

**RESHAPING THE FUTURE OF CYCLING**



**2004**

ITEM	QTY	LENGTH	DESCRIPTION	FORMING	DESCRIPTION	APPROVALS	DATE
T1	1.0	4.31	TT-1-450-070-325	HEAD BUTT PER DWG# HTXLM0-02	DELTA CABLE STOP, 0.75"	DWN. BY: R. COOGLE	09/02/03
T2	1.0	21.50	TT-1-550-028-325	TOP TUBE	DELTA CABLE STOP, 1.138"	ENG: B. DEVANEY	
T3	1.0	17.00	TT-1-375-028-325	SEAT TUBE	BUTTRON HEAD SCREW, M5 x 0.8mm		
T4	1.0	25.63	TT-2-000-026-325	DOWN TUBE	TI INTEGRATED BEARING CUP, BOTTOM		



Team Ofoto Training Camp, San Francisco, CA

Performance with passion! This is the essence of Litespeed. Our passion for performance continually pushes us to reshape the future of cycling. For over two decades, we have been striving to create lighter, faster, higher performing bicycles. It is this one guiding principle that led Cycle Sport Magazine to name Litespeed as one of the most influential bicycle manufacturers of the 20th Century.

Most view us as a titanium bicycle company exclusively, and while we take great pride in being the world leaders in titanium bicycle fabrication, we think of ourselves as much more than that. We design and build high-performance bicycles using the best materials available for the specific application. We choose to focus on titanium because we feel that today it is clearly the best overall material for building a high-performance bicycle frame. However, we also design and build bicycles and bicycle components using different alloys of aluminum and carbon fiber composites. These materials, especially due to their value, have a place in high-performance cycling and can be used to create very good performance-oriented bicycles.



# Choosing the Right Material

## Handling

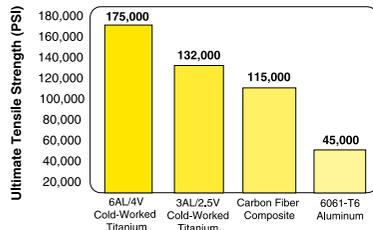
Another important attribute when evaluating any frame is handling. We chose not to rate it on a scale because handling is a very subjective measurement and one that every rider will need to evaluate for themselves. Primarily dictated by the geometry of your frame, handling refers to the way a bike steers, climbs, descends, accelerates, and sprints. Although geometry is critical, other factors can heavily affect the way a bike will handle, including fork rake, wheel design, as well as stem, saddle, and bar positioning.

Each of these characteristics has a distinct effect on performance. Yet they cannot be evaluated totally independent of one another. Change any one of these and you most likely change them all. Therefore it is important not to get too focused on any one property but to appreciate the overall frame performance.

## Why Titanium?

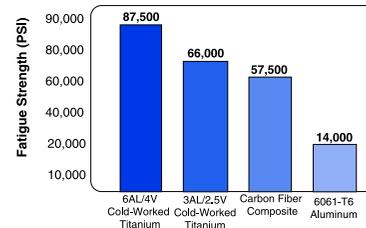
In the world of high performance bicycle frame design, there are three primary materials being used today; titanium, carbon fiber composites, and aluminum. All three materials have properties that work very well in cycling. However the titanium alloys 3Al/2.5V and 6Al/4V offer the greatest overall combination of physical, mechanical, and chemical properties to yield a frame with the best possible combination of durability, ride quality, stiffness, and weight. And to understand exactly why these titanium alloys work so well you need to first understand each property and then more importantly how they all interact together. There are seven primary material properties which factor greatly in bicycle frame design:

## Tensile Strength



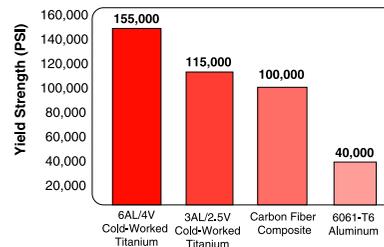
Tensile strength is the basic measurement of strength of a material. It is specifically a measurement of the force required to pull apart a material. In frame design, the higher the tensile strength the better. More strength allows less material to be used thus saving weight.

## Fatigue Strength



Fatigue strength is the measurement of how far and how many times a material can bend before it breaks. High fatigue strength is essential to the durability and safety of the frame. Certain materials such as steel and titanium actually have a threshold that if properly designed and used, can be bent an infinite number of times without failure.

## Yield Strength



Yield strength measures how much force it takes to permanently bend a material. As with tensile and fatigue strength, more is better. The very high strength levels of titanium once again allows less material to be used which saves weight.

## Toughness

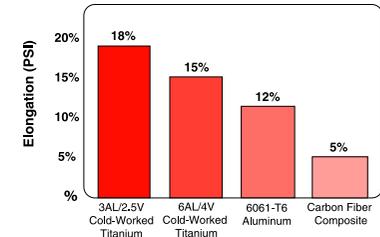
Toughness is the property that defines exactly how much a material can stretch before failing. Titanium is an incredibly tough material. Its toughness vs. weight ratio is one reason it is used as armor in military applications. Aluminum has good toughness as a raw material, but manufacturers have to be careful when designing an aluminum frame to make sure to not let the tube walls get too thin. Toughness is the achilles heel of carbon fiber composites. If carbon receives an indentation, fibers have most likely been severed, strength has been reduced, and the possibility of further fracture has seriously increased.

## Density

Density is simply the weight of a material for a given volume such as pounds per cubic inch or grams per cubic centimeter. Of the three materials measured here, carbon is the lightest weighing approximately .065 lb/sq. in. Aluminum is next in line at .098 lb/sq. in. And titanium is actually the heaviest at .160 lb/sq. in. The density of a material certainly is an important factor in materials evaluation, but the more important analysis for cycling applications is the material's density relative to its strength and durability.

## Elongation

Elongation specifically measures the percentage a material will stretch before tearing or cracking. This is an important



property to evaluate when you're looking at bicycle frame materials. You want a material that will give slightly before it breaks. This in essence becomes a safety factor. Titanium has excellent elongation (15% to 20%) while remaining an extremely durable material.

## Corrosion Resistance

Corrosion (or the lack thereof) plays a key role in the life expectancy of your bicycle and influences the amount of care or maintenance you must put into your bike to keep it in good shape. Fresh water, salt water, sweat, hot, cold, ultra-violet light, infra-red light; none of these elements or conditions will have any effect whatsoever on a titanium bicycle.

## Conclusion

Each of these seven properties has a significant effect on the performance of your bicycle frame. However it is crucial to appreciate the collective contribution of all these properties. Focusing on any singular property could lead to inaccurate conclusions as to the overall performance of your bicycle.

# Litespeed Frame Technology

By now you have a pretty solid grasp on the type of frame you are looking for and a better appreciation of why titanium is the ultimate frame material for creating a true high-performance bicycle. What we would like to do now is introduce you to Litespeed and what goes into the design and creation of the twenty-two different frames we offer.

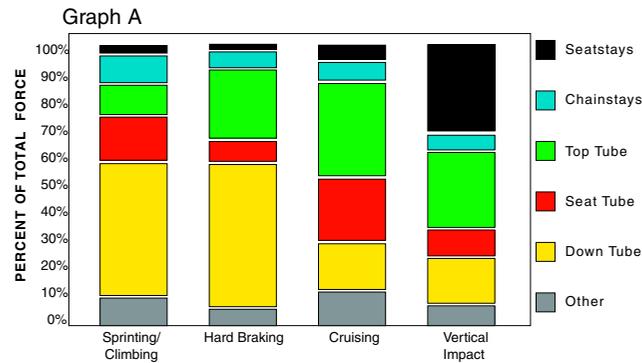
In wind tunnels, laboratories and race venues around the world, we have conducted extensive research and testing and have successfully gathered a wealth of knowledge on how to build the highest-performance bicycles on the planet.

## Frame Stress Analysis

Our years of research have confirmed that bicycles undergo a multitude of different forces when ridden, including; torsion, bending, compression, tension, shear, and aerodynamic to name a few. The location, magnitude, and direction of these forces differ given the type of riding being done. Further, within any given frame, specific tubes will experience very different forces depending on the type of riding being done. To successfully achieve the desired performance target of the bicycle, the designer must have a solid appreciation of what types of forces exist, their magnitude, and their direction during the various aspects of riding. The designer must also have a clear understanding of how these forces travel through the frame and how this path is altered as design changes are made to a particular tube. Only with this information can intelligent decisions be made as to what materials and tube shapes best fit the application.

Graph A explores the magnitude of forces on individual frame tubes and demonstrates how they can change given the type of riding exerted on the frame.

Take for instance the change in force on the top tube during hard braking as compared to sprinting/climbing. The top tube is stressed 2.5 times more during hard braking as compared to sprinting. The minimal role the seatstays



play until a vertical impact takes place is another excellent example of just how much forces can vary as you change riding styles.

In addition to understanding the magnitude of forces placed on individual frame tubes, we also need to factor in the effect that directional forces created under load will have on a frame's performance.

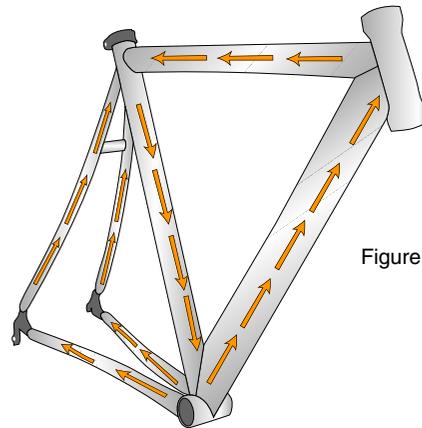


Figure A

Figure A depicts the direction of the forces generated when a bike incurs a vertical impact load. In other words the arrows indicate what direction the different tubes want to move when you apply a vertical impact such as bunny hopping or rolling over the lip of a driveway.

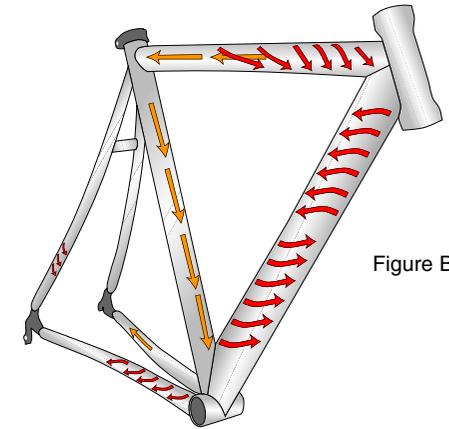


Figure B

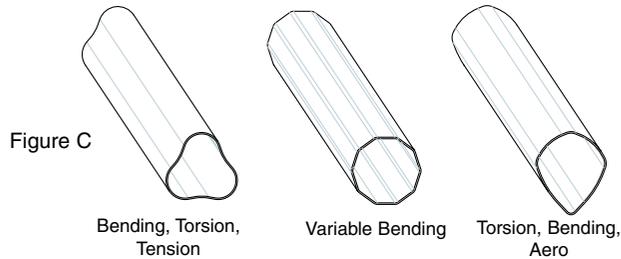
Figure B shows the direction of the forces created under a torsional load such as sprinting. The red arrows effectively demonstrate the twisting loads placed on the individual tubes and the yellow arrows demonstrate the bending loads that occur at the same time.

The detailed stress analysis that we perform for every one of our frames is a critical step in the frame design process. It enables us to decide on what material we want to use and where. More importantly it has given us the information needed to create tubes that are stress-directional-specific and work to counteract the various forces.

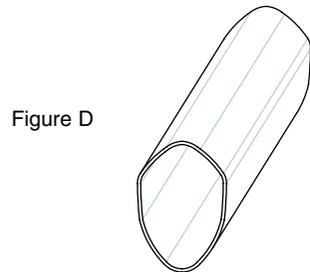
## Geometrically Enhanced Tubing (G.E.T)

We have found that by creating very specific tube shapes we can build frames that will better resist the various types of forces generated in cycling. For example, a round tube will better resist torsional or twisting loads, a rectangular or square tube performs best against bending, and a bladed design is excellent at reducing aerodynamic drag. Given that any tube may undergo one or all of these forces as riding style changes, it becomes obvious that there is no one tube shape that is perfect for all styles of riding. Round tubes make a very good bike, but this single shape simply cannot efficiently address all the different forces any given tube will be subjected to during riding. A round tube will perform well as long as the forces are purely torsional. But in reality there is no riding

circumstance where 100% of the force on a tube is entirely torsional. Modifying the outside diameters and wall thicknesses can offer improvements, but even then compromises will have to be made.



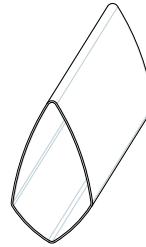
Litespeed combines all the data in each riding case and creates cycling specific geometric tube shapes for each part of the frame. Figure C shows examples.



Take for example, the Vortex top tube (Figure D). This diamond-shaped top tube is designed with consideration given to the specific forces that the top tube will encounter. In this particular case the design parameter is 40% torsion, 55% bending, and 5% aerodynamic. This combination is perfectly suited for the intended use of our Vortex frame.

Likewise, the Vortex down tube (Figure E) is shaped to engage 60% torsion, 30% bending, and 10% aerodynamic forces. This provides a balance of stiffness for climbing,

Figure E



descending, and cruising that normal round tubes simply cannot match.

Each tube of each frame that Litespeed designs takes all these factors into consideration. The end result is a wonderful array of frame choices that address each individual's riding styles and preferences without sacrifice. Geometrically Enhanced Tubing is taking Litespeed to a whole new level in high-performance bicycle technology, one that imitators can only hope to follow.

## Titanium Frame Fabrication

Titanium bicycle frame fabrication is a very difficult process namely because the material itself is extremely complicated to work with. It is extremely difficult to machine, shape, and weld and there is literally zero tolerance for error in any of the processes. Further, it requires special dies, fixtures, expensive cutting tools, strong and accurate equipment, and most importantly a great depth of knowledge in how to use these tools to craft the world's finest bicycle. In a nutshell, its complexity is the reason there are so few titanium makers in the world. We know because we've been custom fabricating titanium for over 40 years.

## Cold-Working

Ironically, one of the properties that makes titanium so difficult to work with is part of the reason it is the best material for a high-performance bicycle frame. Titanium

reacts significantly to cold-working. Cold-working is any process that permanently bends or alters the shape of the metal at room temperature. This process actually increases the hardness and strength of the material. This reaction is commonly called work-hardening. The benefit to the frame is an increase in strength without any gain in weight, giving the designer the option of reducing the overall weight should the increase in strength not be necessary.

