2015
Product Manual

JAMIS
THE POWER OF DESIGN

2015 JAMIS TECH INFORMATION

CARBON FIBER TECHNOLOGY

near net MOLDING

NEAR NET, NOW ON ALL CARBON MODELS

The manufacturing process we pioneered in 2009 and once featured solely on our Xenith SL and Team frames has trickled down and is now a mainstay on all our carbon fiber models (excepting those featuring Near Net SPV, of which there is more info on the next page). Here's a quick primer on how this works and why it matters.

Once we've selected material and resin and determined our lay-up schedule, compaction is where it's at as far as carbon fiber structural integrity is concerned. If the interior design has constrictions that bind bladders or the bladder material doesn't sufficiently sustain air pressure, fiber wash or wrinkling in the fiber and pooling of resin is likely. While this is not unusual in most carbon fiber frames today, it represents unnecessary additional weight and a possible stress riser.

That's why four years ago we took monocoque manufacturing methods to the next level with our Near Net Molding technology. NNM utilizes both removable silicone pre-forms at the main stress points of the frame (head tube, BB, seat tube/top tube) and bladder-wrapped polystyrene cores in the balance of the frame that recede as the oven heats and the bladders are pressurized. This process produces an interior that is nearly as smooth and pristine as the exterior, what we call "near net". With every gram of excess resin squeezed out, every length of fiber flattened and aligned, you're assured the lightest, stiffest, strongest possible frame.

Carbon fiber that is pre-impregnated with resin is laser cut to specific shapes that will form the tubes and joints of the frame

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Polystyrene tube shapes covered with bladders and silicone joints are used to make a pre-form over which the carbon fiber is laid

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The carbon fiber and pre-form are placed in a steel mold and left to cure in an autoclave

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The bladders are inflated and the silcon expands with the heat, pushing the carbon fiber against the walls of the steel mold from the inside

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Once fully cured, the frame is removed from the mold and the polystyrene, bladder material and silicon is removed from inside

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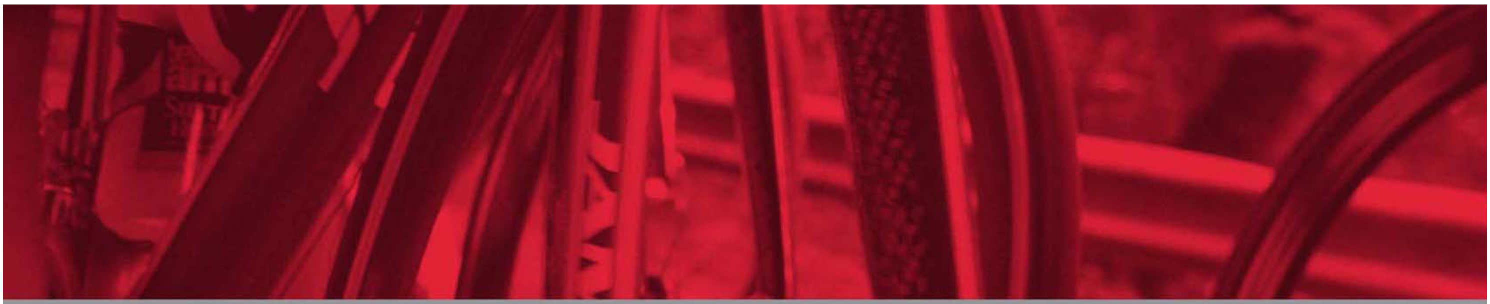
The stays, which were produced in the same fashion, are bonded to the main triangle and final machining and finishing is done

DYAD SUPREME	OMNIAD ELITE	DYAD ELITE	OMNIAD PLUS	DYAD PLUS
High Modulus Carbon Fiber	High Modulus Carbon Fiber	High Modulus Carbon Fiber	Mid Modulus Carbon Fiber	Mid Modulus Carbon Fiber
M40 / M30	FULL M30	M30 / T700	FULL T700	T700 / FRP



Carbon fiber that is pre-impregnated with resin is laser cut to specific shapes that will form the tubes and joints of the frame

