

UDBG - Baja Tire Test of all-new BFG All Terrain T/A KO2

Note: Photos sluggish, captions embedded below photo identifier.

My elbow hurts, hurts a lot. That pain is accompanied by amazement, not dismay, because of how the nerve got whacked; I broke a \$100,000 race car.

PHOTO UDBG_KO2_CannelliP_-1979

Looking dusty after miles of Baja rocks and dust, this Baja Challenge Buggy is equally ready for another 1000 mile race, or the abuse of invited journalists like us.

Photo KO2 Baja Map

Until the BFGoodrich All Terrain T/A KO2 went rolling off ahead of us, the trail had appeared clear, only a nasty bump ahead. "Chris, this is going to be bad," I said to my co-driver. If only I knew how bad. Instead of a left wheel drop off a high point, we dropped and promptly—suspension fully compressed—struck a sex stone, AKA a BFR (big funny rock). Exit the tire, wheel center, and two hub mounting points—we weren't going anywhere.

BFG invited Ultimate Diesel Builder Guide to Baja to test tires, their new All Terrain, the tire which has, in several iterations, dominated most Baja races since 1977 when Scoop Vessels agreed to run the then-unproven radial tire in a 1,000 mile race. He won; BFG's future grew brighter. Since that time BFG has accumulated 80 race wins and a majority of first place finishes (26 of 27 recent). That is, of course, due to the trucks, the teams, the drivers, but also to the ruggedness of the T/A race tire. Race on Sunday, sell on Monday applies to tires as well as trucks.

photo UDBG_KO2_CannellNik-6637

Dan Newsome, BFG LT truck operations manager, delivers technical and market information about the KO2 tire at Horsepower Ranch.

Tires don't only race, they support our trucks, keeping us safe, stopping our trucks, planting tire contact patches firmly for braking, and delivering traction in snow, mud, and over nasty off road gravel, dirt, and rock. Though an excellent tire, the T/A had room for improvement as the decades rolled on.

Customers reported needs for upgrades to the popular All Terrain T/A, specifically a tougher tire better able to resist wear on harsh gravel roads. They wanted more robust sidewalls with increased resistance to sidewall splitting and better traction in mud, snow, dirt, and rock. So, here's where we dive into technological trivia and how BFG's claims stack up against real world conditions.

Photo ComboView.jpg

The latest All Terrain A/T KO2 displays a “dog bone” tread design that’s quiet on the highway, fiercely aggressive off. Those bones lock together to create near-solid tread when challenged.

Any tire engineer will gleefully, or ruefully, tell you that every tire is a compromise. If you make it last longer, it gets harder and has less traction. If you make it sticky, it wears. If you make it quiet, it wears, and if you make it dig for traction it gets noisy. If you use silica (as do most these days) it can make tires slippery. Notice that BFG claims longer wear and durability with increased traction? Another factor is heat buildup. Big bulky tire treads, like those on the KO2, make heat as they flex forward and release—which also makes the wonderful single-note aria you hear from some aggressive off road tires. Yeah, we had a few questions for BFG tire engineers, more than a few.

Questions started with ply strategy. Engineer Jon Jewell said they optimised the types of ply cord to increase overall toughness and dropped the count from three to two (for lighter duty trucks, not our D/E rated tires), using heavier cord structure and nylon sides.

Customers had complained of sidewall splitting and data said 84% of all tire failures were sidewall related, 60% of those caused by sidewall splitting. BFG invented a machine, essentially a simulation of road debris like a chunk of steel, that tries to cut the sidewall, not the tread. Imagine a machete sticking out from the car wash guide rails. Testing was simple, drive over the cutting tool. If the tire sidewall design survived, move the knife higher towards more vulnerable parts of the sidewall and do it again—and again—and again. The result is the massive wraparound shoulder rubber of the KO2. The shoulder and ply change is what Goodrich calls Race Proven CoreGard® Technology. Incorporated into the shoulder edges are deflector channels that do their best to push away any stone or rock that attempts to infiltrate the sidewall, rolling them off and away.