## It's All In-House

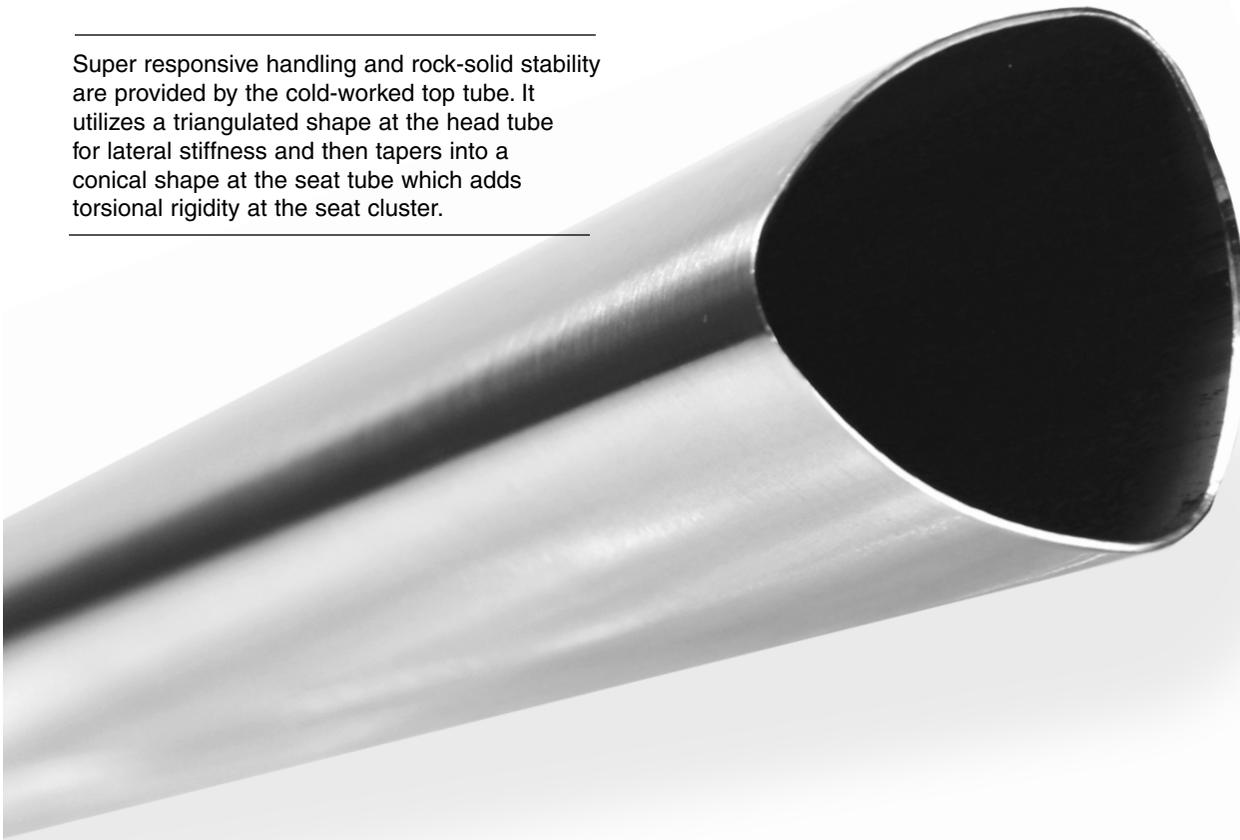
In order to keep all the complications of working with titanium under control, we believe in the axiom "If you want it done right, you better do it yourself". At Litespeed not only do we build bicycle frames, we CNC machine all the small parts of the frame such as drop-outs, bottom bracket shells, cable guides, etc. We do all the forming, shaping, and bending of every tube. We make all our own tooling, dies, and fixtures. We even design and build much of the equipment necessary to create bicycle specific titanium tube sets. By doing all this ourselves we are able to maintain the quality assurance necessary for our products. This also gives us the added benefit of rapid and efficient innovation. For example, if we need a change in a tube shape, we have the ability to create the necessary tooling literally overnight as opposed to the weeks and months it could take by having it outsourced.

Our flexibility and speed in manufacturing is just one example of how we are able to continually push the technological envelope in bicycle design. Our dedication and passion to always improve is what drives us every day to build lighter, faster, higher performing bicycles. We hope you enjoy reading through the details of our 2004 product guide and we encourage you to visit us at our website at [www.litespeed.com](http://www.litespeed.com).

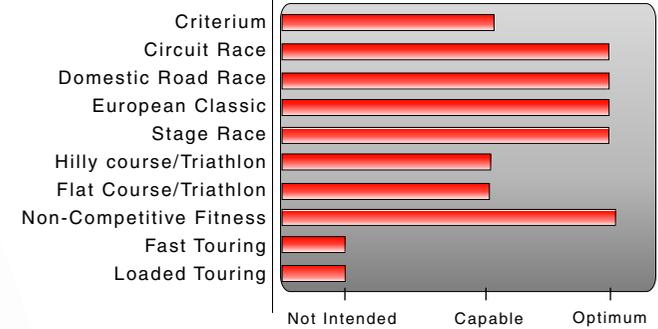
# Ghisallo

Now in its third year, the Ghisallo continues to set the bar as the lightest production frame in the world. Its medium/large frame size weighs a mere 1.99 pounds, with no weight limit and a full lifetime warranty. New for 2004 we have increased the lateral stiffness of the frame with an oversized seat tube that along with its other Geometrically-Enhanced tubes delivers heart-pounding acceleration and climbing ability.

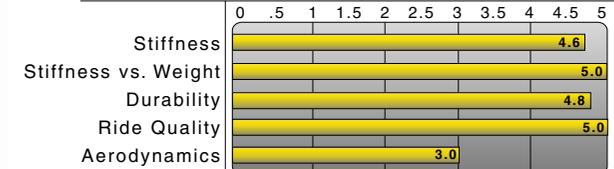
Super responsive handling and rock-solid stability are provided by the cold-worked top tube. It utilizes a triangulated shape at the head tube for lateral stiffness and then tapers into a conical shape at the seat tube which adds torsional rigidity at the seat cluster.



## Performance Styles



## Performance Attributes



Note: Scores are based on Litespeed rating scale and demonstrate differences between various models within a given category.

## Advantage

Unmatched climbing ability  
Lightning quick acceleration  
Great power transfer

Superior comfort

## Feature

Sizes :: S M M/L L XL

Certified 1.99 pound compact-geometry frame (size M/L)  
Small rear triangle  
Teardrop shaped down tube (biaxially shaped on sizes L and XL) and new oversized seat tube (31.6 seat post)  
Vertically-compliant, radially-curved seatstays

# Titanium :: Road



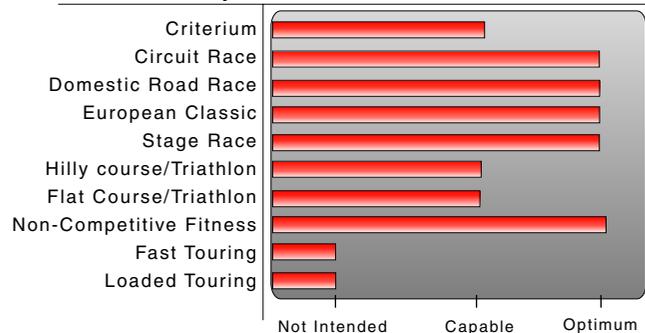
Titanium :: Road



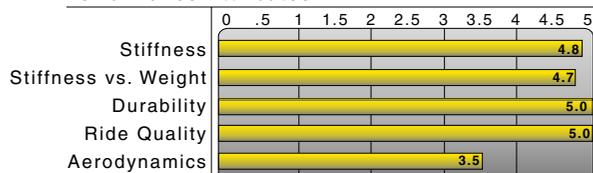
The most celebrated Litespeed ever; the Vortex snatched multiple victories in Ironman competitions as well as stage victories in 2002's Tour de France. Its geometric tube set provides athletes tremendous energy-transfer and adds to the rock-solid stability of its front-end. The new teardrop-shaped chainstays allow for even more raw, out-of-the-saddle power.

# Vortex

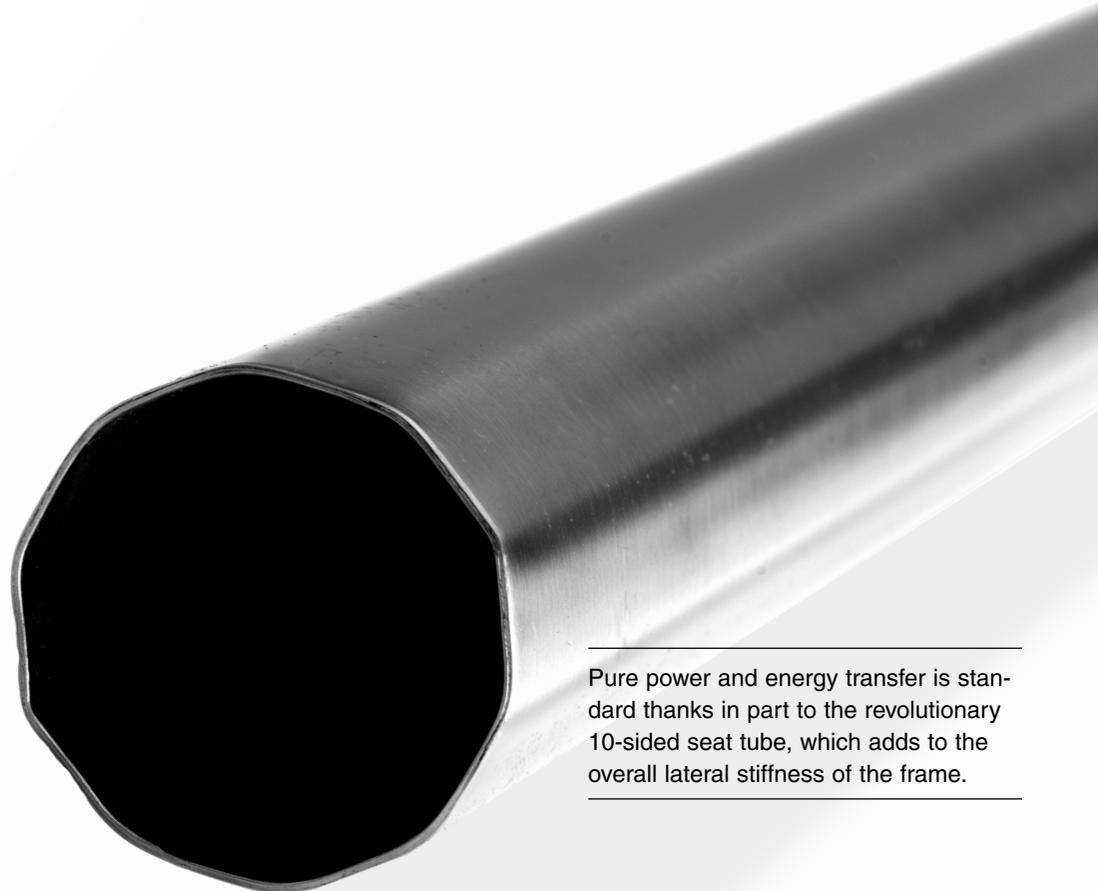
## Performance Styles



## Performance Attributes



Note: Scores are based on Litespeed rating scale and demonstrate differences between various models within a given category.



Pure power and energy transfer is standard thanks in part to the revolutionary 10-sided seat tube, which adds to the overall lateral stiffness of the frame.

## Advantage

- Increased power transfer
- Unrivalled strength to weight ratio
- Great power transfer
- Control and comfort

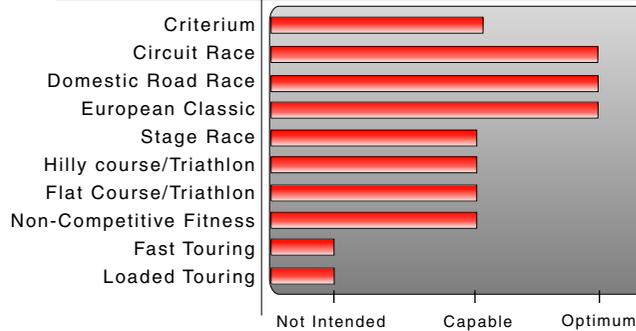
## Feature

- Sizes :: 49 51 53 55 57 59 61
- New, more aggressive teardrop-shaped chainstay
  - 6Al/4V titanium, cold-worked, geometrically-enhanced frame
  - Oversized 6Al/4V diamond-shaped down tube and oversized seat tube (31.6 seat post)
  - Tapered 6Al/4V diamond-shaped top tube

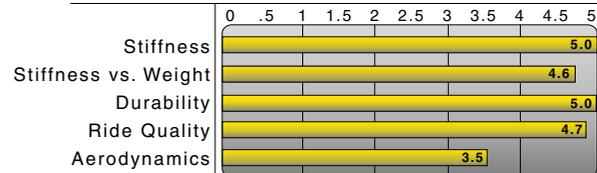
# Ultimate

As difficult as it may seem, our engineers have actually found a way to further improve the Ultimate for 2004. From the precision engineering of its all-new Geometrically Enhanced Titanium (GET) tube set to the smoothness of its new aero-bladed LiteTEC HP carbon monostay, every stroke yields superior power and performance, no matter what the road holds in store.