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SILICONE joints and POLYSTYRENE tube shapes covered with bladders are used to make a pre-form over which the carbon fiber is laid

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The pre-form with full carbon fiber lay-up is placed in a VACUUM pre-mold that sucks out all the air trapped between the pre-form and multiple layers of fiber

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The carbon fiber and pre-form are placed in a steel mold and left to cure in an autoclave

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The bladders are inflated and the silcon expands with the heat, pushing the carbon fiber against the walls of the steel mold from the inside

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THE NEXT BEST THING IN NEAR NET

Too much of the marketing for carbon fiber bikes is focused solely on the material: how high is the modulus? The rationale being that since modulus is a measure of stiffness, then surely the higher the modulus the better the material! And if higher modulus carbon fiber is more expensive, then clearly it must be better! It ain't always true. That's like saying white bread is better for us than whole wheat simply because it's undergone more processes in it's manufacturing.

The truth is, making the lightest, stiffest, most comfortable and most durable frame is not just about what carbon fiber you use, but how you engineer to use it and how you manufacture with it. It's about what you lay-up and where. It's about how you compress and set the fibers. Design and engineering are King. Compaction is Queen. And material is the Princess that the media and marketing love to write stories about.

We've taken our revolutionary Near Net dual-molding manufacturing process, that utilizes both silicone and polystyrene internal cores to support the frame shape while it is being pressurized within the steel mold, and added a vacuum purge procedure before molding that compresses and eliminates all air between carbon plies. Compaction is absolutely optimized. Not only is weight reduced while stiffness and strength are increased, but over-reliance on fragile and harsh-riding super-high modulus fiber is minimized. The result is a lighter, faster, stiffer, stronger frame that simply rides better.

FRAME TESTING

TAKING IT TO THE LIMIT

All our frames and forks are tested continually to meet or exceed (in some cases, well exceed) EN standards 14764, 14765, 14766 and 14781. We conduct these tests at our frame manufacturing facilities, but we also use EN accredited testing laboratories such as Intertek and SGS to verify the results of our own tests. If these tests aren't telling us everything we want to know about our bikes, we increase the loads and cycles, or we determine another way to test. Where current hydraulic testing machines, jigs and hardware aren't up to the task of emulating some of the forces and impacts our bikes might be subject to, we've designed our own.

We relentlessly cycle test for fatigue from pedaling and torsional forces on every single frame size, with deflection tests for stiffness at every point of the frame. Brutal impact tests with massive weights dropped on fixed frames or forks are performed. Then reversed, with weights attached to the frame, the frame hoisted to a given height depending upon product type, then released.

This destructive testing is enormously instructive and important. And it is in continual process. But it's our ongoing non-destructive testing of frames and forks fresh off the factory floor that's just as vital.

For our carbon fiber frames, EVERY frame is weighed to make sure it's neither resin rich nor resin deficient. We also measure the stiffness of each frame in 6 critical areas as a check on lay-up production. Each deflection test must fall within 5% of the standards our machine and field-testing have established. This weighing and stiffness deflection testing guarantees every single frame we produce meets all Jamis manufacturing protocol and will deliver the ride qualities we defined and demand.

REYNOLDS STEEL

REYNOLDS

STEEL KEEPING IT REAL

Back when we started building our first bikes in the late 70's, steel was the only way to go. Fast forward 35 years and steel is no longer the industry's dominant frame material, but we still love to work with it and ride it. Why? Hit a baseball with a wooden bat then with an aluminum bat and you'll know why. You want your frame material to soak up streets and trails, not beat you with them. Not to mention the stuff is durable, can handle nicks and dents and gouges without cause for alarm, and is easily repairable. We like the look of those straight, skinny tubes, too. And we use only the best, from Reynolds.

Reynolds pioneered the techniques of making butted tubing around the turn of the century, and their 531 manganese-molybdenum tubing was the standard of excellence for many decades. In 1995, Reynolds introduced 853 (and a non-heat-treated version, 631, two years later); the world's first commercial air-hardening steel for bicycle frames and Jamis was one of the first brands to use it in 1997. Welding steel often results in a 40% strength loss, requiring thick tubing walls as an offset. Not so with 853 and 631. This material actually gets stronger at the weld zones, allowing Reynolds to draw the tubing thinner for a lighter, stronger frame.

