2000 Level III flexible body armor systems will defeat the following rifle rounds that normally fall into the Level IV category, and all lesser threats.

7.62 x 39 mm 125 GR, steel case mild steel core – 2300 – 2700 fps.
5.56 x 45 mm 65 GR, M855 (SS109 Green tip) – 3250 – 3900 fps."

To reiterate, this Pinnacle Armor Inc. Level III body armor is not the same as other manufacturers' NIJ Level III body armor. Pinnacle likes to significantly exceed the NIJ standard at all protection levels, with all of its products.

**The Core Technology:**
Pinnacle Armor Inc.'s advanced ballistic ceramic discs/panels are extremely high-tech. They're not just ceramic or titanium. They're actually composed of advanced ceramic or titanium composite matrixes and laminates that can incorporate other materials. There's even a lighter-weight metal than titanium that Pinnacle Armor is now combining with ceramic that we will not disclose, which offer's a superior level of performance-to-weight ratio over titanium. SOV-1000 titanium composite discs/panels and SOV-2000 ceramic composite discs/panels are approximately 2" in diameter, and their anti-materiel discs, like their "atomic cookie" (discussed two paragraphs down) go up to approx. 3" in diameter.

Pinnacle Armor Inc.'s most advanced ballistic hard armor, their Level IV "+" ceramic composite flexible body armor will defeat multiple hits of 7.62x51mm AP rounds, like the Winchester/Olin .308 SLAP (Saboted Light Armour-Penetrating) round, which utilizes a tungsten sabot bullet. This particular level of ballistic protection will only be available to military end-users, although it's not available quite yet. However, it's expected to be ready for U.S. military use in the first quarter of 2006. Understand, again, that we're talking about Pinnacle Armor's unique and superior version of level IV body armor/ballistic protection, not your conventional, run-of-the-mill NIJ level IV SAPI protection. Pinnacle Armor Inc's unique Level IV "+" flexible ceramic hard armor will successfully take many more hits than conventional/standard NIJ Level IV SAPI plates, and provides coverage over a much greater surface area. In other words, it provides for more complete torso coverage, all the way up to total coverage.



Both the SOV-1000 and SOV-2000 technologies will stop military V0 and V50 threats at military V0 and V50 muzzle velocities, which is higher than NIJ muzzle velocities in the civilian world. The SOV-1000 titanium composite armor was originally designed for ground vehicle, water vessel, and aircraft applications, and offers ballistic and fragmentation resistance comparable to steel at half the weight. The SOV-2000 vest was specifically designed and developed to stop sniper rounds, and can achieve classified cababilities. The author will not disclose the nature or absolute capabilities of the SOV-1000 titanium composites or SOV-2000 ceramic composites, or what combination/matrix of ballistic fibers Pinnacle Armor Inc. is using in their vests. However, we will say that the versatility of Pinnacle Armor Inc.'s SOV-2000/Dragon Skin flexible hard armor system is now lending itself to stopping 12.7mm (.50 BMG) and Russian 14.5mm anti-tank ballistic threats for aircraft, watercraft, and ground vehicle applications. Of course, Pinnacle Armor Inc.'s composite

titanium and ceramic armor technologies are far more expensive than steel armor, so up-armoring military Humvee's (HMMWV's), a.k.a. "Hummers" with the much superior SOV/Dragon Skin technology is perhaps still a tough sell, even though it would save even more lives than current up-armor technologies and up-armored Humvee's (HMMWV's) are an incredibly hot topic, right now, in the news media.

It should perhaps be noted that I've personally seen what Pinnacle Armor refers to as their "atomic cookie" composite disc/panel, which was designed and developed for vehicle, vessel, and aircraft applications. Specifically, it was developed to protect them against any ballistic threat up to high explosive 20mm cannon projectiles. That's all the author can really say about the "atomic cookie", otherwise Pinnacle Armor Inc. and ARL (U.S. Army Research Laboratory) would perform anti-materiel tests on me, your humble correspondent.