Photo Cutaway.jpg

Here’s the color code: Black is the tread or sidewall, no surprise, with the tread and shoulder wraps clearly visible. Beneath, the red highlights a single full-width nylon cap ply, the light and dark gray are KO2’s two steel belts. Underlying all, colored gold, green, and blue are structural radial support plies. In this graphic our diesel truck D and E rated tires use the three ply design, lighter duty tires will have two structural support plies.

Tire buyers wanted quieter tires that were more aggressive in traction, mutually opposing ideas, plus there’s that heat thing. Like any good engineers, BFG’s studied the tread blocks, finding a way to create the necessary big chunks of rubber while making them quiet. Their answer came from sister Michelin, whom they punked. Their 3D sipes are, to say the least, unusual. Tire sipes are usually simple razor cuts that increase the number of biting edges on a contact patch by literally slicing the blocks into smaller pieces. Hmmm, that would increase wear, wouldn’t it? Not this way. The 3D sipes *look* like straight cuts, but describe an “S” shape as they enter the tread block with an 0.8mm cut. Inside the depth goes to 0.2mm and interlocking lugs further lock the block into place once the tread block(s) is set. So, as the tire rolls forward it has more biting edges, as individual block sections move past that initial contact bite, they lock together

in large, wear-resistant, chunks for traction in mud and dirt. BFG says KO2 has 60% more biting edges.

Photos HR_sipecut and HR_sipecut6

These illustrations make the S shape perfectly clear. Below the initial sipecut, molded-in undulations (lugs) lock up when pushed together. This creates a near-solid tread block when needed, an open, water-mud-snow drain at other times, and creates many more biting edges for traction.

Noise was addressed by computer algorithms that spaced and sized the blocks to prevent, as much as possible, noise creation. The goal is a series of frequencies spread out across the spectrum, white noise. The block design itself resulted in better water traction as the water can pass out in any direction, never getting trapped: there are no blocking points to stop water from moving. Additionally, in tough going the “dogbones” interlock with other shapes to form a greater tread surface. Hard to see, but there, are triangular “stone ejectors” sunken below tread depth. Their function is to prevent stones from stuck between tread blocks and then drilling into the tire carcass. They work!

Another request from tire buyers was for better wear, particularly from owners who drive on stone and gravel. The technical term is chip and tear, which was solved using proprietary rubber compounds. We suspect engineered carbon molecules together with man-made and natural rubber, some clever polymer engineering, and doses of silica. One test was running tires with different compounds and weighing them to see which had lost the most rubber! Engineers call simple, useful, tests like this elegant.

Still in the traction department, think about a tire that works in snow and sand, from -15°F in Houghton, Michigan to 100+°F in Baja California, Mexico. Normally when a compound is sticky in the summer it has as much winter traction as a bowling ball, and the reverse. Winter tires last a month or two in summer. So here’s a tire that lasts, works in snow and mud, and has what the company calls Side Biter Lugs for rough traction, particularly when aired down for off roading. They’re the rounded edges that alternate with cutting or sculpted edges. Another development, which we tested (oh, wow, how we tested them) are Mud Phobic Bars. Ever run your truck through mud and end up with packed tires? You know you have. These seemingly insignificant little bits of tire rubber will spit a King’s Ranch of mud and clean the tires. We *never* got our tires filled and compacted, and we surely had the opportunity when we met Hurricane Norbert and its 3-10” of rain during our test.

photo 596B0478

Best practice for rocks, put the tread as close to centered as possible. If not, the wraparound CoreGard tech delivers plenty of sidewall protection.

The last surprise, well, we kinda gave it away, is that the same tire that runs Baja has the 3-peak mountain symbol attached, as it exceeds rubber manufacturers association standards for severe snow. That is, traction on par with dedicated winter tires according to BFG tests. Overall, the promise of 20% tougher sidewalls, 200% more durability on gravel and 15% more on asphalt, 10% improved mud traction were all put to the test (we’re hoping for a rematch to see if the advertised 19% improved snow traction is delivered—hopefully not in open buggies!)