Though the high performance and buttery-smooth ride qualities of Reynolds 853 and 631 usually grab all the headlines, our frame building is equally over the top. All tubing is cleaned before being cut, jigged and welded. All tubing cuts are de-burred and buffed before welding. We use heat sinks in the head and seat tubes to control distortion. And our low-angle welding tracks form precisely arced, low-profile TIG beads while dispersing welding heat more widely, yielding a frame that requires less post-welding alignment. Add investment cast or water-jet cut dropouts for great looks and extra strength and you've got a labor of love that rides like a dream.

THE DIFFERENCES BETWEEN 650B AND 29″ MOUNTAIN BIKES

650b wheels first popped up on French touring and randonneuring bikes in the 40's and 50's. Their smaller-than-700c diameter and fatter 35 – 42c footprint made them perfect for meandering the less-than-perfect roads of Europe with loads. They were also used on some of the first mountain bikes built by Tom Ritchey and Joe Breeze more than 30 years ago.

But it was 26″ wheels that took hold and dominated MTB diameters for 20-something years until Gary Fisher rolled out his big 29″ wheels more than a decade ago. Those first 29'ers were tall, heavy, with huge wheelbases and sluggish steering. Like how Gary musta felt the morning after. And that was the hardtails! Trying to package those over-sized wheels in a mid-travel, dual suspension frame that was worth owning just wasn't happening. But there was no discounting that the roll-over-anything attributes of this wheel size and their low-BB-height-to-wheel-axle position held promise.

All of which was the catalyst for Kirk Pacenti in 2007 to polish up and re-pioneer the slightly-smaller-than-29″-but-larger-than-26″ 650b wheel size for mountain bikes. We were on it immediately and after testing a 5″ travel Dakar XAM with Kirk's 650b wheels later that year, were absolutely smitten with the ride qualities and went all-out to get to market with our 5″ travel Dakar 650b in 2009.

So there's your wheel-size history lesson for the day. Here's your wheel-size physics lesson.

It shouldn't take too much brow furrowing to recognize that for any given size obstacle it's the larger size wheel that's going to roll-over that bump with the least energy expended. Think Monster truck versus Tonka truck.

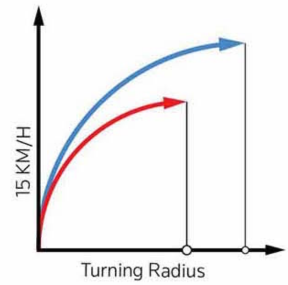
It also shouldn't take much cognitive wavelength to surmise that a larger diameter wheel, weighing more, is going to require more energy to get up to speed than smaller wheels. But once up to speed bigger wheels are going to roll and roll without much gas. Until you've got to slow it all down and change direction, then get it all back up to speed again. Lots of trade-offs going on here depending on wheel size: acceleration, deceleration, inertia, maneuverability, momentum, weight.

Less obvious is the benefit of lowering BB height relative to the wheel axles. Though the BB heights of most 650b and 29″ bikes are about the same from the ground, their relation to the wheel axle centerline is substantially different. The crank centerline on a Dakota D29″ bike is 13mm lower relative to the wheel axles than on a 650b Nemesis. Getting the rider's weight further below the axles of rotating wheels is like pedaling with a stabilizing ball: you're riding between the wheels, not on top of them.

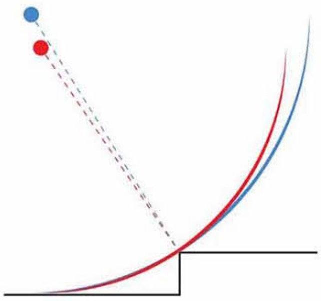
So where does that leave us on the various wheels sizes? Big wheels are clearly the way to go. There are way too many advantages over the traditional 26″ wheel to ignore. But to throw a stake into the ground and claim that it's an either/or proposition: only 650b or only 29″ is the only way to go is ignoring the clear benefits each wheel size holds over the other. And it's why we offer both through much of our ATB line. Leaving you a whole host of great choices depending on the kind of rider you are and the kind of terrain you ride.