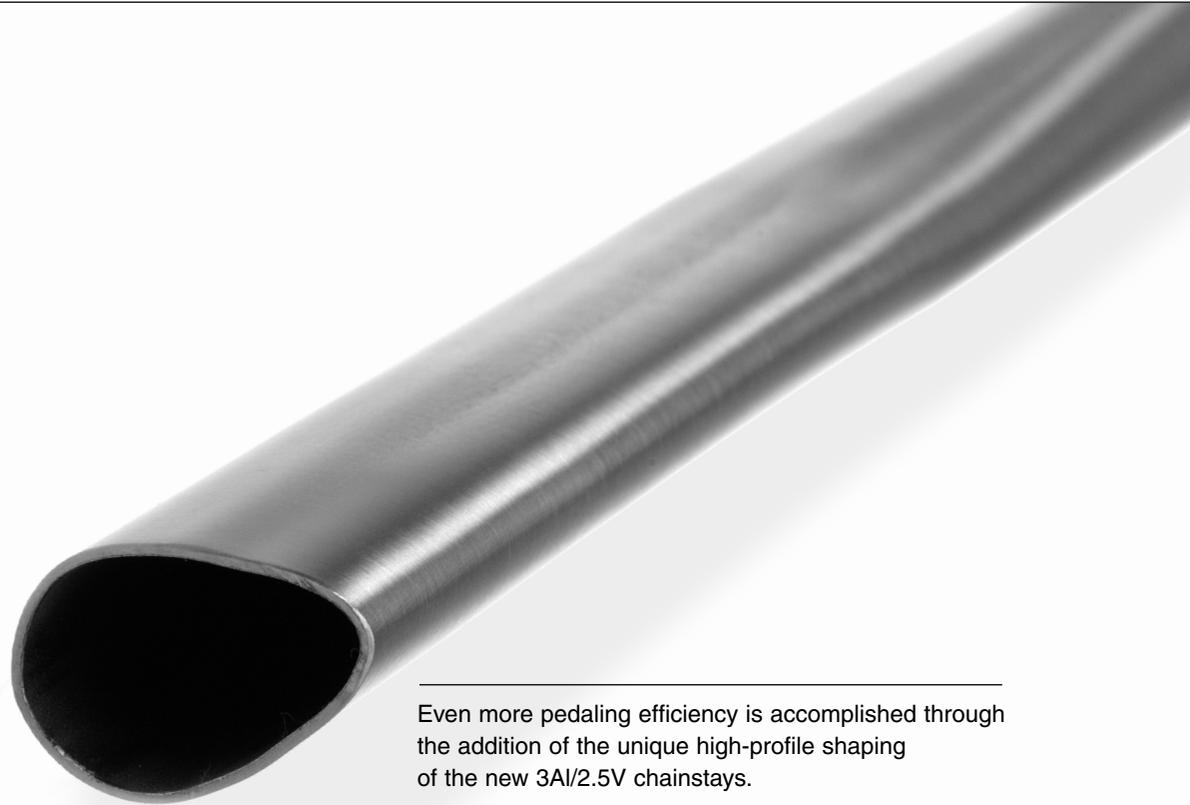
## Performance Styles



## Performance Attributes



Note: Scores are based on Litespeed rating scale and demonstrate differences between various models within a given category.



Even more pedaling efficiency is accomplished through the addition of the unique high-profile shaping of the new 3Al/2.5V chainstays.

## Advantage

- Confidence-inspiring front-end stability
- Great power transfer
- Incredibly smooth and comfortable
- Increased power transfer

## Feature

Sizes :: 49 51 53 55 57 59 61 63

- New cold-worked 3Al/2.5V shaped top tube and integrated head tube
- New oversized 6Al/4V tapered, diamond-shaped down tube and oversized seat tube (31.6 seat post)
- New aerodynamic, LiteTEC HP carbon seatstays
- New, more aggressive teardrop-shaped chainstays

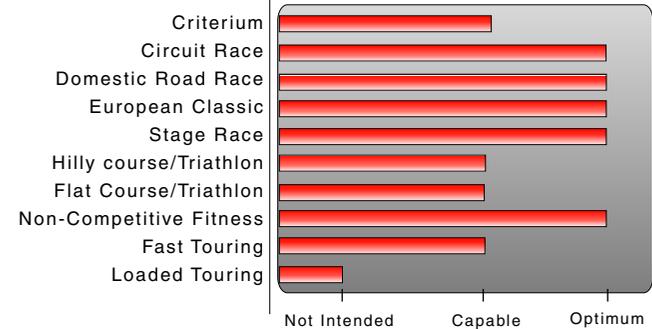


# Tuscany

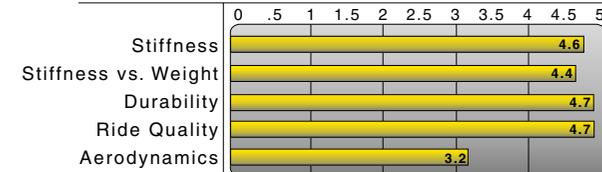
Constructed of cold-worked 3Al-2.5v Geometrically Enhanced Titanium (GET) tubing, the Tuscany inspires confidence and is truly impervious to the demands of the road. Its all new shapes for 2004 are not only eye-stopping but they also supply pure adrenaline to any speed addicted cyclist that craves more. With the new black paint scheme option, its external artistry now complements its head-turning structural beauty.

Precise steering control is delivered by the cold-worked cloverleaf-shaped top tube. The added stability will give you the confidence to descend faster than you thought possible, especially through the toughest curves of your favorite ride.

## Performance Styles



## Performance Attributes



Note: Scores are based on Litespeed rating scale and demonstrate differences between various models within a given category.



The Tuscany's appointed gloss black paint.

## Advantage

- Precise handling and control
- Superb acceleration and sprinting
- Magical ride quality
- Stunning good looks

## Feature

Sizes :: 47 49 51 53 55 57 59 61

- New GET 3-leaf clover top tube and integrated head tube
- Diamond-shaped 3Al/2.5V down tube and oversized seat tube (31.6 seat post)
- Litespeed signature, radially-curved seatstays
- Bright brushed finish or elegantly appointed gloss black paint



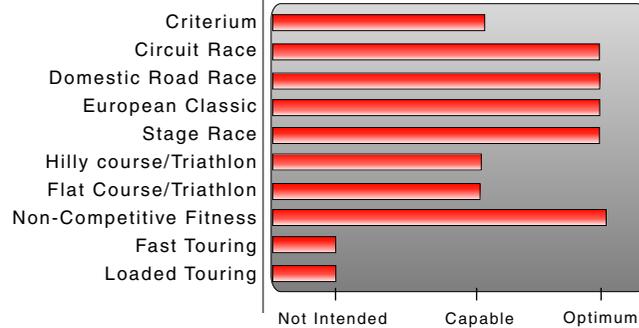
Titanium :: Road



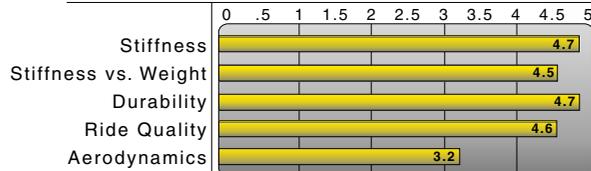
Our most popular compact frame design, the Siena, sets the bar for other compact makers, and one spin around the block will let you know why. With the remarkable damping performance of our titanium-enhanced carbon seatstays and the unmatched stiffness and handling of our cold-worked frame, the speed might shock you but the ride definitely won't.

# Siena

## Performance Styles



## Performance Attributes



Note: Scores are based on Litespeed rating scale and demonstrate differences between various models within a given category.



The unrelenting harshness of the road is negated by the unique titanium weave of the new LiteTEC carbon seatstay. The titanium's strategic location and pattern have been designed to re-route the road's vibrations, ensuring its dissipation before it ever reaches the seat and you.

## Advantage

- Superior in-saddle climbing
- Precise handling and control
- Remarkable speed and power
- Incredibly smooth and comfortable

## Feature

Sizes :: S M M/L L XL

- Super-light and nimble compact frame design crafted from 3Al/2.5V titanium
- New GET 3-leaf clover top tube and integrated head tube
- Oversized seat tube (31.6 seat post) and diamond shaped down tube
- New aerodynamic, LiteTEC HP carbon seatstays

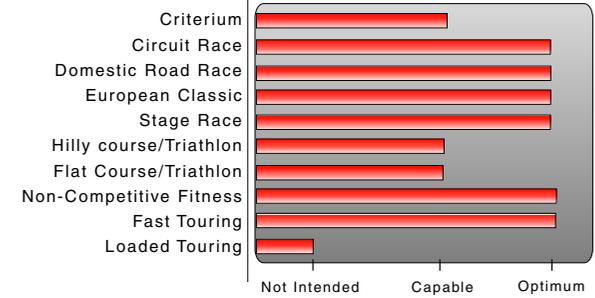
# Classic

The Classic sets the standard with its traditional road geometry and ignites the soul with its ability to carve tight corners. Its cold-worked 3Al/2.5V titanium tube set and European geometry are equally suited to the racer or the rider who simply enjoys local group rides. The Litespeed Classic will forever be "a classic".

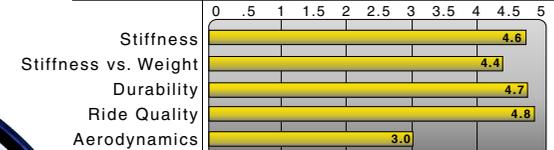
## Titanium :Road



### Performance Styles



### Performance Attributes



Note: Scores are based on Litespeed rating scale and demonstrate differences between various models within a given category.

### Advantage

- Truly magical ride
- Tremendous power transfer
- Comfortable and stable ride
- Traditional elegance

### Feature

- Sizes :: 51 53 55 57 59 61 63
- Traditional European road geometry
  - Biaxially-ovalized down tube at the bottom bracket
  - Curved and tapered chainstays
  - Bright brush finish and classic road-race full-wrap decal package

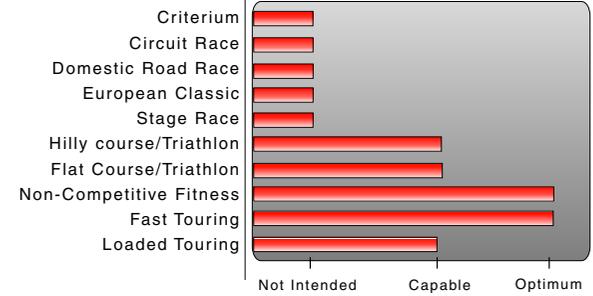
Thanks in part to its shorter top tube and taller head tube, the Veneto's ingenious geometry delivers a more upright and comfortable position - perfect for long training rides through the countryside near your home or the Italian city after which it was named.

# Veneto

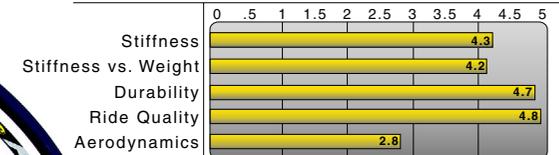
## Titanium :: Road



### Performance Styles



### Performance Attributes



Note: Scores are based on Litespeed rating scale and demonstrate differences between various models within a given category.

### Advantage

- Extremely comfortable and smooth riding
- Magical ride quality
- Remarkable speed and power
- Unparalleled strength and durability

### Feature

Sizes :: XS S M L XL

- Taller head tube and shorter top tube
- Litespeed-signature, radially-curved seatstays
- Oversized seat tube (31.6 seat post) seat post and cold-worked down tube
- Cold-worked 3Al/2.5V tube set

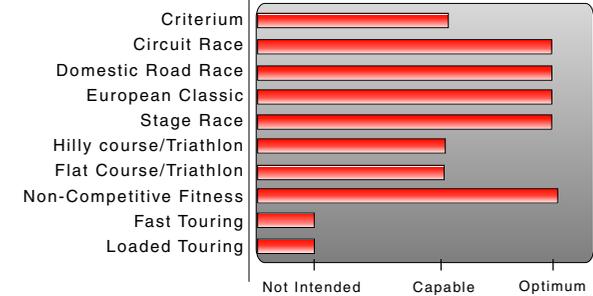
# Solano

Brand new for this year, the Solano is likely to become a bike that legends are made of. Following the lead of the Vortex this bike proudly boasts a traditional road geometry with a GET titanium tube set, the Litespeed carbon fork with carbon steerer and the exciting Supersonic 40 aero carbon wheel set from Real-Design.

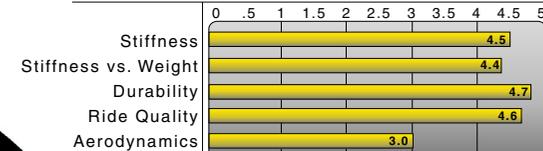
## Titanium :: Road



### Performance Styles



### Performance Attributes



Note: Scores are based on Litespeed rating scale and demonstrate differences between various models within a given category.

## Advantage

Remarkable speed and power  
 Precise handling and control  
 Incredibly smooth and comfortable  
 Race-ready parts package

## Feature

Sizes :: 49 51 53 55 57 59 61  
 Oversized seat tube (31.6 seat post) seat post and oversized teardrop-shaped down tube  
 Cold-worked, GET three-sided top tube  
 Litespeed signature, radially-curved seatstays  
 Shimano nine-speed Ultegra components, Real-Design Supersonic carbon wheels, Litespeed carbon fork with carbon steerer

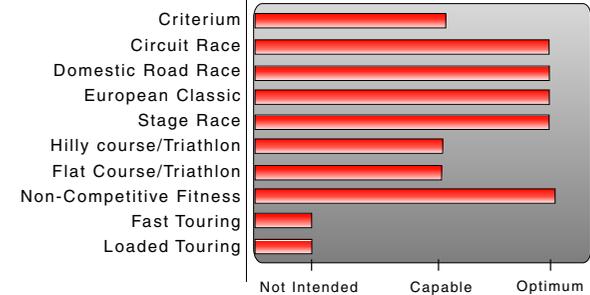
Perfect for just about anything you can throw at it, the new compact Teramo is modeled after the Litespeed flagship – the Ghisallo. With its shaped tubing, compact geometry and Viper red paint this is a full-race rig – right out of the box. The marriage of the Ultegra components and Mavic wheels will make sure that you stay at ease while the competition stays behind.

# Teramo

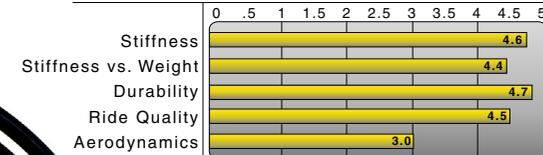
## Titanium :: Road



### Performance Styles



### Performance Attributes



Note: Scores are based on Litespeed rating scale and demonstrate differences between various models within a given category.

