



CASE STUDY

How Sullivan Steel's expertise helped Enduro Bearings develop cycling's most reliable bearing

MANUFACTURER

Enduro Bearings

APPLICATION

Bicycle bottom bracket bearing

GOAL

Extend bearing lifetime beyond industry standards

SOLUTION

XD15NW® High Nitrogen Steel

RESULTS

Elite hybrid bearing with near-indefinite lifespan

Unrivalled pitting, galling, and corrosion resistance

Zero bearing maintenance required

About Enduro Bearings

Enduro Bearings designs, manufactures, and supplies premium bearings and related products to top-tier bicycle brands, distributors, and retailers, empowering millions of dedicated riders across the world.

Harsh Conditions Cause Standard Hybrid Bearings to Deteriorate Rapidly

GOAL ■ Create a bottom bracket bearing that performs longer in challenging racing environments

Bearing longevity is critical in the elite cycling industry, particularly for the bottom bracket bearing, the most punished part of a bicycle. A pro rider can wear out a bottom bracket bearing as quickly as every two weeks.

■ **“I wanted to find something that lasts a really long time so I can ride my bike farther and longer without having to change out the bearings.”**

■ **- Matt Harvey, Co-Founder, Enduro Bearings**

Enduro Bearings co-founder Matt Harvey, an avid biker himself, was well aware of the shortcomings of existing bearing technologies. He knew that there must be a way to build a superior bearing for pro cyclists, helping them ride farther and longer.

Matt investigated different ways to improve the 52100 bearing steel he used, including heat treatments, cryogenic treatment, and more. But it was only when he shifted his thinking, looking to other industries, that he came upon a material with the ideal properties.

He discovered nitrogen alloys—specialized steel used in the aerospace industry for flight-critical components. Nitrogen grades offer superior wear resistance, hardness, and corrosion resistance. Matt figured that if any material could withstand the rigors of high-performance racing, nitrogen steel was it.

Securing the steel, however, proved challenging. When the mills wouldn't return his calls, Matt was stuck spinning his wheels. Then, a chance meeting at a trade show with Todd Chavanne, Business Development at Sullivan Steel, changed all that.

Sullivan Supplies Enduro with Nitrogen Steel from Aubert & Duval

SOLUTION ■ Enduro uses XD15NW®, a high-nitrogen, martensitic stainless steel, to create the XD15 bottom bracket bearing

Sullivan Steel specializes in providing high-performance steel grades for demanding applications. Client industries range from aerospace to motorsports to food & beverage production to medical equipment.

After a conversation with Matt about his goals for bearing performance, Todd suggested one of Sullivan's offerings—XD15NW®, a martensitic nitrogen steel made by French mill Aubert & Duval.

Now that Matt had a knowledgeable supplier of aerospace-grade steel, Enduro geared up to prove the alloy's feasibility for hybrid bottom bracket bearings. "It was unknown territory, definitely for the cycling industry at the time, because nobody was using the material," explained Matt.

Enduro got the ball rolling and created a prototype of what would become the XD15 bearing (named for XD15NW®). For Matt, working with a new grade was intimidating, but Sullivan provided technical support for every step of processing. Finding the best heat treatment procedure was another unique challenge.



Todd reviewed the results after every heat-treat iteration, tweaking the procedure until Enduro reached a point where bearing races came out as close to finished as possible.

Matt supplied several cyclo-cross riders with his new XD15 bottom bracket bearings. The punishing terrain and conditions of cyclo-cross races were ideal for evaluating the performance of the XD15. Enduro also carried out lab testing of XD15 bearings against conventional industry bearings. An amplified testing method shortened the test period from years to just a few months. The test rig measured three variables for each bearing: wattage, test loading, and vibration.



■ Testing setup for the Enduro Bearings XD15 bottom bracket bearing

XD15NW® Beats All Other Bearing Steel Candidates in Lab & Field Testing

RESULTS ■ Enduro's XD15 bearings far exceeded expectations in both durability and efficiency