Bead Seat Diameters

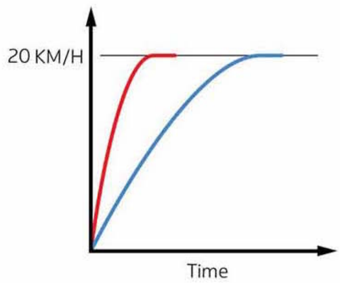
Cornering



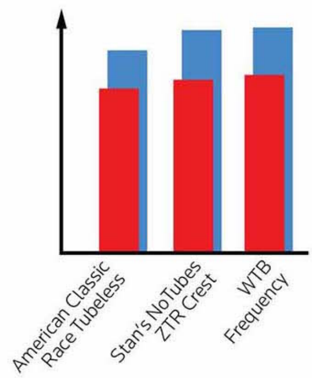
Roll-Over



Acceleration



Weight



MP4

THE MAGIC OF MP4

All great engineering is based on simplicity. Find the most elemental solution possible, refine it, reduce the complexity, and you're done. And that's how our mp4 suspension has evolved.

Our mp4 designs rely on a single primary pivot, located just above and behind the bottom bracket centerline. Because this single pivot takes most of the load we don't need a plethora of heavy bearings—just two really good ones. And because everything happens at this one location, we can place it in such a way that it minimizes braking influences, reduces pedal kickback and unwanted movement due to chain tension.

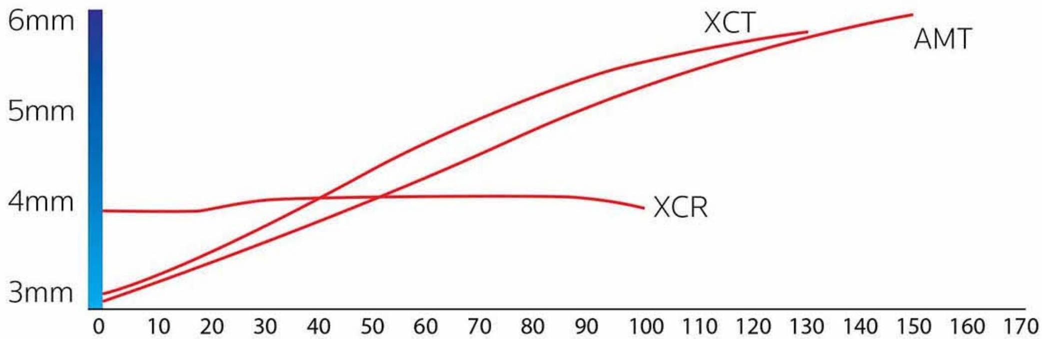
The seatstay pivot improves geometry with a consistently near-vertical axle path throughout the wheel's travel, for better suspension movement over tiny stutters and big hits alike. And structurally, the bell-crank helps shore up the rear triangle against lateral movement and improves torsional rigidity so the rear wheel stays in plane—there's no wandering or fishtailing because the axle's so well controlled.

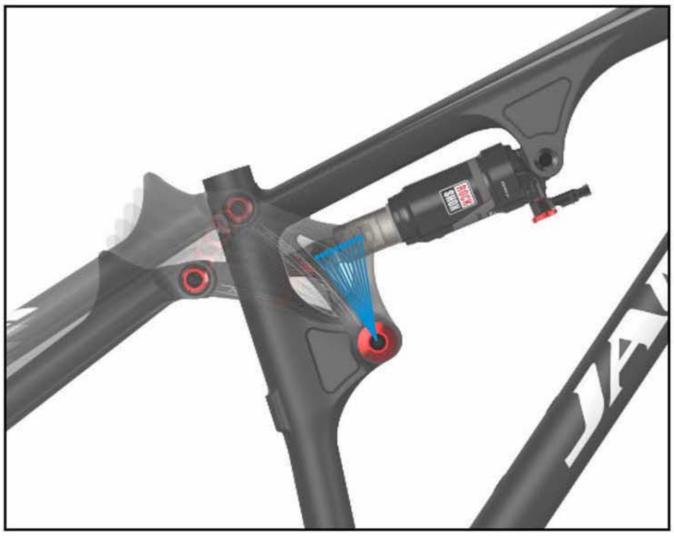
But it's where these pivots are placed in relation to bell-crank triangulation and shock placement that creates the real magic of mp4.