## Advantage

- Superior in-saddle climbing
- Precise handling and control
- Remarkable speed and power
- Race-ready parts package and finish

## Feature

Sizes :: S M M/L L XL

- Super-light and nimble compact frame design crafted from 3Al/2.5V titanium
- Cold-worked, GET three-sided top tube
- Oversized seat tube (31.6 seat post) and oversized teardrop-shaped down tube
- Shimano Ultegra components, Mavic Ksyrium Equipe wheelset, Litespeed carbon fork with carbon steerer, Viper Red paint with satin-finish rear-end

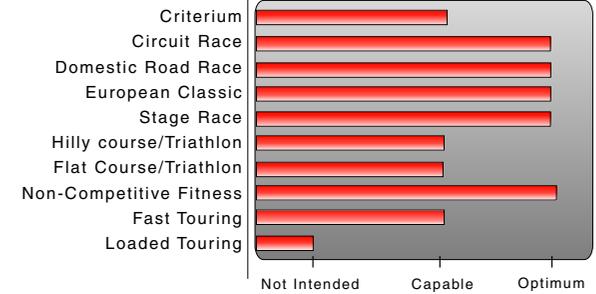
# Firenze

Named after the famous Italian city of Firenze (Italian for Florence), this bike is rich in classical touches reminiscent of Italian road racing legends. One glance at the traditional round titanium tubes, full-wrap decals and non-integrated head tube and you start thinking of bikes that have won many a stage in the mountains of Italy.

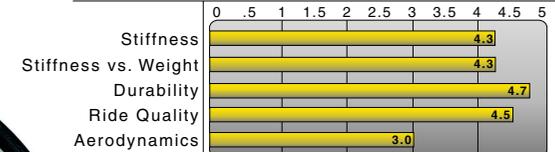
## Titanium :: Road



### Performance Styles



### Performance Attributes



Note: Scores are based on Litespeed rating scale and demonstrate differences between various models within a given category.

## Advantage

- Excellent climbing prowess
- Remarkable speed and power
- Greater vertical compliance and added comfort
- Race-ready parts package and finish

## Feature

Sizes :: 49 51 53 55 57 59 61

- Sub 18 pound complete bike weight (55cm)
- Oversized seat tube (31.6 seat post) and oversized 3Al/2.5V titanium down tube
- Radially-curved seatstays
- Shimano Ultegra components, Mavic Cosmos wheelset, Litespeed carbon fork with carbon steerer, satin-finish with classic full-wrap decal package

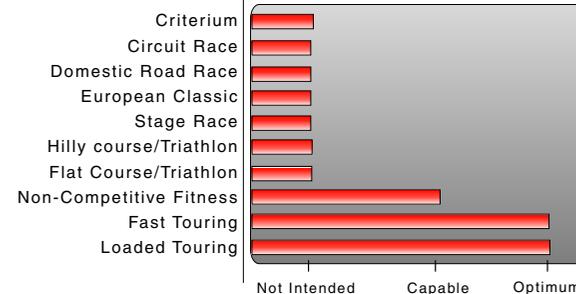
Designed specifically for the touring aficionado, the 2004 Blue Ridge features longer chainstays, rack and fender mounts and stiffer, oversized tubing for a powerful ride with plenty of comfort. Whether its fast touring you prefer or long fully-loaded jaunts across the country, the Blue Ridge is the only true titanium touring bike in its class.

# Blue Ridge

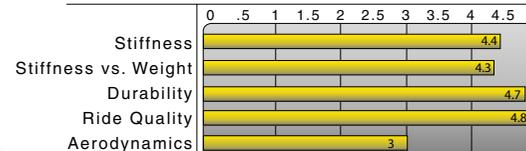
## Titanium :: Touring



### Performance Styles



### Performance Attributes



Note: Scores are based on Litespeed rating scale and demonstrate differences between various models within a given category.

### Advantage

- Unlimited strength and power
- Comfortable and relaxed fit
- Ability to carry big loads
- Excellent stopping power

### Feature

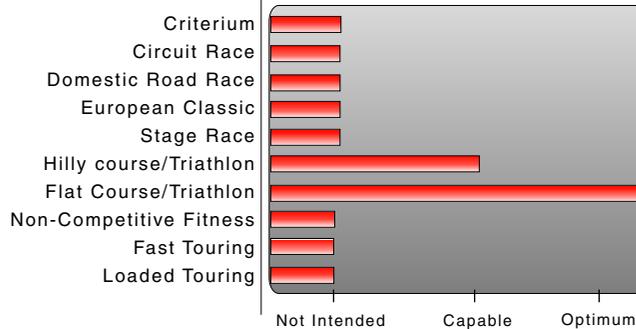
Sizes :: 49 51 53 55 57 59 61

- Cold-worked, GET, 3Al/2.5V titanium tube set
- Longer wheelbase and slacker head tube angle
- Standard rear rack and fender mounts
- Cantilever brake bosses and beefy titanium seatstays

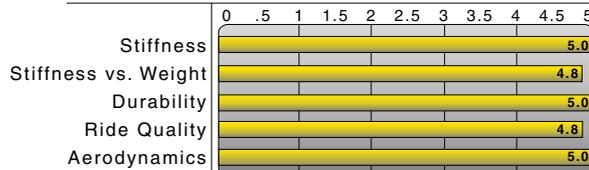
# Blade

Only Litespeed could create the world's fastest and most desired time trial frame and remain unsatisfied. That's why for 2004 we have refined every last detail of the Blade and then some. We have added a new lighter weight top tube and seat tube while maintaining the sleek and aerodynamic properties that have defined this bike for the last 10 years. New aero chainstays are now matched to the double-diamond shaped seatstays further reducing wind drag. The Blade's race-proven design is poised to once again slice through the competition with more power, more speed and even more intimidation.

## Performance Styles



## Performance Attributes



Note: Scores are based on Litespeed rating scale and demonstrate differences between various models within a given category.

Superior aerodynamics and speed are easily attained with micro-adjustable rear-entry dropouts. The beautifully machined horizontal dropouts allow the rider to tuck the rear wheel in closer than ever to the seat tube, reducing wind drag significantly.



## Advantage

Superior aerodynamics

Increased aerodynamic advantage

Confidence-inspiring front-end stability

Increased power transfer

## Feature

Sizes :: 49 51 53 55 57 59 61

Massive 6Al/4V titanium aero-shaped down tube, double-bladed and curved seatstays, and sculpted, teardrop-shaped seat tube plus new aero-internal cable routing

Rear entry dropouts with micro-adjusters allow rear wheel to be precisely positioned behind the seat tube

New cold-worked 3Al/2.5V shaped top tube and integrated head tube

New more aggressive teardrop-shaped chainstays

Titanium :: Triathlon



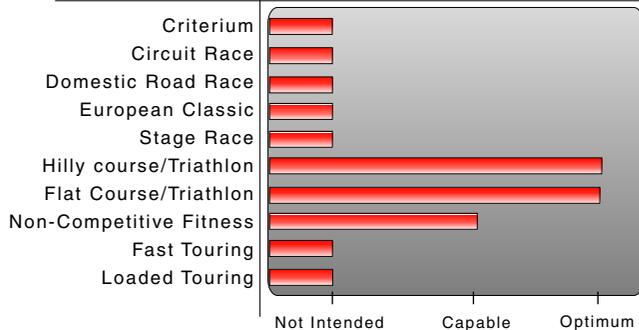
Titanium :: Triathlon



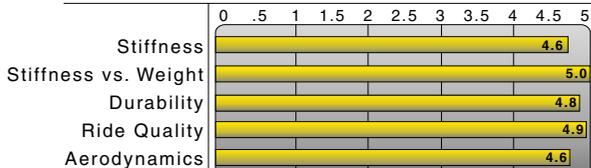
Created through years of aerodynamic testing, the 2004 Saber is built for full-throttle competition – yet versatile enough to handle the most brutal daily training. It now boasts an aerodynamic teardrop-shaped 3Al/2.5V titanium down tube and an aero-bladed LiteTEC HP titanium-enhanced carbon seatstay, for the perfect blend of light weight and cutthroat speed.

# Saber

## Performance Styles



## Performance Attributes



Note: Scores are based on Litespeed rating scale and demonstrate differences between various models within a given category.



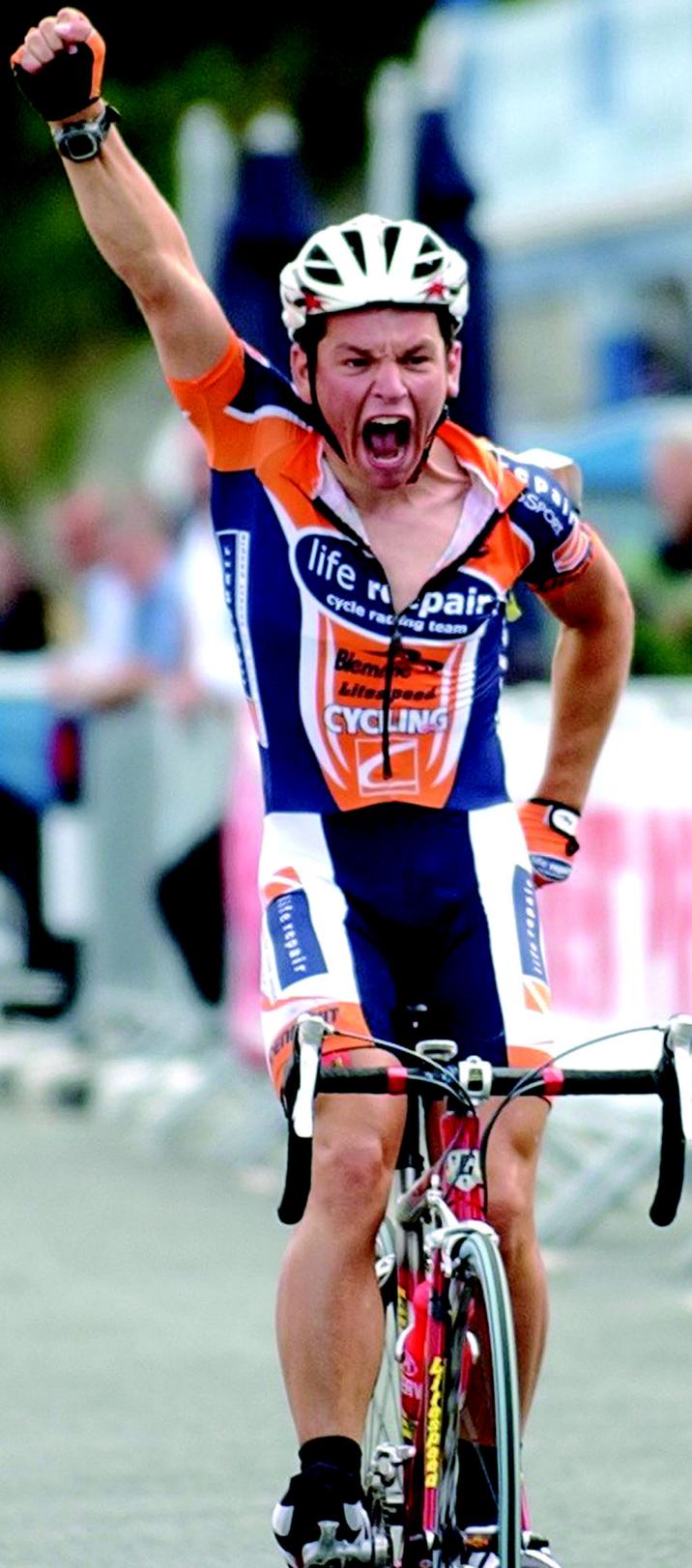
Wind-slicing aerodynamic performance is beautifully supplied by the new 3Al/2.5V cold-worked shaped down tube.

## Advantage

- Unsurpassed aerodynamic performance
- Confidence-inspiring front-end stability
- Proven efficient aerodynamic positioning
- Incredibly smooth and comfortable

## Feature

- Sizes :: 47 49 51 53 55 57 59 61
- 3Al/2.5V bladed down tube, and seat tube
  - New cold-worked 3Al/2.5V shaped top tube and integrated head tube
  - Tri-specific geometry available in nine sizes, including 650C options
  - New aerodynamic, LiteTEC HP carbon seatstay

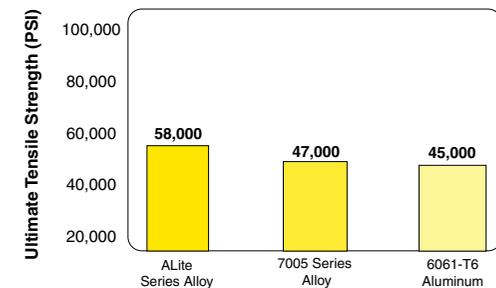


## Why Litespeed Aluminum?

On page three we discussed the fact that we design and build high-performance bicycles using the best materials available for the specific application. Although Litespeed's history in titanium is legendary, we feel confident that the 2004 lineup of aluminum product is poised to head down the very same road. Just as we continually push and refine our titanium frame structures, we push and refine our aluminum frames as well. We choose to start with ALite aluminum, a material that has taken aluminum technology to an entirely new level.

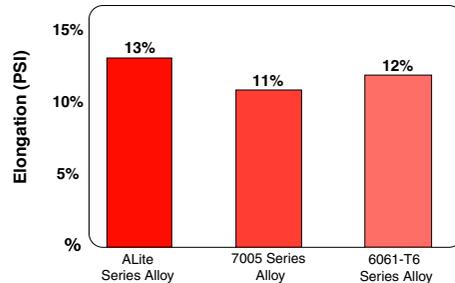
### ALite Aluminum

There are a multitude of aluminum alloy options available today, and just like in titanium, some deliver more performance than others. Litespeed's ALite tubing is based on AN6 aluminum. After frame shaping, butting, and welding it undergoes a proprietary heat-treating process resulting in a remarkable structure that boasts a higher tensile strength and lighter weight than both 6061 and 7005 series alloys. (see graph)



The higher tensile strength allows us to use less material in our frame designs resulting in lighter weight bikes and without surrendering durability.

In addition to the greater tensile strength, the ALite tubing used throughout the Litespeed aluminum product line provides superior elongation properties than the 6061 and the 7005 alloys. (see graph)



The greater elongation of the ALite alloy means the Litespeed frame has a better ability to give than the other alloys. In other words, our engineers are able to design lighter frames that are more durable because the ALite alloy material has the ability to stretch a greater amount before failure.

## AL GET (Aluminum Geometrically Enhanced Tubing)

We've spent the better part of a decade developing our own titanium tube shapes that enhance the ride quality of every Litespeed frame we produce. These stress-directional specific shapes are so efficient and create such an incredible ride quality that we felt compelled to bring that same technology into our aluminum bikes. Nowhere is that more evident than in the introduction of the all-new Mira and Avior for 2004. We have basically shaped every tube on the frame to re-create the magical performance characteristics of our flagship titanium bike - the Vortex. But we didn't stop with just shaping.