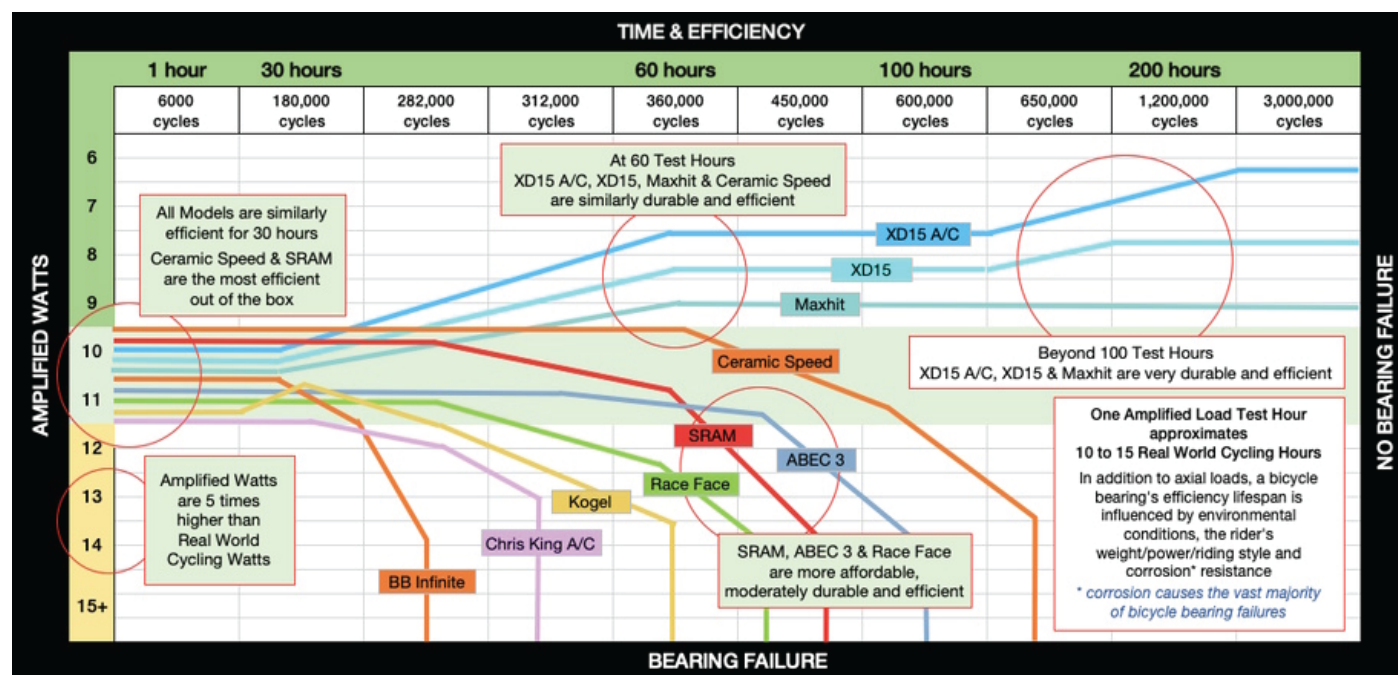
The cyclo-cross riders experienced impressive results from their XD15 bearings right out of the gate. After months of riding through sand and dirt, the XD15 performed like new, even in the notorious Sand City race—it was an unheard-of result for a bottom bracket bearing.

In addition to resisting damage from particulates, field testing also proved the XD15's corrosion resistance when, during an early-season race, roads were salted due to an unexpected snowfall. Corrosion destroyed every bearing on every bike in the race except for the XD15s, which not only survived but were seemingly unaffected by the highly corrosive road salt.

"I knew already the XD15 worked because of the field testing. But it's always good to be able to replicate the results in lab testing, too."

The XD15 lab test results told a similar story to the field tests:

- After 30 test hours every bearing but the XD15 dropped off in efficiency.
- After 200 test hours the XD15s experienced improved performance.
- Testing was halted at 3,000,000 cycles and the XD15 had yet to experience performance degradation.



■ Test results for 4 Enduro and 6 competitor bottom bracket bearings

One of the most surprising results of the field testing was that XD15 bearings did not require any maintenance at all, even without grease. When particulates infiltrated the XD15, rather than causing deterioration, they seemed to polish the races smoother.

“XD15NW® was the silver bullet answer I was looking for, because nobody has problems with these things once they have them. And they don’t need to service them, just put them in your bike and ride. I’ve seen bikes 10 years later with XD15 bottom brackets still going.”

- Matt Harvey

Today

Since Enduro released the XD15 bottom bracket bearing, it’s gained an industry-best reputation for high-performance cycling. In the harshest racing conditions, the XD15 bottom bracket bearing continues to function, even becoming smoother over time. Today, it still sits at the pinnacle of performance with millions of units sold worldwide to hundreds of OEMs and distributors.

Enduro achieved its goal of innovating a bottom bracket bearing that allows cyclists to ride longer, farther, and harder with no bearing maintenance whatsoever. The lifetime guarantee for XD15 bottom bracket bearings is an industry first, and proof of Enduro’s confidence in the reliability and durability of Aubert & Duval’s XD15NW® steel.

“I don’t think we could have gotten the XD15 across the finish line without Sullivan sticking with us. If there had been nobody to talk to and get advice on next steps, we probably would have stopped, and that would have been a terrible shame for the cycling industry,” says Matt.

From aerospace to food & beverage production to medical manufacturing to cycling, find out how Sullivan Steel can help you achieve success for your application. We not only supply high-performance steel but also provide technical support so you can reach your goals.

With Sullivan, you’re rolling with the best—see for yourself how we stand behind our commitment to customer excellence.

Learn More About XD15NW®

Due to specialized manufacturing, very few mills are capable of producing nitrogen steels. But it's worth it. XD15NW®'s nitrogen component enables unparalleled corrosion resistance, and high cleanliness supports superior fatigue resistance and hardness.

Sullivan Steel is the exclusive supplier of Aubert & Duval's XD15NW® in North America.

For more on XD15NW® or any of Sullivan Steel's products, contact us today.

Sullivan Steel Your source for high-performance metals.

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