On the XCT and AMT, our pivot placement produces a slight, rising-rate spring curve. This means you don't get a sudden ramp-up as the suspension compresses—there's nearly linear response in the fat part of the travel curve, for supple action over stutters and medium hits, with a bit of ramp-up as you approach the travel limits and a nearly bottomless suspension feel that's ideal for mid-travel rigs like the XCT and AMT.

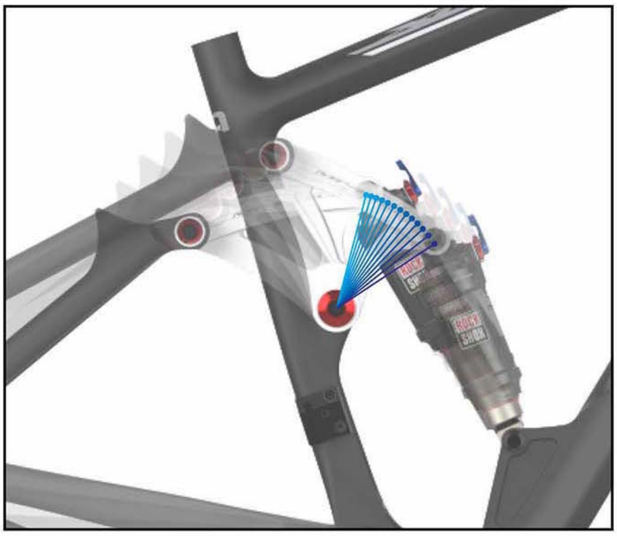
On the shorter travel XCR, we're pure linear, so the suspension provides a constant pedaling platform from the beginning for efficient power transfer off the line, on climbs and sprints, or when hammering in the big ring on a fire road downhill. When coupled with the naturally progressive spring curve and tune-ability of an air shock, the system is ready to soak up unexpected hits when you miss that line in a nasty rock garden.