To further enhance the ride we lightened the bikes up dramatically by double and triple butting the new shaped tubes. Next, each frame is meticulously handcrafted with an ultra-precise mitering and TIG welding technique that creates an indestructible and beautifully consistent joint. Finally each frame is then heat treated to produce a more uniform frame strength. The end result is a very lightweight yet remarkably durable aluminum bike that is unrivaled in the cycling industry.

## LiteTEC Technology

Vibration and road shock can take their toll on your body, which means they take their toll on your endurance as well. A bike's seatstay and front fork play major roles in a bike's comfort and performance – either negatively or positively – because they form a direct connection between the rider and road.



That is why Litespeed developed LiteTEC, our Titanium-Enhanced Carbon seatstay and front forks. The construction of LiteTEC is what makes it perform so well. The carbon fiber provides outstanding vertical compliance for comfort and superior lateral stiffness for efficient power and acceleration. That, combined with the new titanium weave, means a remarkably comfortable ride, and here's why.

First, LiteTEC's carbon fiber composition works to effectively absorb the larger impacts your favorite road can throw at it.



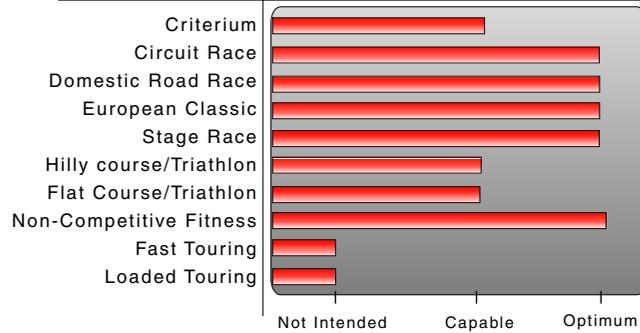
Second, the newly designed titanium weave further dissipates small road vibrations due to the inherent damping properties of titanium. As road vibrations attempt to travel along the outside of either the seatstay or the front fork the unique titanium weave serves to diffuse the unwanted shocks before they ever reach the seat or the handlebars.

Last, for enhanced vertical compliance, the LiteTEC seatstay features a radial curve that further reduces the intensity of road shock. Together, they create a ride that is super smooth, no matter what the surface.

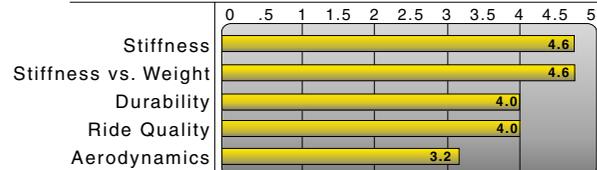
# Avior

Named after a star and designed for the serious road enthusiast, the all-new Avior takes Litespeed aluminum to a whole new level in 2004. Modeled after the highly-acclaimed Vortex, no other bike has come this close to matching the performance of titanium in an aluminum frame – until now. The complicated tube manipulations on the Avior have no rival in aluminum today and will no doubt send other frame-makers back to the drawing boards scratching their heads.

## Performance Styles



## Performance Attributes



Note: Scores are based on Litespeed rating scale and demonstrate differences between various models within a given category.



Smooth, fast, and comfortable are the words most commonly used to describe the aero-profile titanium-enhanced carbon seatstays. The matching LiteTEC carbon fork that comes standard on the Avior creates the perfect compliment to the rear stays.

## Advantage

- Massive power transfer
- Excellent cornering and handling
- Impeccably smooth ride quality
- Tailored fit and part selection

## Feature

- Sizes :: 47 49 51 53 55 57 59 61
- Oversized diamond-shaped AL GET down tube, and new oversized decagonal seat tube
  - Diamond-shaped top tube, integrated head tube and Litespeed LiteTEC HP carbon fork
  - New aerodynamic high performance LiteTEC carbon seatstays
  - Eight different sizes and five different component options allow you to truly customize your bike

Aluminum :: Road



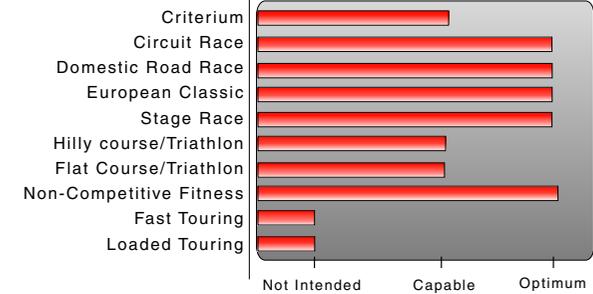
# Mira

It's often said that good things come in small packages, and the exciting new Mira is the best example we've seen of that in years. With its compact frame geometry, diamond-shaped triple-butted Alite tubing, and the new LiteTEC HP titanium-enhanced carbon seatstays, the Mira represents the epitome of break-neck speed, uphill or down.

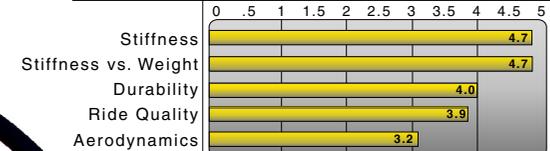
## Aluminum :: Road



### Performance Styles



### Performance Attributes



Note: Scores are based on Litespeed rating scale and demonstrate differences between various models within a given category.

## Advantage

- Superior in-saddle climbing
- Excellent cornering and handling
- Massive power transfer
- Impeccably smooth ride quality

## Feature

Sizes :: S M ML L XL

- Super-light and nimble compact frame design crafted from triple-butted AN6 aluminum
- Diamond-shaped AL GET top tube, integrated head tube and new Litespeed Lite Tec HP carbon fork
- Oversized diamond-shaped AL GET down tube, and new oversized decagonal seat tube
- New aerodynamic high performance LiteTEC carbon seatstays

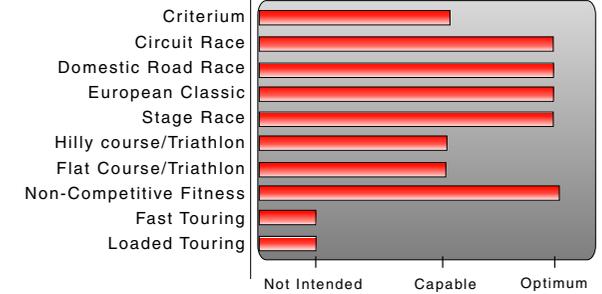
Designed for the serious road enthusiast, the 2004 Capella's compact frame geometry and LiteTEC titanium-enhanced carbon seatstays offer a premier blend of stiffness, vertical compliance and speed that leaves lesser bikes struggling to keep pace.

# Capella

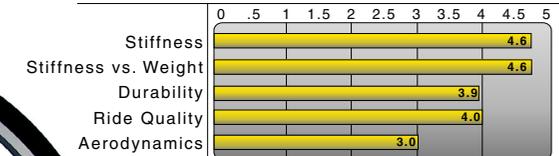
## Aluminum :: Road



### Performance Styles



### Performance Attributes



Note: Scores are based on Litespeed rating scale and demonstrate differences between various models within a given category.

### Advantage

- Quick and responsive
- Explosive energy transfer
- Rock solid steering and handling
- Zero harshness

### Feature

Sizes :: S M ML L XL

- Very light and nimble compact frame design with small rear triangle
- Oversized triple-butted AN6 aluminum tube set
- Integrated head tube and Litespeed carbon fork with carbon steerer
- Radially-curved LiteTEC carbon seatstays

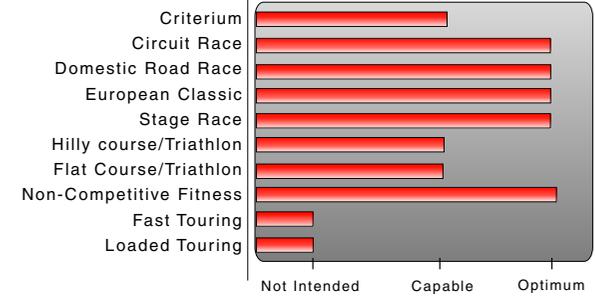
# Vela

Inspired by the constellation Vela meaning "the sail" this beautiful bike features the same frame technology as the Capella, but does so in a paint and parts package that will absolutely knock your socks off. Jump on it and you'll find out immediately that it delivers an amazing ride no matter how hard you accelerate.

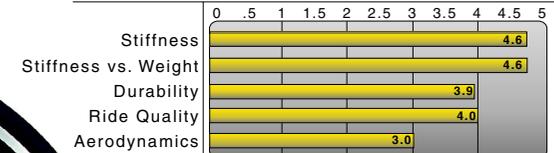
## Aluminum :: Road



### Performance Styles



### Performance Attributes



Note: Scores are based on Litespeed rating scale and demonstrate differences between various models within a given category.

### Advantage

- Quick and responsive
- Explosive energy transfer
- Rock solid steering and handling
- Zero harshness

### Feature

- Sizes :: S M M/L L XL
- Very light and nimble compact frame design with small rear triangle
  - Oversized triple-buttet AN6 aluminum tube set
  - Integrated head tube and Litespeed carbon fork with carbon steerer
  - Radially-curved LiteTEC carbon seatstays

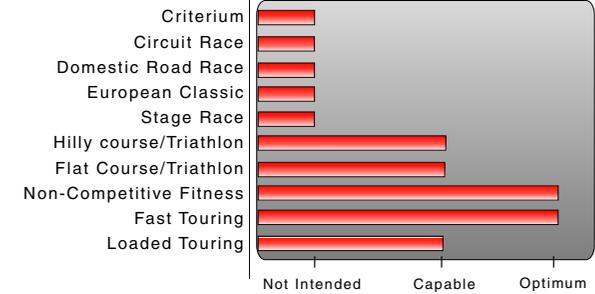
Based on the huge success of last year's Veneto, Litespeed is excited to introduce the Palio for 2004. The shorter top tube and taller head tube ensure that the athlete looking for more comfort without surrendering performance is more than just satisfied. The lightweight triple-butted ALite aluminum tubing makes the most strenuous of climbs seem almost implausibly easy.

# Palio

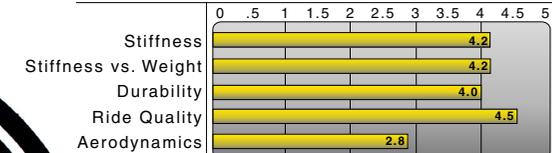
## Aluminum :: Road



### Performance Styles



### Performance Attributes



Note: Scores are based on Litespeed rating scale and demonstrate differences between various models within a given category.

### Advantage

- Maximum comfort
- Explosive energy transfer
- Rock solid steering and handling
- Challenging climbs made easy

### Feature

Sizes :: XS S M L XL

- Taller head tube and shorter top tube place rider in a more upright position
- Oversized triple-butted AN6 aluminum tube set and oversized seat tube
- Integrated head tube and Litespeed carbon fork with carbon steerer
- Shimano 105 triple option provides limitless gearing

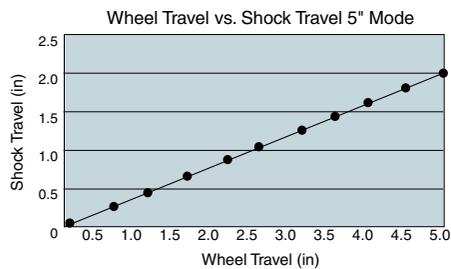
# Niota - The Full Suspension Story



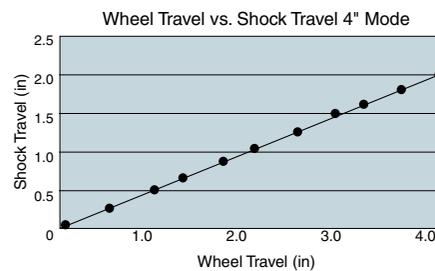
## Linkage System

At the heart of the new Niota is its ground-breaking CLR (Constant Leverage Ratio) linkage system. The CLR linkage was designed to provide 4" or 5" of rear wheel travel while maintaining a constant ratio to the rear shock travel. (see Graphs A and B).

Graph A



Graph B



The benefit – a suspension system that delivers smooth compression and rebound travel through the entire stroke of the shock. Most rocker and linkage designs have a variable rate that either increases or decreases within the stroke of travel. Designers are then forced to average the variable leverage ratios and valve the shock accordingly. This explains why some designs perform well in the middle of the stroke and don't allow finite tuning at the top or bottom of the travel. Riders are forced to use air pressure adjustments to make the bike work well at the top of the stroke. In most cases this inevitably makes the bottom of the stroke so stiff, that full travel is never really achieved. In theory, a six-inch travel bike may only have five inches of true usable travel. With the CLR linkage you are assured of a full four or five inches of rear wheel travel.

On the Niota Ti the linkage is built out of CNC-machined titanium which enables designers to create incredibly light yet indestructible linkage mechanisms. On the Niota aluminum frame the pivots and linkage are all made from CNC-machined aluminum and both frames tout maintenance-free sealed-cartridge bearings.

## The Shock Story

The CLR linkage was designed around the latest and most sophisticated shock technologies from Fox Racing. The Fox Float RL AVA (Air Volume Adjuster) rear shock allows the rider to fine tune the progressivity of the shock's spring curve, in conjunction with its air pressure adjustment, to optimize suspension performance for their specific set of circumstances. For those grinding hard-packed climbs, the on-the-fly lock-out lever is easily accessible, and when locked-out, delivers maximum pedaling efficiency. Although the design really doesn't need a lockout option we thought it was worth the extra 4 grams to add the switch.



Suspension performance is optimized thanks to the AVA sleeve which allows adjustment of the air-spring curve by adjusting air volume during set-up. (The AVA system is not intended as an "on-the-fly" adjustment but rather a set-up tool for the rider).



Consistently smooth travel is guaranteed by the patented Float shock that features a "self-adjusting negative spring", which creates a coil-like feel to an air shock. The Float system automatically keeps the balance between the positive and negative air chambers, thus reducing the pre-load commonly associated with air-sprung shocks. The air negative pressure also works to reduce stiction, providing very predictable bump performance.



No pedaling energy is wasted with Fox's "ProPedal Damping". The stable pedaling platform delivers the right balance of low-speed compression damping without sacrificing small bump performance and high speed compression control.