Photo Sat 31 BFG KO2 Baja Bower Media (not perfectly clear - use small if used)

Using cut tread samples, BFG engineers explain construction at Horsepower Ranch.

After gathering the second of three waves of tire testers in San Diego we all bussed directly, with a stop at the border, to a familiarization with our Baja Challenge race prepared buggies and Ford Raptor “test beds”. Helmets size and fittings, safety lecture delivered and learned, use of the Raptor’s electronics, experiencing the slip of the BC buggies clutch. we did it all—in helmets. For the entire posse, BFG’s emphasis was on being safe, not racing—but going fast—and not driving over our heads. The last thing anyone wanted, including we drivers, was something evil to happen. From there, dinner at Horsepower Ranch. If you’ve ever read about Baja you know Horsepower Ranch is the Baja Off Road Mecca. It’s where we dined and learned about the BFGoodrich Tire Company, the history of Baja, and the technology of the new All Terrain T/A KO2 tire.

photoUDBG_KO2_CannelliP_-1970 UDBG_KO2_CannelliP_-1973 UDBG_KO2_CannelliP_-1974

1970 From a speeding bus we caught sight of a maker for Horsepower Ranch.

UDBG_KO2_CannelliP_-1973. Once inside, a lengthy bar with more off road history than we could comprehend offered cold refreshment and a glimpse into the tall, and true, tales that had been told.

UDBG_KO2_CannelliP_-1974 Dinner in the sombrero and beast decorated main room, its walls covered in Baja racing history.

The next morning We returned to Horsepower Ranch to seek out our assigned vehicle, a BC Buggy. One of the warnings about these \$100,000 race cars was that they were unstable, in fact, squirrely, on pavement. Oh, that is true! Steering might be as well by tiller as the steering wheel—when on asphalt. Once on dirt, nirvana. BC Buggies are built to a spec class of Baja racing so “anyone” can arrive and race. Anyone with \$100,000 (for up to four drivers), which includes the use of the vehicle, a support crew, and everything needed to run the Baja 1000. For our use the race cars had been slightly detuned.

PHOTO - UDBG_KO2_CannelliNik-6642.

Our BC buggies, clean, shiny, ready for action. Ready for inexperienced wannabe drivers that is. These are the BC Challenge buggies you can rent and run Baja yourselves, just dial up Wide Open Baja and plunk down cash.

Under the steel tube chassis are Fox double reservoir shocks and a Subaru B-25 boxer motor in 200 horsepower tune (race is much higher). The engine is normally aspirated and lives about a foot from your helmet. Gauges are basic, warning lights tell the tale of engine oil pressure (if the red light goes on, shut it down!), as does the oil pressure gauge, alternator yellow warning (if it goes on, worry, and look at the amp gauge) that maybe suggests you’re dead in the water, or dirt. The transmission is race-built and essentially a VW design gearbox reimaged and hardened. We were warned to shift slowly as speed shifts could also blow the \$10,000 transmission.

PHOTO UDBG_KO2_CannelliNik-6652

Looking into the cabin, twin cooling fans are inches from helmets. Gauges are basic, warning lights critical. Subaru's boxer B-25 engine is below, coupled to what's essentially a VW microbus transmission with better case and gears.

There is no windscreen in a BC Buggy, only the roll cage hoop, and Baja is rather dusty; we met with clouds of mud, dust, dirt, and rain. So, helmets are equipped with a positive pressure fresh air system called Parker Pumps; we breathed clean air. Seat belts, five-point, are required and used, as are window nets to prevent flailing arms. Buckets are lined with padding and comfortable, with no drains for water—we'll tell you why that's important later. Some departed in Ford Raptors, twice as powerful, but twice as heavy. We would be the last to drive the Raptors.

