FIRST LOOK

Kali's New Multiple Impact Helmet - Interbike 2016

Sep 21, 2016
by Mike Levy Follow

Kali's new MacDuff dirt/street half shell helmet, which borrows its name from the balls-out and usually brakeless Matt MacDuff, is claimed to be able to withstand up to ten impacts before needing to be replaced thanks to some clever science and the use of new materials, all of which are hidden underneath a redesigned matte black shell.

The production version of the helmet will be available in January of 2017, and is said to weigh less than other dirt/street lids despite its multiple impact abilities, all while also sporting a thinner profile. Expect a retail price of around $100 USD.

Kali MacDuff Details

- Designed for multiple impacts
- Casidion acrylic foam instead of EPS
- Up to ten impacts
- New shell design
- Colors: matte black only
- Weight: TBA
- Availability: January 2017
- MSRP: $100 USD (approx)
- www.kaliprotectives.com / @KaliProtectives

All that white stuff? It's not your standard EPS foam, but rather self-healing acrylic foam that incorporates carbon Nano-tubes. Hashtag science.

Kali isn't the first to offer a multiple impact bicycle helmet, and they're fairly common in the snow sports world, but it is something that most bicycle helmet companies have shied away from over the years, likely because it's a term that can be hard to quantify. In fact, there is no real multiple impact testing standard for bicycle helmets, a fact that makes touting such an ability a tricky thing. Kali's founder and lead engineer, Brad Waldron, believes that he has the answer, however: Casidion. While it sounds like a far away planet, it's actually a self-healing acrylic foam incorporating carbon Nano-tubes and replacing the EPS foam we're all used to seeing in traditionally constructed helmets. Kali is calling the result Nano Core.

Waldron says that Nano Core is the result of a partnership between Kali and Italian materials manufacturer Alia Mentis that sees the Casidion foam in-molded with the MacDuff's shell.

EPS foam, the stuff that's used to make the large majority of helmets on the market, is usually one-hit wonder kind of thing. The foam is crushed, it has done its job and, hopefully, your head is still in working order. The issue is that the EPS foam is mostly hidden underneath thin outer shells, especially when it comes to a lot normal mountain bike helmets, and this outer shell simply springs back to life but the EPS foam under it is crushed and effectively expired. But we can't see that, which is the problem.

Nano Core, on the other hand, is said to be able to handle up to ten impacts, Waldron explained, all while rebounding nearly back to its original shape after each hit. But since there is no multiple impact test for bicycle helmets, Waldron has had to compare his findings to testing standards from the snow industry where a multiple impact helmet is required to withstand three strikes in the same spot at 4.8 meters per second without sustaining a certain amount of measurable damage. That's a simplified description of the test, of course, but you get the idea.

And the new MacDuff? Waldron described testing it with ten or more strikes in the same spot at 6.2 meters per second, with it easily passing.

The MacDuff's thinner shell and Nano Core construction give it a smaller profile compared to most dirt/street helmets.

The Casidion foam is attached to the MacDuff's shell by way of Kali's Composite Fusion technology, which refers to how the foam is bonded to the helmet's shell. This is said to allow for a thinner shell and therefore a smaller overall size that projects less leverage onto a rider's head and neck in the event of a crash. In other words, while a massive looking helmet appears to be safer, Waldron is convinced that the opposite can be true because of the added leverage it provides when it hits the ground.

The MacDuff's ABS and polycarbonate blended shell is also all-new, and rather than be super rigid, it's been designed to be more flexible and elastic. This is said to allow for a much more forgiving outer layer that lets the Nano Core innards perform as designed. Waldron stressed that a smaller helmet with a more flexible outer shell, when designed in conjunction with the proper foam, is safer than a much more rigid helmet that features standard EPS foam, although this isn't a view shared by those who run the tests.

The relatively plain looks match most dirt jump helmets, but it's what's on the inside tht counts.

If the MacDuff's Casidion foam and Nano Core technology are so great, why isn't Kali replacing the EPS foam in all of their helmets with it? While Nano Core offers multiple impact protection, Waldron did admit that the exposed foam is less robust when it comes to shearing strikes like you might see happen to a well-vented helmet where the foam is more exposed. It's for this reason the Kali has first used complete Nano Core construction in a dirt/street helmet with fewer vents, as well as reinforced it around the edges with thin, transparent plastic protection. They've also employed a thinner layer of Nano Core in their Shiva 2.0 and Interceptor helmets, sandwiched between EPS foam, but the company is working on a trail helmet using complete Nano Core construction.

The MacDuff is still a ways out - it won't be available until early in 2017 - but expect it to cost around $100 USD when you start to see it in bike shops. The price also includes a lifetime no-charge crash replacement.