Shock Stroke Increment per 10mm of Wheel Travel



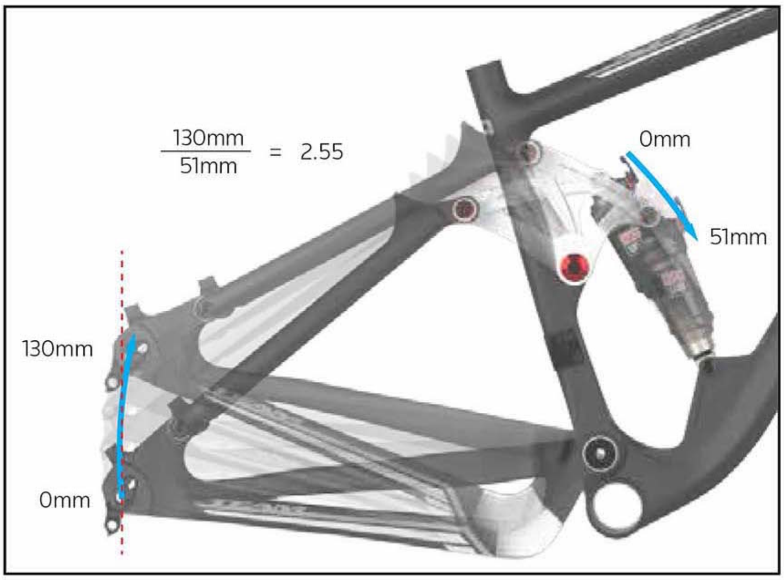


DAKAR XCR 29



DAKAR XCT 650

Wheel Travel to Shock Travel Ratio



DAKAR XCT 650
2.55:1 RATIO

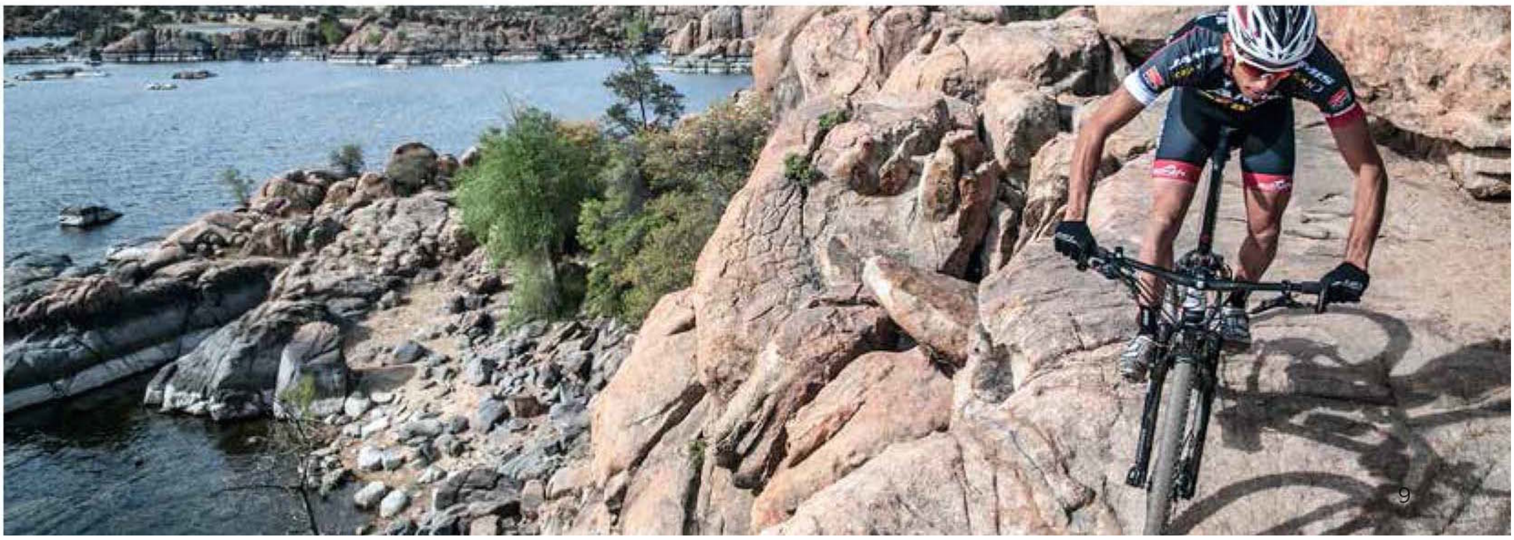
THE LOW LEVERAGE ADVANTAGE

We're big believers in the benefits of low shock leverage ratios. With leverage measured as the ratio of wheel travel to shock stroke. The mp4 design comes in at 2.55:1 on our XCT's and 2.63:1 on our XCR's and AMT's. This is really important, when it comes to suspension smoothness and durability.

For one thing, you get better performance from the shock with a low leverage ratio. There's less force being taken up by the shock, which reduces stress on the shock internals. And because you're employing more of the shock's throw for the fat part of the travel curve, the suspension action is much smoother and better controlled.

A low leverage ratio means you don't need super high spring rates, which translates to improved shock sensitivity. External rebound and compression damping adjustments can be made in much finer increments, which wouldn't make an appreciable difference on more leveraged designs. You can make better use of the shock's tune-ability (and today's shocks are impressively tune-able).

What's more, a lower spring rate lets you run less air pressure, which improves shock sensitivity and vastly extends seal life.