PHOTO UDBG_KO2_CannellNik-6649

As close to a 2500-3500 truck as we got, still plenty good! Raptors are made for off roading with enhanced traction control, enhanced engine control, and a gutsy 6.2-liter V-8 and skid plates everywhere.

Leaving Horsepower Ranch we discovered the truth about Buggy's and pavement, that is, pitch and catch. Just let them run and push them back between the lines. That said, they're much wider at the wheels than you think, so it's important not to put the driver's side wheels into oncoming traffic. With communications between driver and co-driver, radio comm for the groups, we were always in touch. The formula was this: lead car announced something like "Left at (mile) 17.2" and succeeding buggies repeated their mileage in sequence. We, BC #4, were tail end except for mechanics and chase.

Once off the pavement we immediately put the new T/A KO2 to the test as roads were more rock gardens than trails. "It smells like flint, sharp, almost metallic" I remarked to Chris, my co-driver. If you've broken rock or cement, that's the acrid sharp aroma shattering rocks. To say it was rough would be an understatement, yet the buggies rolled over it with almost no sensation. For a few miles. One of the hardest ideas to grasp for a truck owner, or anyone who's driven vehicles off road, is how much suspension articulation there is in a BC Buggy, 20" of travel, and how soft many of the bumps are. You braced for impact and it was more pillow fight than slam to the canvas. Until it got rough, really, really rough. If you've driven trucks off road it's likely at a modest speed, not 40-60mph as we were traveling. Some experienced team drivers wore kidney belts!

Chris and I switched places, he subjecting me to the pounding I'd inflicted on him, with an ongoing joke of "why are you abusing me so badly? I was nice to you...". As our confidence in the rear drive buggy grew we attempted to drive like the pro's in line with us, Baja winners like Bryce Menzies, Ryan Arciero, Andrew Comre-Picard, Rob MacCachren, Rich Minga, and Kyle Tucker (that I remember). The technique is similar to rally driving; point to the inside, let the rear start to drift, and nail the throttle. We sucked 90% of the time—but that 10% of blissful sideways sliding made it worth striving for.

Photo UDBG_KO2_CannellNik-6681
UDBG_KO2_CannelliP_-1993

Moments before impact we'd paused for a driver change. You can see the abuse suffered by the wraparound sidewalls. They really did the job in pushing penetrating stone and rock out of the way.

Chris surrendered the wheel, each of us having driven about 50 miles, and I broke the buggy 12.4 miles later.

UDBG_KO2_CannellIP_-1994,

UDBG_KO2_CannellIP_-2001

Unfortunately no mechanical system is abuse proof, something we proved. Everything is intact—except the knuckle connection to the rack. Kind of important, you know. Oh, and the center of the wheel is completely broken. Look at about 1 o'clock and you'll see where the departing aluminum cut the tire right at the shoulder. Massive abuse and it almost held air.

It was after some hard hills, an easy left hand sweeper and we were atop harder ground rather than putting wheels into runoff ruts. Ahead a nasty little drop off of about 12" promised a good jolt. "Chris," I said over the intercom, "this is going to be bad". I delivered on that promise as, once over the bump (which was not all that bad), with left front suspension fully compressed I struck that rock. BLANG; and the left wheel rolled straight down the road, the wheel center had been torn out, fracturing part of the hub/

UDBG_KO2_CannellINik-6685 UDBG_KO2_CannellINik-6695

6685 Two chase cars, both with mechanics, were on the scene in minutes. All knew the BC buggies inside out, had tools and jacks; they'd done this before!

6695 I walked back to see if the rock was still there, it was, and precisely in the wrong spot, exactly where the tire and wheel had to be on the line I'd (sadly) chosen.