# A Suspension Tuner's Dream

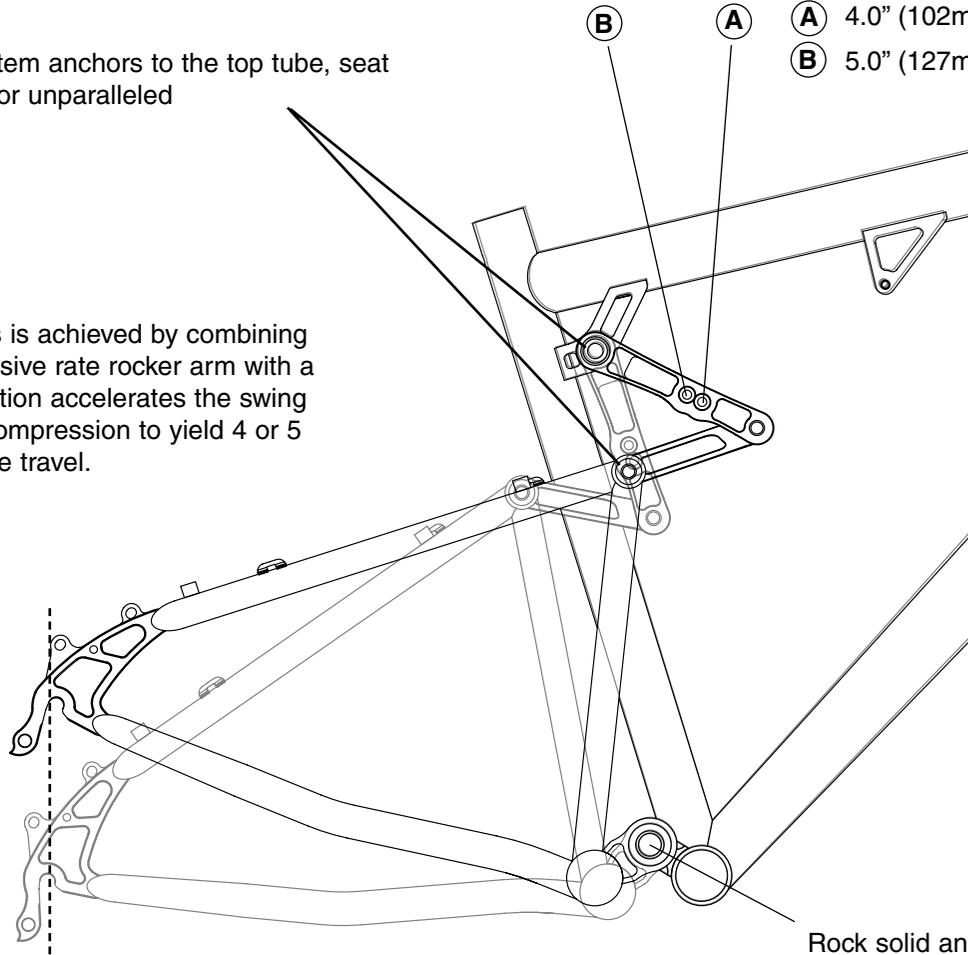
Adjustable travel modes:

- A** 4.0" (102mm)
- B** 5.0" (127mm)

The CLR linkage system anchors to the top tube, seat tube, and swingarm for unparalleled stiffness.

Coil spring plushness is achieved by combining the action of a regressive rate rocker arm with a cam-link. The cam action accelerates the swing of the rocker under compression to yield 4 or 5 inches of plush usable travel.

Fox's AVA (Air Volume Adjuster) system allows micro-adjustability of the spring curve to achieve a perfectly linear or progressive spring rate. When matched with the CLR linkage the rider now has the ability to truly tune the performance of the rear suspension to their exact riding style.

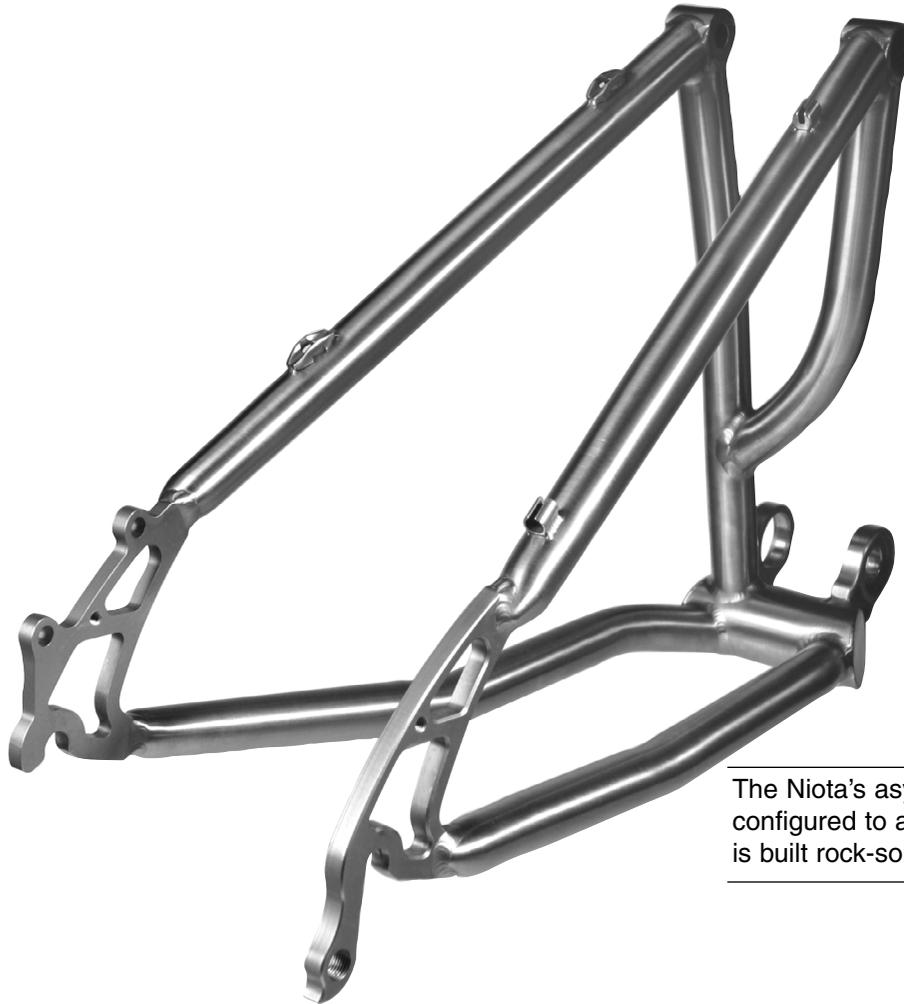


Rock solid and maintenance-free sealed-cartridge bearing swingarm pivot

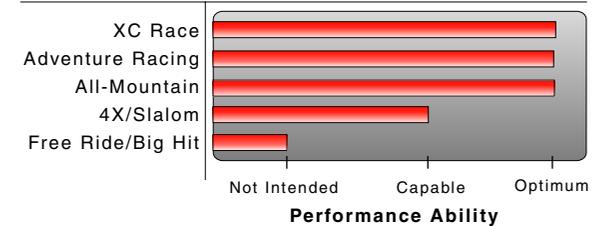
Smooth, precise wheelpath with no "hinge-effect" or change of direction, ensuring minimal drivetrain interference.

# Niota Ti

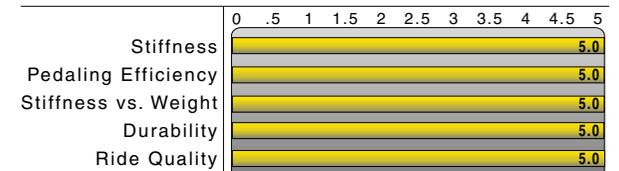
In any full-suspension conversation, lightweight and long travel has been deemed mutually exclusive – until now. Meet the all-new Niota, featuring variable travel of 4 to 5 inches and a complete frame weight with rear shock at 4.9lbs. The next generation of full-suspension is finally here.



## Riding Style



## Performance Attributes



Note: Scores are based on Litespeed rating scale and demonstrate differences between various models within a given category.

## Riding Style

The Niota's asymmetrical swingarm is uniquely configured to allow for five inches of travel but is built rock-solid for ultra-precise trackability.

## Advantage

- Versatility made simple
- Consistently plush performance
- Explosive climbing ability
- Maximum pedaling efficiency

## Feature

- Sizes :: S S/M M L
- Adjustable 4" and 5" travel options
- CLR linkage (see pages 35-36) supplies constant leverage ratio throughout shock stroke
- 4.9 lbs. full titanium frame (w/shock) made from 6Al/4V and 3Al/2.5V GET titanium tubing
- Fox's Float RL AVA rear shock with ProPedal damping (see page 35)



# Niota

Little brother to the Niota Ti, the Niota takes the brilliant suspension design and matches it to our double-butted AN6 aluminum tubing. As in the Ti version, the revolutionary CLR linkage and Fox's new Float RL AVA rear shock work together to consume just about anything your favorite trail can dish out.

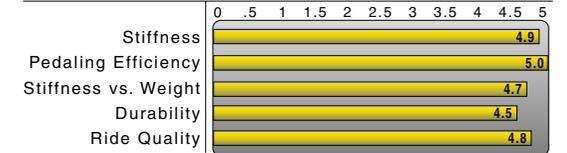
## Aluminum :: Mountain



### Riding Style



### Performance Attributes



Note: Scores are based on Litespeed rating scale and demonstrate differences between various models within a given category.

## Advantage

- Incredibly tough and durable
- Versatility made simple
- Consistently plush performance
- Maximum pedaling efficiency

## Feature

Sizes :: S S/M M L

- Double-butted AN6 oversized aluminum, with CNC-machined yolks and sealed linkage bearings
- Adjustable 4" and 5" travel options
- CLR linkage (see pages 35-36) supplies constant leverage ratio throughout shock stroke
- Fox's Float RL AVA rear shock with ProPedal damping (see page 35)

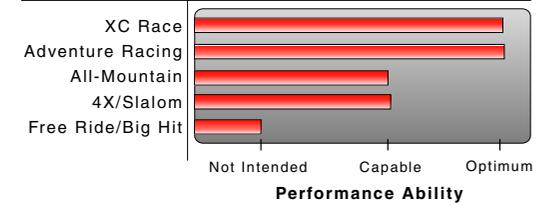
Named after a state park in Northeast Georgia, the Unicoi is perfect for the mountain biker who likes to ride a hardtail but still appreciates a smooth ride. The Unicoi's cold-worked Geometrically Enhanced Titanium (GET) tubing gives you maximum control, while its rear Cane Creek suspension system provides a smooth, air-adjustable ride.

# Unicoi

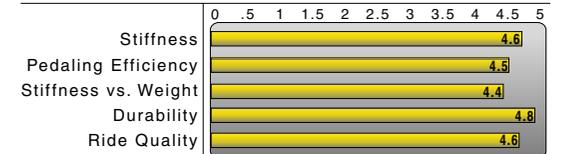
## Titanium :: Mountain



### Riding Style



### Performance Attributes



Note: Scores are based on Litespeed rating scale and demonstrate differences between various models within a given category.

### Advantage

- Consistent rear wheel traction
- Stable off-road handling and durability
- Efficient power transfer and bottom bracket strength
- Braking versatility

### Feature

- Sizes :: 14 16.5 18 19.5
- 1-inch rear wheel travel with Cane Creek adjustable air shock
- Cold-worked Geometrically Enhanced Titanium tube set
- Oversized 3Al/2.5V down tube and oversized decagonal seat tube (31.6 seat post)
- Disc-specific rear dropouts and cantilever bosses come standard giving riders their choice

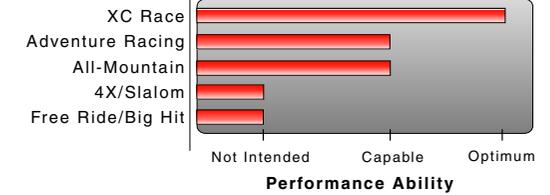
# Tanasi

Named after a beautiful trail system in Southeastern Tennessee, the Tanasi has taken another bold step in 2004, due in large part to the massive bi-axially ovalized 6Al/4V down tube. Already our lightest mountain frame, we've gone one step further in the pursuit of lightweight, by making the Tanasi a disc-specific design and elevating it to a high-performance XC category by itself.

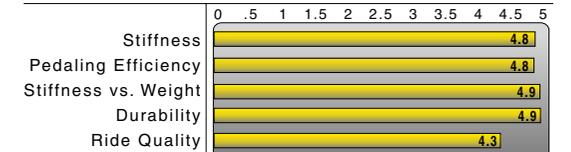
## Titanium :: Mountain



### Riding Style



### Performance Attributes



Note: Scores are based on Litespeed rating scale and demonstrate differences between various models within a given category.

## Advantage

- Durable and ultra lightweight
- Relentless mountain climbs made easy
- Precise steering accuracy
- The ultimate in all-weather braking performance

## Feature

- Sizes :: 14 16.5 18 19.5
- Cold-worked 6Al/4V titanium main frame weighs in at a scant 3.1 lbs (18")
- Ultra-stiff two-inch biaxially-ovalized down tube
- Tapered three-sided top tube and 1 1/8" integrated head tube
- Disc-specific 6Al/4V dropouts and sleek uninterrupted cable routing

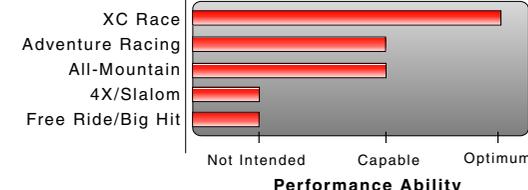
The Pisgah offers classic Litespeed mountain geometry and GET technology, ensuring lightweight performance and excellent durability. That's why it can tame just about any terrain – even the menacing North Carolina forest it was named after.

# Pisgah

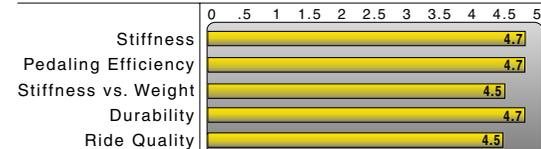
## Titanium :: Mountain



### Riding Style



### Performance Attributes



Note: Scores are based on Litespeed rating scale and demonstrate differences between various models within a given category.