XENITH WINDSHIELD II

THE NEXT GENERATION OF BREAKING THE WIND

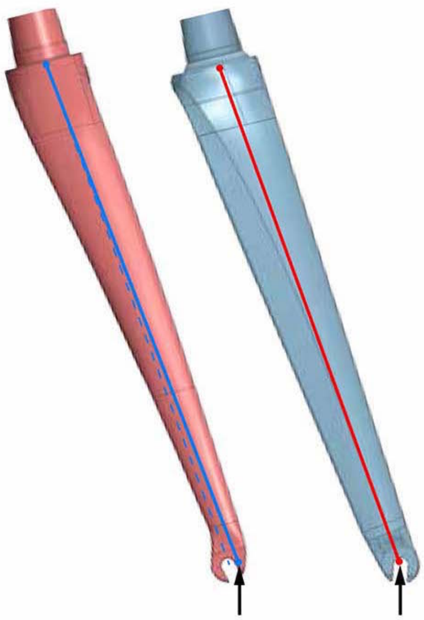
Our chief design criteria when engineering the new Xenith frame platform was to make it lighter, stiffer, more impact resistant, more comfortable and more aerodynamic. In that order. The listing of "more aerodynamic" as last in this inventory of performance attributes is not without intention. Frame design is always about compromise; it's always about prioritizing one riding attribute over another. Designing a frame to be the most aerodynamic, the lightest, the stiffest AND the most comfortable is simply not possible.

The professional riders of Team Jamis/Hagens-Berman p/b Sutter Home were adamant about what to do when told we were working on the next gen Xenith and wanted their feedback on every element of the frame they had been racing (and winning) on before our engineering team would commence. Their response was unanimous -- if you can make it stiffer for sprinters likes JJ, great; if you can make it lighter for hill climbers like Janier and Tyler, great; as for impact resistance, comfort and aerodynamics, sure, if you want, but don't change a thing about the fit, handling or the balance of the bike, it's perfect as is.

With the teams' design guidelines defined, we did lighten and stiffen the new Xenith frameset and we did increase impact resistance and comfort by implementing NearNet SPV.

But we also improved aerodynamics. The advantages of our original Windshield fork, which shrouds the rear-facing front brake on our T2 time trial bike within the fork blades, has been proven time after time in the wind tunnel and on the racecourse. That project and experience led us to develop a lighter version for use on the new Xenith SL, Team and Pro. Our new Windshield II fork design with trailing direct-mount brake reduces drag by nearly 4% compared to last year's fork with leading caliper brake. An advantage you're sure to appreciate the next time you're pulling a breakaway or closing the gap solo.

ECO FOR ENDURA



ENHANCED COMPLIANCE OFFSET

A fork's sole purpose is to secure and steer the front wheel. But there's a whole lot of engineering involved in making sure your bike doesn't just steer, but steers "just right". Not too sluggish. Not too twitchy. And has sufficient lateral and torsional stiffness to hold a line at speed, under turning loads, while still being able to dampen road vibration for comfort and control.

One of the chief variables between forks is a measurement called "rake". Rake refers to the curvature or angle of the fork blades as measured from the center of the steer tube to the center of the dropouts. More rake for any given head tube angle will equate to faster steering, with less input required to make the bike turn. But steering characteristics are not determined by rake alone. It is "trail", a measurement calculated from wheel size, head angle AND fork rake, which tells us how fast a bike will actually steer. More trail yields slower steering, less trail produces faster steering.

One of our design goals for the new Renegade and Enduras was to optimize fork compliance for greater control and comfort without compromising steering characteristics, lateral stiffness or torsional rigidity. A torsionally flexible fork will slow steering on descents and fast corners. There will be a noticeable lag between handlebar input and the bike's reaction.

We accomplished our goals with E.C.O. -- Enhanced Compliance Offset. The ECO fork blades are swept forward a few millimeters to reduce the angle of the fork leg to the road, which increases vertical compliance for a more comfortable and controlled ride. A reinforcing rib on the inside of the fork legs assures both lateral and torsional stiffness. Most importantly, the Renegade and Endura's "just right" handling traits remain unchanged, even with the more forward bent fork blades, because the ECO trailing dropout design negates the increase in fork rake maintaining trail for optimal steering characteristics.