What's most amazing about Pinnacle's SOV/Dragon Skin technology is how thin and light it is for the level of protection it provides. As far as the author is aware, no other body armor manufacturer in the world can match Pinnacle Armor Inc.'s capabilities in this regard. When you combine that with the armor's flexibility and area of coverage, no one else even comes close, as far as we know. Pinnacle's "scalar" hard armor ceramic disc configuration, which allows this hard armor system to flex and move with the body, is really ingenious.

Recently, I had the opportunity to visit Pinnacle Armor Inc.'s headquarters. While I was there, I got to handle some of Pinnacle's advanced ballistic ceramic composite discs. Needless to say, I was impressed. Then, when I donned one of their SOV-2000 vests, I was even more impressed. The one I got to wear offered virtually complete level III protection on the front, back, and sides of the vest. The only area that didn't have the Dragon Skin Level III protection was on the shoulder straps, which were Level IIIa and fragmentation resistant.



The SOV-2000/Dragon Skin level III vest seemed somewhat heavy when I first picked it up. However, once I put it on, it didn't seem that heavy at all. That's because Pinnacle Armor SOV-2000 (and SOV-1000) vests distribute the weight extremely well, once they're on. The one I had on was brand new, so it was a little stiff, but it was still comfortable. Murray Neal, Pinnacle Armor's CEO, told me that the vest would become more flexible as it was worn. He also pointed out that the Pinnacle Armor SOV/Dragon Skin vests wear very differently than standard soft armor vests that utilize ballistic ceramic plates/inserts. The weight distribution on the SOV/Dragon Skin vests is superior, and the panels don't pull away from the wearer while the vest is being worn. The SOV/Dragon Skin vests stay in tight to the body, while their worn. With a Pinnacle Armor "scalar" flexible hard armor vest, the wearer stays cooler, even though the vest is still right up agains the body. This is because the wearer doesn't have to work as hard to move around while wearing a flexible vest. Less work, less BTU's generated. This aspect, combined with the SOV/Dragon Skin's reduced backface deformation signature capability (more on this, in a minute), according to Pinnacle Armor Inc., negates the need to stand the armor 2.5-3 inches off the body and provide air channels for cooling, like body armor technologies being developed elsewhere.

I also had the opportunity to view and handle the remains of military rounds (including AP rounds) that had been fired into Pinnacle Armor Inc.'s SOV-1000 and SOV-2000 Level III and Level IV "Dragon Skin" vests, and was just blown away. The Pinnacle Armor vests reduced these rounds to shrapnel. I've never seen anything like it. When you see tungsten and tungsten carbide-core rounds obliterated like these rounds were, you just have to shake your head and laugh.

Only it's not funny. It's actually incredibly important, because these Pinnacle Armor Inc. vests can really save lives. I sincerely hope that all of our troops engaged in urban warfare in Afghanistan and Iraq end up acquiring Pinnacle Armor Inc. SOV/Dragon Skin vests. They need them–right now. Unfortunately, the reality is that most of them probably will never get them. Pinnacle Armor Inc. body armor costs more money than the old tech, and when it comes to equipping our infantry soldiers and Marines, money is always an issue. It's also unfortunate that on the law enforcement front, most state and local police department and sheriff's departments have never even heard of Pinnacle Armor Inc. body armor, so their SWAT/SRT teams are still running around with old tech (i.e. standard NIJ Level IIIa hard armor, or possibly Level IV hard armor ballistic ceramic panel inserts, which are thick, heavy, and brittle) made by a number of big-name body armor/ballistic vest manufacturers. This is unfortunate.

It should be noted that unlike many of these big-name body armor manufacturers, Pinnacle Armor Inc. is privately-owned, so they don't have to cow-tow to any investors and thus compromise quality/performance. Pinnacle relies on being better, not on increasing/optimizing its stock price. They're lean and mean. And, here's the kicker: Pinnacle says that they're currently anywhere from 15 to 30 years ahead of the rest of the pack (body armor manufacturers), technologically (depending on the company). According to them, no one else even comes close to what Pinnacle is doing. Based on what I saw and handled (and wore) while I was there, I'm inclined to believe them. The future is here, folks.