"Car 4, at 12.5 (miles), broken and stopped, suspension" I reported. Mechanics from Wide Open Baja, our support crew, were soon on the spot. Chris was scooped up, and I awaited a ride. Which turned out to be sort of good fortune as ACP, or Andrew Comrie-Picard, X Game participant, North American Rally Champion, Baja 1000 Class winner took me on as passenger. And we promptly attempted to make up 30 minutes of lost time in one of the most savage, hair-raising, sphincter-puckering rides I've had and that includes right seating John Buffum, Rod Millen, a host of race drivers, and driving portions of the Dakar Rally route.

We made it to lunch, catered and what you would call genuine, authentic Mexican (!), and had our car returned to us all freshly rebuilt. Little did we know it would get worse, at least in personal comfort, as Hurricane Norbert was coming ashore, headed towards us.

photo UDBG_KO2_CannellINik-6698

Post lunch, our lineup of buggies ready to deliver more excitement. We've been on many tire tests: skid pads, wet skid pads, race tracks, you name it. This beat them all!

Chris started, I followed, and the rain came down. With no windscreen, only our helmets kept vision clear. Well, with the help of the occasional palm across the Lexan. Then we hit mud as the rain continued. Deep, thick, viscous mud mixed with water. Did we mention that the buggies have openings to drain water? They're even better at letting it flow in over your feet! I was the first to go through a puddle too quickly and

waves came across our bow, drenching us with muck and mud. Try as we might to avoid it, mud continued to splatter us. We switched, and Chris got revenge!

photo UDBG_KO2_CannelliP_-2015

Photo UDBG_KO2_CannelliP_-2032

Chris' mud splattered helmet tells just part of the tale, mud starts at our toes and never ends. The exterior tells a better story of how our day at the spa; we got the full mud bath experience!

After a couple of hours of misery the sun came out and all was good. It was unfortunately temporary. The rain and tornados (really, there were no tornados as no Weather Channel reporters were there to observe...) were soon upon us.

photo UDBG_KO2_CannelliP_-2037 UDBG_KO2_CannelliP_-2039

Faces protected by helmets there's no muddy faces. Shorts, shoes, legs bodies—a completely different story.

Rain began again in buckets instead of simply downpouring. Soon the very roads we drove were awash in water running—somewhere. This is where we proved the merit of the new KO2; we didn't get stuck despite being axle-deep in slime. If you've seen a mud-bog race, it was us. Mud was hurled from back tires straining for traction and we never stuck, never faltered. BFG's tire engineers later admitted that the drive went far beyond their own testing, far more and deeper mud than they'd envisioned. And then our road disappeared in a flood plain.

At one point, with water flowing across our laps, we wondered if there were drains in the bucket seats. There were not; soon our cheeks were as wrinkled as our sphincters, if you get my drift. Wide Open Baja, please put drain holes in the seats, OK?

Photo UDBG_KO2_CannelliP_-2009

Photo UDBG_KO2_CannelliP_-2020

Soon after we left the sunshine, only half an hour into the rain, the road ahead was washed over with running water.

2020 Another quarter hour, which seemed like an entire afternoon in a cooler, and we were barbed wire fenced in. We turned back, retraced some steps, and the water got deeper. There were waves in the water covering out course!

After slogging through two hours of mud and cold rain—the temperature dropped to the 40's—our alternator quit. First the voltage fluctuated from 15 volts to 11, which means battery only, then the yellow warning light came on, finally staying on. We were dead in the water, literally. Once again Chris and I split up, he arriving at Mike's Sky Ranch in time to do a bit of rock crawling. I was stuck with the car and, shivering and feeling drowned, riding with Hector, our chief mechanic. He is not a specifically a racer, though you'd never know it by his skill, speed, and obviously oversized cojones!

After coffee, an attempt at drying off (some, like me, had zero forethought and no clean, warm cloths), and dinner, we hit the bar.

photo UDBG_KO2_CannelliP_-2045

All's well that ends with beer, and food. Gourmet? Not really, but filling and delicious.