### Advantage

- Stable off-road handling and durability
- Billy-goat-like climbing ability
- Superior braking power
- Precise steering accuracy

### Feature

Sizes :: 12 14 16.5 18 19.5

- Cold-worked, Geometrically Enhanced Titanium tube set
- Laterally stiff 4-sided down tube and oversized seat tube (31.6 seat post)
- Clean and simple cable routing design that handles V-brakes or hydraulic disc lines
- Cold-worked 3Al/2.5V top tube and 1 1/8" integrated head tube

# Creating Your Custom Litespeed

Every serious cyclist deserves the perfect ride. And while some professionals find exactly what they need within our line of technologically advanced machines, others ask us to create their dream bike from the ground up, designed specifically around their anatomy, riding style, and performance goals. We can do the same for you. Whether you need us to create a bicycle that provides you with that hard-to-find perfect fit, or you are looking for a bicycle crafted with a certain performance criteria in mind, we can build it.

Our custom bikes belong in a classification of their own. In the factory, we utilize separate machinery, staff, and engineers completely dedicated to custom fabrication. This staff works daily at only one task, creating perfectly designed and constructed custom bikes. We have made thousands of high-performance custom frames over the years, many of which were designed for some of the top names in cycling. From the Tour de France to Ironman, our custom designs have set the standard in racing for years.

## The Litespeed Custom Difference

Building a custom Litespeed is a much more complicated endeavor than building a round-tube frame. Although we build many round-tube frames in our custom shop we believe that you should be able to get whatever tube shape, material or geometry you need in order to achieve your individual riding goals. We have access to hundreds of tube shapes, different materials, and an unlimited range of geometries from which to craft a bicycle, which translates into a guaranteed perfect ride for you on your custom bike.

In addition, we insist that every frame be meticulously drawn on our CAD (Computer Aided Design) system to ensure the utmost



in accuracy. That drawing is then approved by you and your dealer. Most of our competitors choose to build close-to-your-needs frames using pre-mitered tubes that are pulled off the shelf as needed. In most cases you never even see the frame before it is actually delivered and therefore you must trust that they are matching your needs with the right frame. Our approach is to work closely with you and your

dealer to design the frame of your dreams, and the entire process can take as little as three to five weeks.

Once designed, you can now add your signature to the bike by selecting from our rainbow of paint and decal options, creating a bike that truly reflects your individuality.

## Paint Options

Black Metallic : PPG 95130  
Bright Red : PPG 75250  
Deep Blue : PPG 190410  
Super Yellow : PPG 84209  
Bright Green : PPG 402498  
Pearl White : PPG 4938/4939  
Pearl Orange : PPG 62494/62495  
Silver Blue : PPG 190693  
Green Gold : PPG 48475



# Apparel and Accessories



**Litespeed Team Jersey**  
100% Polyester. European fit.  
Made in Italy.  
Sizes: S - XL



**Litespeed Ellipse Jersey**  
100% Polyester. European fit.  
Made in Italy.  
Sizes: S - XL



**Litespeed Shorts**  
80/20 Nylon Lycra. Anti-bacterial  
chamois. Made in Italy.  
Color: Black  
Sizes: S- XL



**Litespeed Bib Shorts**  
80/20 Nylon Lycra. Anti-bacterial  
chamois. Made in Italy.  
Color: Black  
Sizes: S- XL



**Litespeed Reshaping Tee**  
100% Cotton Beefy-T.  
Color: White only.  
Sizes: M - XL.



**Litespeed Socks**  
50% Nylon/40% Coolmax/10% Lycra.  
Made in USA.  
Colors: Blk, Wht.  
Sizes: S - XL



**Litespeed Handcrafted Tee**  
100% Cotton Beefy-T.  
Color: Dark Navy only.  
Sizes: M - XL.



**Litespeed Baseball Cap**  
Adustable Cotton Twill.  
Color: Black only.  
Size: One Size Fits All

# Componentry

## Road Kits

		Shimano Dura Ace*	Shimano Ultegra*	Shimano 105*	Campagnolo Record*	Campagnolo Chorus	Campagnolo Centaur*
controls	Headset**	Cane Creek Integrated	Cane Creek Integrated	Cane Creek Integrated	Cane Creek Integrated	Cane Creek Integrated	Cane Creek Integrated
	Handlebar	ITM Millennium S.O.	ITM Mantis S.O	ITM Super 330 S.O	ITM Millennium S.O	ITM Mantis S.O	ITM Super 330 S.O
	Stem	ITM Millennium S.O.	ITM Mantis S.O	ITM Forged Lite Luxe	ITM Millennium S.O	ITM Mantis S.O	ITM Forged Lite Luxe
	Grips/Bar Tape	Litespeed Off the Front	Litespeed Off the Front	Litespeed Off the Front	Litespeed Off the Front	Litespeed Off the Front	Litespeed Off the Front
	Saddle	Selle Italia Flite Ti Gel	Selle Italia Flite Ti Gel	Selle Italia Nitrox Gel	Selle Italia Flite Ti Gel	Selle Italia Flite Ti Gel	Selle Italia Nitrox Gel
	Seat Post	Easton EC-70 C	Thomson Elite, black	Thomson Elite, black	Easton EC-70 C	Thomson Elite, black	Thomson Elite, black
drivetrain	Front Derailleur	Dura Ace	Ultegra	105	Record	Chorus	Centaur
	Rear Derailleur	Dura Ace	Ultegra	105	Record	Chorus	Centaur
	Shifters	Dura Ace flight deck compatible	Ultegra flight deck compatible	105 STI	Record Ergo	Chorus Ergo	Centaur Ergo
	Cranks	Dura Ace 39/53	Ultegra 39/53	105 - 39/53	Record 39/53	Chorus 39/53	Centaur 39/53
	Bottom Bracket	Dura Ace	Ultegra	105 cartridge	Record cartridge	Chorus cartridge	Centaur cartridge
	Cassette	Dura Ace 12/25	Ultegra 12/25	105 12/25	Record Ti 12/25	Chorus 12/25	Centaur 12/25
brakes	Chain	Dura Ace	HG - 93	HG - 73	Record	Record	Record
	Calipers	Dura Ace SLR dual pivot	Ultegra SLR dual pivot	105 SLR dual pivot	Record	Chorus	Centaur
wheelset	Levers	Dura Ace STI	Ultegra STI	105 STI	Record Ergo	Chorus Ergo	Centaur Ergo
	Front Hub	Mavic Ksyrium SL	Mavic Ksyrium Equipe	Mavic Cosmos	Mavic Ksyrium SL	Mavic Ksyrium Elite	Mavic Cosmos
	Rear Hub	Mavic Ksyrium SL	Mavic Ksyrium Equipe	Mavic Cosmos	Mavic Ksyrium SL	Mavic Ksyrium Elite	Mavic Cosmos
	Rims	Mavic Ksyrium SL	Mavic Ksyrium Equipe	Mavic Cosmos	Mavic Ksyrium SL	Mavic Ksyrium Elite	Mavic Cosmos
Tires	Vittoria Rubino Pro Slick	Vittoria Rubino Pro Slick	Vittoria Rubino Pro Slick	Vittoria Rubino Pro Slick	Vittoria Rubino Pro Slick	Vittoria Rubino Pro Slick	

\*These groups are also available in triple configuration. \*\*The non-integrated headsets for Dura Ace and Record kits are Chris King, and for all other kits are Cane Creek.

## Multisport / Triathlon Kits

		Shimano Dura Ace	Shimano Ultegra	Shimano Ultegra Touring
controls	Headset	Cane Creek Integrated	Cane Creek Integrated	Cane Creek Integrated
	Handlebar	Profile Airwing	Profile Airwing	3T Forma 2
	Aero bars	Profile Aerolite	Profile Aerolite	N/A
	Stem	3T Zepp	3T Forgie	ITM Mantis S.O.
	Grips / Bar Tape	Litespeed Off the Front	Litespeed Off the Front	Litespeed Off the Front
	Saddle	Selle Italia Flite Ti Gel	Selle Italia Flite Ti Gel	Sella Italia Flite Ti Gel
drivetrain	Seat Post	Easton C	Thomson Elite, black	Thomson Elite
	Front Derailleur	Dura Ace	Ultegra	Ultegra
	Rear Derailleur	Dura Ace	Ultegra	Ultegra
	Shifters	Dura Ace Bar End	Dura Ace Bar End	Ultegra
	Cranks	Dura Ace 39/53	Ultegra 39/53	Ultegra 30/42/53
	Bottom Bracket	Dura Ace	Ultegra	Ultegra
brakes	Cassette	Dura Ace 12/25	Ultegra 12/25	Ultegra 12/25
	Chain	Dura Ace	HG - 93	HG-93
wheelset	Calipers	Dura Ace SLR dual pivot	Ultegra SLR dual pivot	Avid Shorty
	Levers	Dura Ace STI	Ultegra STI	Ultegra STI shift/brake combo
	Front Hub	Dura Ace 32h	Ultegra 32h	Ultegra 32h
	Rear Hub	Dura Ace 32h	Ultegra 32h	Ultegra 32h
	Rims	Velocity Deep V MSW	Velocity Deep V MSW	Mavic Open Pro 32h, black
Tires	Vittoria Rubino Pro Slick	Vittoria Rubino Pro Slick	Continental Top Touring 700x32	

## Touring Kit

## Road Upgrades

## Mountain Upgrades

Forks	
Litespeed LiteTEC Carbon	Answer Skareb Elite
Litespeed Carbon	Answer Skareb Super
Litespeed Carbon Aero	Answer Skareb Platinum
Litespeed Carbon Touring	Fox F 100 X
Reynolds Ouzo Pro Aero	Fox F 80 X
Reynolds Ouzo Pro	Fox Talas
	Fox Vanilla
	Fox Fox Float 80 RL
	Rock Shox SID Team
Wheels	
Campagnolo Eurus	Mavic Cross Max SL
Campagnolo Hyperion	Mavic Cross Max XL
Campagnolo Neutron	Mavic Crossland
Campagnolo Proton	
Mavic Ksyrium SL	
Mavic Ksyrium Equipe	
Mavic Ksyrium Elite	
Mavic Cosmos	
RealDesign Supersonic	
RealDesign Ultrasonic	
RealDesign Hypersonic	
Shimano WH 7800	
Shimano R540	

# Componentry

## Complete Bike Components

		Solano	Teramo	Firenze	Capella	Vela	Palio
controls	Headset	Cane Creek S2 Integrated	Cane Creek S2 Integrated	Cane Creek S2 Integrated	FSA Orbit	IS3 Integrated	IS3 Integrated
	Handlebar	ITM Super 330	ITM Super 330	ITM Super 330	ITM Super 330	ITM Super 330	ITM Super 330
	Stem	ITM Forged Lite	ITM Forged Lite	ITM Forged Lite	ITM Forged Lite	ITM Forged Lite	ITM Forged Lite
	Grips / Bar Tape	Litespeed Synthetic Cork	Litespeed Synthetic Cork	Litespeed Synthetic Cork	Litespeed Synthetic Cork	Litespeed Synthetic Cork	Litespeed Synthetic Cork
	Saddle	Litespeed Ti Rails	Litespeed Ti Rails	Litespeed Ti Rails	Litespeed Ti Rails	Litespeed	Litespeed
	Seat Post	Litespeed Carbon	Litespeed Aluminum	Litespeed Aluminum	Litespeed Aluminum	Litespeed Aluminum	Litespeed Aluminum
drivetrain	Front Derailleur	Ultegra	Ultegra	105	105	105	105
	Rear Derailleur	Ultegra	Ultegra	Ultegra	Ultegra	105	105
	Shifters	Ultegra STI	Ultegra STI	Ultegra	Ultegra	105	105
	Cranks	Ultegra 39/53	Ultegra 39/53	Ultegra 39/53	FSA Energy	FSA Gossamer	FSA Gossamer
	Bottom Bracket	Ultegra	Ultegra	105	FSA Platinum ISIS	ISIS	ISIS
	Cassette	Ultegra 12/25	Ultegra 12/25	Ultegra 12/25	Ultegra 12/25	105 12/25	105
	Chain	Ultegra	Ultegra	105	105	105	105
brakes	Calipers	Ultegra	Ultegra	Ultegra	Ultegra	105	105
	Levers	Ultegra	Ultegra	Ultegra	Ultegra	105	105
wheelset	Front Hub	RealDesign	Mavic Ksyrium Equipe	Mavic Cosmos	Mavic Cosmos	Shimano R540	Shimano R540
	Rear Hub	RealDesign	Mavic Ksyrium Equipe	Mavic Cosmos	Mavic Cosmos	Shimano R540	Shimano R540
	Rims	RealDesign Supersonic	Mavic Ksyrium Equipe	Mavic Cosmos	Mavic Cosmos	Shimano R540	Shimano R540
	Tires	Vittoria Rubino Pro Slick	Vittoria Rubino Slick	Vittoria Rubino Slick			

Note: Specifications and options are subject to change. European specifications may vary.

## Mountain Bike Kits

		Shimano XTR	Shimano XT	Shimano LX / XT	SRAM /Avid
controls	Headset	Cane Creek Integrated	Cane Creek Integrated	Cane Creek Integrated	Cane Creek Integrated
	Handlebar	Easton EC-70 C Flat [Easton EC-70 C Riser]	Easton EA-70 Al [Easton EC-70 Al Riser]	Easton EA-50 Al	Easton EA-50 Al [Easton EC-50 Al Riser]
	Stem	Thomson Elite or Easton	Thomson Elite	Thomson Elite	Thomson Elite
	Grips / Bar Tape	Oury	Oury	Oury	Oury
	Saddle	Selle Italia Nitrox Gel	Selle Italia Nitrox gel	Selle Italia Nitrox gel	Selle Italia Nitrox Gel
	Seat Post	Thompson Elite	Thomson Elite	Thomson Elite	Thomson Elite
drivetrain	Front Derailleur	XTR	XTR	LX	Shimano LX
	Rear Derailleur	XTR	XT 9 speed	XT	SRAM X.9
	Shifters	XTR Dual Control	XT Dual Control	LX Rapidfire shift levers	SRAM X.9
	Cranks	XTR Hollowtech II 22 / 32 / 44	XT Hollowtech II 22 / 32 / 44	LX	FSA V-Drive
	Bottom Bracket	XTR	XT	LX	FSA ISIS
	Cassette	XTR 12/34	XT 11/34	LX	SRAM
brakes	Chain	XTR	XT	LX	Shimano LX
	Brakes	XTR disc	XT disc	LX V-Brake	Avid Mechanical Disc
wheelset	Levers	XTR STI	XT STI	LX	Shimano LX
	Front Hub	Mavic Crossmax SL	Mavic Crossmax Enduro	Mavic Crossland	XT Disc
	Rear Hub	Mavic Crossmax SL	Mavic Crossmax Enduro	Mavic Crossland	XT Disc
	Rims	Mavic Crossmax SL	Mavic Crossmax Enduro	Mavic Crossland	Mavic 717
	Tires	Kenda Kharisma 2.1 UST [Kenda Kinetics 2.2 UST]	Kenda Kharisma 2.1 UST [Kenda Kinetics 2.2 UST]	Kenda Kharisma 2.1 UST	Kenda Kharisma 2.1 UST [Kenda Kinetics 2.2 UST]

## Paint Options

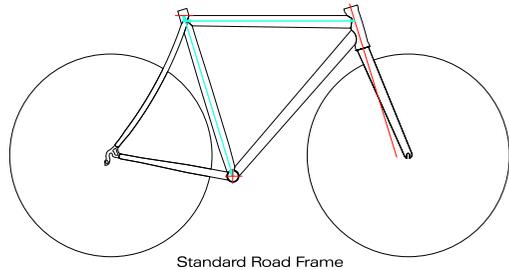


Note: Specifications and options are subject to change. European specifications may vary.