So, what will the future cost you? Well, again, it ain't gonna' be cheap. A Pinnacle Armor Inc. SOV-2000 Level III ballistic vest with a full torso wrap (that's full Level III torso coverage, including the shoulder straps) will run you about $4,600 US, as this article goes to print. That includes everything–carrier, molle webbing, etc. The SOV-2000 Level III+ or "enhanced Level III" ballistic vest with full-torso wrap weighs 17.5 lbs, only 1.2 lbs more than the U.S. military's current USMC Interceptor Multi-Threat Body Armor System Outer Tactical Vest (OTV). Understand that the SOV-2000 Level III ballistic vest with full-torso wrap used to weigh 19.5 lbs, but Pinnacle was able to advance the technology again and reduce the weight of their individual hard armor Dragon Skin discs by 26%, tranlating into a full 2 -pound weight reduction for this particular SOV-2000 version. That's pretty significant. Again, if you need a lighter-weight vest than 17.5 lbs, Pinnacle Armor Inc. can costom-configure the armor to your required specs. You just won't have quite as complete torso coverage. However, you'll still have much greater coverage than the industry-standard 10"x12" SAPI plates/inserts (ceramic hard armor plates/inserts) that pretty much everyone else is using.

The following are some "bullet points" for you to remember about the individual Pinnacle Armor Inc.'s SOV/Dragon Skin flexible hard ceramic and titanium composite discs. They offer:

1) Enhanced impact capability. As you can see in the pictures included with this article, the SOV/Dragon Skin discs can take hits at the edge without failing. They can also take a greater saturation of hits, i.e. more hits over a given area, than traditional ceramic or titanium hard armor plates/inserts (i.e. SAPI plates).

2) Enhanced muli-hit capability. SOV/Dragon Skin discs protect against "multiple repeat hits at muzzle" from 5.56x45mm, 7.62x39mm, 7.62x51mm, etc. We're talking muzzle-velocity hits, here, folks.

3) Increased V50 speeds on the projectiles.

4) Reduced trauma to the body, due to much less backface deformation signature (BDA). Pinnacle Armor Inc.'s Level III system has stopped an NIJ Level IV round with only 9mm backface deformation signature. That's just over 5/16th's of an inch BDA. This means the wearer can take multiple hits on the vest and keep fighting effectively. This aspect, by itself, is incredibly important, especially in urban warfare and CQB (Close Quarters Battle) scenarios.

5)Incredible durability (up to 500% greater durability than SAPI plates). While SAPI plates can easily crack or chip if dropped (that's why they say "Handle with Care" on them), you can drop, stomp on, and otherwise beat the proverbial hell out of Pinnacle Armor Inc. body armor. SOV-1000/Dragon Skin body armor can handle being run over by a military Humvee (HMMWV).

If you or your organization/unit would like to inquire about the Pinnacle Armor Inc. SOV/Dragon Skin flexible body armor system (SOV-1000 and SOV-2000), you should contact Murray Neal at 559-292-3185 or 800-200-0915. Murray Neal can be contacted via email at murray@pinnaclearmor.com.

Click here to view a Pinnacle Armor Inc. SOV-1000 Level III panel shot with 7.62x51mm M80 ball steel-jacketed round (2850-2900 fps) at a distance of 15ft (muzzle to body armor).

Click here to view the same SOV-1000/Dragon Skin disc/panel with M80 ball round stuck in it. M80 ball is a Level IV ballistic threat, and Pinnacle's SOV-1000 Level III "+" system has stopped it. Backface Deformation Signature is only 9mm (just over 5/16").

Click here to view SOV-1000 titanium composite disc/panel(s) shot with 7.62x39mm armor-piercing round (mild-steel-core penetrator). Point of impact is .25 inches from the edge of the disc/panel.

Click here to download an interesting Pinnacle Armor press release on their SOV/Dragon Skin "Flexible-Modular Body Armor for High Power Rifle Protection".

Click on this link to read about Pinnacle's "Armor Piercing Handgun Defeating Body Armor. This is also a press release.