Mike's Sky Ranch is off road headquarters. It is legendary, remote, unique. It feels like Africa, South America, another era. It also has beer and Tequila, which eased

the chill. Walls are covered in memorabilia: posters, photos, banners, and hats. We watched old movies of Baja until the generator shut down at 11PM.

Photo: Sun 109 BFG KO2 Baja Bower Media

Before the lights went off, before we drank the last beer, Mike's Sky Ranch gave us a moon to admire.

The following morning, our last day of "racing", dawned gray, with the promise of rain. Our squishy seats were covered in Hefty bags, those with rain coats donned them in a primitive attempt to ward off the storm clouds. We again drove off into rocks.

Photo UDBG_KO2_CannelliP_-2051

Photo UDBG_KO2_CannelliP_-2057

Chris struggles into his helmet, and we have a new car for the day, one with squishy seats covered by Hefty bags for our delicate butts.

2072 Both ready, buckled in, air hoses attached and communications plugged in, we were ready.

No rain, faster roads, stout and steep hills to climb, and no car problems. It was a glorious day of driving. Chris set the speed record (he claims!) at 72mph. And it was he that drove over the hillcrest above the Pacific. We drove along the coast, kicking up dust, for another half hour until we reached lunch in a cow pasture filled with trucks, buggies, and the buzzymost flies anyone could recall in one place. Lunch was tortillas filled with beans and seafood or chicken. There we switched to Raptors for our final leg.

Photo UDBG_KO2_CannelliP_-2072.jpg

Despite visible use and abuse, only one tire was destroyed (ours), one sidewall cut by a projecting rock that mimicked the sidewall test machine. That's toughness.

UDBG_KO2_CannelliP_-2077

Swooping over a crest and there, barely 300 meters away, the Pacific Ocean redolent with salt. Another amazing moment in our journey.

UDBG_KO2_CannelliNik-6728

Our Raptor journey hugged the coast most of the afternoon, delivering beauty and a desire to return.

The last half-day was in startling, comfortable, contrast. We had windscreens, air conditioning, tinted windscreens. We had quiet. Because of the quiet we were able to hear, rather, not hear, the tires on pavement. This confirmed the last of BFG's claims, that the new KO2 was quiet. We were surprised by the lack of road noise from such an aggressive tire tread, one that had gotten the Raptors out of as much mud and muck, as it had us.

We arrived to Juan's Acambaro Market, half way between Santo Tomas and Estero Beach Resort and surrendered our trucks and buggies, adventure almost complete. We drank beer, ate quesadillas, drank more beer and compared notes, then returned to Estero Beach Resort to swim, get a hot shower, and complete the journey over dinner. Our tire test days were done, absolutely never to be forgotten. For me, this goes into the same scrapbook as the final Paris-to-Dakar Rally in Africa, the first Paris-to-Dakar Rally in South America, it was magnificent.

Mon 62 BFG KO2 Baja Bower Media.jpg

We surrendered the Raptors reluctantly, they are a great ride, but were rewarded with cold adult beverages. “Una cerveza más, por favor!”.

Sidebar: Tires for your diesel

Photo UDBG_KO2_CannelliP_-1988

caption: Though this tire looks a bit worse for wear, it is one that has run over the worst of Baja, yet show practically zero wear. If your truck runs on dirt, rock, gravel, anywhere rough, this is tire to consider next time you need them.

With no mention of diesels in the story you’re wondering. No fear. At launch BFG will offer 12 sizes, which are already available in stores as we hit the news stand. Later, a full lineup of 61 sizes will be available by the end of 2015. The launch lists LT275/70R17 121/118R LRE, which fit Ram 2500-3500, as hitting the street first, followed by LT235/85R16 120/116S LRE, LT265/70R17 112/109S LRC, LT265/65R18 122/119R LRE, and LT265/70R17 121/118S LRE. That covers many Ram, Ford, and GM Heavy Duty 2500-2500 products, as well as their lighter duty siblings. Note that most are in the E load range, so plenty strong to wrap around your 8-lug rims.