THE EVER EVOLVING BOTTOM BRACKET

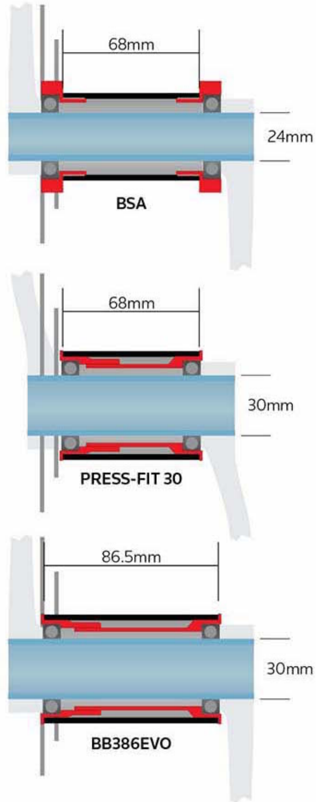
There are a number of BB standards in the bike industry right now. Here is what you will find on our bikes, and why.

Traditional: The BSA standard. The standard forever. A steel BB spindle, 17mm in diameter, turns within a 68mm or 73 mm shell and upon sealed cartridge ball bearings that are threaded into the BB shell. Not particularly light, not especially stiff (by today's standards), but reliably durable and definitely cost effective.

External Bearing: The BB shell is still 68mm or 73mm wide and just under 35mm in diameter, but the bearings have been moved outside the BB shell (Shimano Hollowtech II, SRAM GXP, FSA MegaExo). This allows the spindle diameter to be increased over 40% to 24mm and hollowed for a huge stiffness increase with a significant weight reduction. The larger diameter spindle does not compromise bearing size because all bearings now reside outside the frame. The spindle is also better supported with bearings nearer its ends rather than its center.

PressFit30: PressFit30 (SRAM) is a derivative of the BB30 (FSA) system. BB30 increases the spindle diameter to a whopping 30mm for the ultimate in stiffness. But because the BB shell's inside diameter is also increased from just under 34mm to 42mm, bearing size is not compromised. The challenge with BB30 is that bearings are pressed directly into the frame, leading to durability issues if there are any frame or bearing tolerance deviations. The beauty of the PF30 system is that bearings are housed in nylon cups that are pressed into the frame's bottom bracket shell. Bottom-line advantages of the PF30 system over BB30? Improved bearing-to-shell interface, greater bearing durability and simplified installation.

BB386EVO: The BB386 EVO bottom bracket design amplifies the benefits of the proven BB30 and PF30 system. It takes the lighter, stiffer 30mm alloy spindle from the BB30 design, incorporates press-fit bearing cups from the PF30 system and marries both to a wider 86.5mm BB shell (which is the same width as on a standard 68mm shell with external bearings). All without changing Q-factor. Why a wider shell? It allows us to increase the diameter of our seat and down tubes at the BB shell a full 30%, for increased stiffness where you really need it. We can also optimize chainstay design with an increased diameter that doesn't crowd the rear tire.



ADAPTIVE CABLE ENTRY

2.3mm Hole and Cable Stop for Mechanical Derailluer Cables | 6mm Hole for Brake Cable or Di2 Wire | Flat Plate Cover for Unused Hole When Running Di2 | 8mm Hole for Hydrolic Brake * Supernova Only

KEEPING IT ALL INSIDE

Before electronic shifting was a commercial reality, we were torn on the benefits of internal cable routing. The advantages – stunningly clean aesthetics, no cable stops to chip, ostensibly cleaner cabling systems – were counter-balanced by its chief disadvantages – the extra weight and friction of full-length housing or interior guide tubes and the labor-intensive challenges of installation and replacement. Given our engineering emphasis on performance-first design, we previously outfitted our road-racing Xeniths with externally routed gear and brake cabling. It was light. It was simple. It was easy to maintain.

But with electronic shifting, it makes much more sense to run everything inside. Attaching and affixing wiring and harnesses externally is every bit as laborious (think cable ties, adhesives and external mounts) as running them internally, where they are much more protected as well. Not to mention, running this stuff inside just looks right.

Which is why every 2015 Xenith, Endura, Renegade, Supernova and Xenith is equipped with our new Adaptive Cable Entry system. ACE allows our frames to elegantly and easily manage the internal routing of brake and derailleur cable housing OR electronic Di2 wiring. Models specified with standard cable-actuated drivetrains will be outfitted with ACE plates with integrated cable stops. But we also include with every bike an extra set of ACE plates for Di2 wiring should you ever wish to make the jump to electronic shifting.