Items in brackets indicate the all-mountain version of the listed kits.

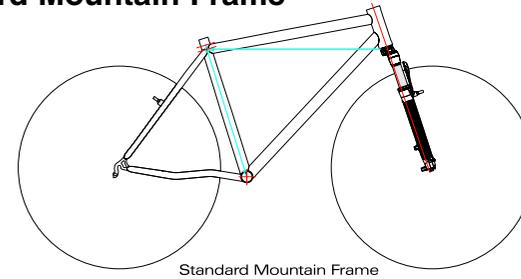
# How We Size Our Frames

## Standard Road Frame



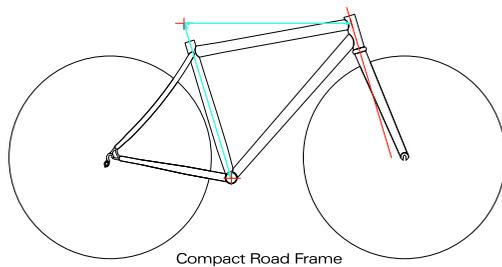
All Litespeed standard road frame sizes are measured in a center to top format from the center of the bottom bracket shell to the intersection of the centerline of the seat tube and top tube. Top tube lengths on our road frames are taken from the intersection of the centerlines of the seat tube and top tube to the horizontal intersection on the centerline of the head tube.

## Standard Mountain Frame



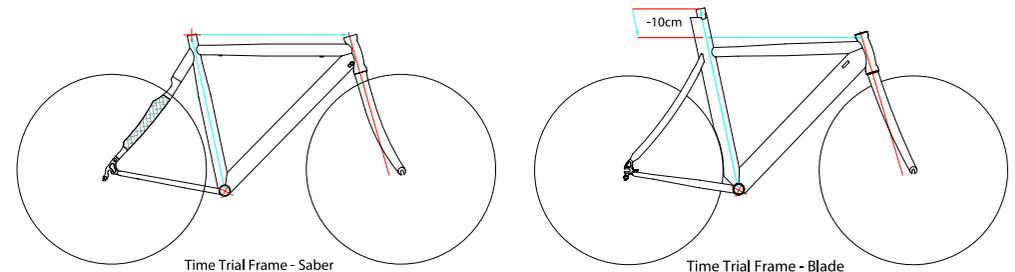
All Litespeed mountain frames are measured from the center of the bottom bracket shell to the intersection of the top of the top tube and the centerline of the seat tube. Top tube lengths on mountain frame are taken from the intersection of the centerlines of the top tube and seat tube to the point at which a horizontal line intersects the centerline of the head tube. NOTE: The intersection of the horizontal and centerline of the head tube will be at the bottom of the head tube but on its centerline in the fork region.

## Compact Road Frame



Compact Litespeed frame sizes are based on the intersection of the virtual top tube and seat tube. The actual size is based on the virtual seat tube length. The virtual seat tube is measured from the center of the bottom bracket shell to the point where the virtual top tube meets the centerline of the seat tube extending into the seat post region. The virtual top tube is the horizontal line parallel to the ground and extending from the point at which the centerline of the top tube meets the centerline of the head tube.

## Time Trial Frames



The Saber and Blade frame sizes are measured from the center of the bottom bracket to the top of the seat tube, but on the Blade 10cm have to be deducted because of the extended seat tube. The top tube length is measured from the centerline at the top of the seat tube to the point at which a horizontal line meets the centerline of the head tube. NOTE: The horizontal intersection at the head tube may intersect at a point in space above or below the actual head tube but along its centerline.

# Geometry

	Frame Size	Top Tube Length (CM)	Head Tube Angle	Seat Tube Angle	Chainstay Length (CM)	BB Drop (CM)	Wheelbase (cm)	Front Center (cm)	Fork Rake (cm)	Standover (cm)	Head Tube Length (cm)	Frame Weight g (lbs)
<b>Ghisallo</b>	S	52.5	73.0	74.0	40.6	6.8	96.1	56.4	4.5	71.4	8.1	889(1.96)
	M	54.0	73.0	73.0	40.6	7.1	96.6	57.0	4.5	72.3	9.5	900(1.98)
	M/L	55.5	73.5	73.0	40.6	7.1	97.5	57.9	4.0	73.7	11.2	902(1.99)
	L	56.5	73.5	73.0	40.6	7.1	98.5	58.9	4.0	75.1	13.2	1,079(2.38)
	XL	57.5	73.5	73.0	40.6	7.1	99.4	59.8	4.0	76.6	15.2	1,100(2.42)
<b>Vortex</b>	49	51.0	73.0	74.0	40.6	6.7	94.6	54.9	4.5	74.8	12.1	1,164(2.5)
	51	52.5	73.0	74.0	40.6	6.8	96.1	56.4	4.5	75.9	12.1	1,213(2.7)
	53	54.0	73.0	74.0	40.6	7.1	97.5	57.9	4.5	77.5	13.2	1,256(2.8)
	55	55.5	73.5	73.0	40.6	7.1	97.5	57.9	4.0	79.2	14.7	1,305(2.9)
	57	56.5	73.5	73.0	40.6	7.1	98.5	58.9	4.0	81.1	16.7	1,348(3.0)
	59	57.5	73.5	73.0	40.6	7.4	99.3	59.8	4.0	82.7	18.4	1,403(3.1)
	61	59.0	73.5	72.5	41.1	7.4	100.7	60.7	4.0	84.5	20.2	1,418(3.1)
<b>Ultimate</b>	49	51.0	72.0	74.5	39.3	6.8	94.4	56.1	4.5	75.6	13.6	1,389(3.1)
	51	52.5	72.5	74.0	39.3	6.8	95.2	56.9	4.5	76.7	13.6	1,417(3.1)
	53	54.0	73.0	73.0	39.3	6.8	95.4	57.0	4.5	78.1	14.7	1,448(3.2)
	55	55.5	73.0	73.0	39.3	6.8	96.3	58.0	4.0	79.9	16.1	1,476(3.2)
	57	56.5	73.0	73.0	39.3	6.8	97.3	59.0	4.0	82.0	18.4	1,506(3.3)
	59	57.5	73.0	73.0	39.3	6.8	98.3	60.0	4.0	83.9	20.3	1,532(3.4)
	61	59.0	73.0	73.0	39.3	6.8	99.8	61.5	4.0	85.8	22.3	1,556(3.4)
	63	61.0	73.0	73.0	40.6	6.8	103.2	63.5	4.0	87.8	24.2	1,584(3.5)
<b>Classic</b>	49	51.0	72.0	74.0	41.3	6.8	96.0	55.7	4.5	74.8	9.3	1,402(3.1)
	51	52.5	72.5	74.0	41.3	6.8	97.2	56.9	4.5	76.0	9.3	1,461(3.2)
	53	54.0	73.0	74.0	41.3	7.1	98.2	57.9	4.5	77.6	10.8	1,490(3.3)
	55	55.5	73.0	73.0	41.3	7.1	98.2	58.0	4.0	79.3	12.8	1,510(3.3)
	57	56.5	73.0	73.0	41.3	7.1	99.2	58.9	4.0	81.2	14.8	1,559(3.4)
	59	57.5	73.0	73.0	41.3	7.4	100.0	59.9	4.0	82.8	16.0	1,603(3.5)
	61	59.0	73.0	72.5	41.7	7.4	101.5	60.8	4.0	84.6	17.8	1,618(3.6)
	63	61.0	73.0	72.0	41.7	7.4	102.9	62.3	4.0	86.3	19.6	1,657(3.7)
<b>Siena</b>	S	52.5	73.0	74.0	40.6	6.8	96.1	56.4	4.5	72.6	12.1	1,384(3.1)
	M	54.0	73.0	73.5	40.6	7.1	97.0	57.5	4.5	73.2	13.2	1,292(2.8)
	M/L	56.0	73.5	73.0	40.6	7.1	98.0	58.4	4.0	76.0	15.5	1,334(2.9)
	L	57.0	73.5	73.0	40.6	7.1	99.0	59.3	4	76.5	17.4	1,344(3.0)
	XL	59.0	73.0	72.5	41.1	7.4	101.2	61.2	4	77.6	20.5	1,376(3.0)
<b>Tuscany</b>	47	50.5	72.0	74.5	39.4	4.5	94.2	55.3	3.8	71.9	13.2	1,229(2.7)
	49	51.0	72.0	74.0	40.6	6.7	95.4	55.7	4.5	75.1	12.6	1,256(2.8)
	51	52.5	72.5	74.0	40.6	6.8	96.5	56.8	4.5	76.2	12.6	1,286(2.8)
	53	54.0	73.0	74.0	40.6	7.1	97.5	57.9	4.5	77.5	13.8	1,304(2.9)
	55	55.5	73.0	73.0	40.6	7.1	97.5	58.0	4.0	79.2	15.3	1,339(3.0)
	57	56.5	73.0	73.0	40.6	7.1	98.5	58.9	4.0	81.1	17.2	1,357(3.0)
	59	57.5	73.0	73.0	40.6	7.4	99.4	59.9	4.0	82.7	18.9	1,390(3.1)
	61	59.0	73.0	72.5	41.1	7.4	100.9	60.9	4.0	84.5	20.8	1,429(3.2)

# Geometry

	Frame Size	Top Tube Length (CM)	Head Tube Angle	Seat Tube Angle	Chainstay Length (CM)	BB Drop (CM)	Wheelbase (cm)	Front Center (cm)	Fork Rake (cm)	Standover (cm)	Head Tube Length (cm)	Frame Weight g (lbs)
Veneto	XS	52.1	73.0	74.0	41.7	7.6	96.1	55.7	4.5	74.2	13.8	1,294(2.9)
	S	52.1	73.0	74.0	41.7	7.6	96.1	55.7	4.5	76.5	15.6	1,338(2.9)
	M	53.8	73.0	73.5	41.7	7.6	97.4	56.9	4.5	78.8	18.2	1,380(3.0)
	L	55.2	73.5	73.0	41.7	7.6	98.0	57.5	4.0	81.9	21.2	1,402(3.1)
	XL	57.1	74.0	72.5	41.7	7.6	99.0	58.5	4.0	84.5	23.9	1,464(3.2)
Avior	47	50.8	72.0	74.5	40.9	6.8	96.2	56.2	4.5	73.7	11.2	1,206(2.7)
	49	51.4	72.0	74.5	40.9	6.8	96.7	56.8	4.5	75.5	12.0	1,243(2.7)
	51	52.5	72.5	74.0	40.9	6.8	96.8	56.9	4.5	77.3	13.7	1,284(2.8)
	53	54.0	73.0	73.5	40.9	6.8	97.5	57.5	4.5	78.9	14.9	1,320(2.9)
	55	55.5	73.0	73.5	40.9	6.8	98.5	58.5	4.0	80.4	16.3	1,352(3.0)
	57	56.5	73.0	73.5	40.9	6.8	99.5	59.5	4.0	82.0	18.1	1,388(3.1)
	59	57.5	73.0	73.5	40.9	6.8	100.5	60.5	4.0	84.3	20.3	1,438(3.2)
61	59.0	73.0	73.5	40.9	6.8	102.0	62.0	4.0	86.2	22.4	1,479(3.3)	
Vela/Capella	S	52.5	73.0	73.5	40.9	6.8	96.0	56.1	4.5	72.6	12.4	1,279(2.8)
	M	54.0	73.0	73.5	40.9	6.8	97.5	57.5	4.5	73.1	13.4	1,296(2.9)
	ML	55.3	73.0	73.5	40.9	6.8	98.8	58.8	4.0	73.1	13.4	1,314(2.9)
	L	56.3	73.0	73.5	40.9	6.8	99.8	59.8	4.0	73.8	14.9	1,332(2.9)
	XL	57.4	73.0	73.5	40.9	6.8	100.9	60.9	4.0	74.4	16.3	1,351(3.0)
Mira	S	52.5	73.0	73.5	40.5	7.0	95.5	56.0	4.5	73.1	12.3	1,292(2.9)
	M	54.0	73.0	73.5	40.5	7.0	97.0	57.5	4.5	73.6	13.4	1,319(2.9)
	ML	55.3	73.0	73.5	40.5	7.0	98.3	58.8	4.0	73.6	13.4	1,329(2.9)
	L	56.3	73.0	73.5	40.5	7.0	99.3	59.8	4.0	74.3	14.9	1,347(3.0)
	XL	57.3	73.0	73.5	40.5	7.0	100.3	60.8	4.0	74.9	16.3	1,370(3.0)
Palio	XS	52.1	73.0	74.0	41.1	7.6	95.7	55.8	4.5	74.1	13.4	1,272(2.8)
	S	52.1	73.0	74.0	41.1	7.6	95.7	55.9	4.5	76.3	15.2	1,344(3.0)
	M	53.8	73.0	73.5	41.1	7.6	97.0	57.1	4.5	78.6	17.8	1,389(3.1)
	L	55.2	73.5	73.0	41.1	7.6	97.6	57.7	4.0	81.8	20.8	1,432(3.2)
	XL	57.2	74.0	72.5	41.1	7.6	98.5	58.6	4.0	84.5	23.5	1,489(3.3)
Blade	49 (650C)	50.0	72.0	78.0	38.7	3.8	96.3	58.5	3.5	71.5	14.7	1,393(3.1)
	51 (650C)	51.5	72.5	78.0	38.7	3.8	97.5	59.7	3.5	73.5	15.1	1,439(3.2)
	53 (650C)	53.0	73.0	78.0	39.4	6.7	98.8	60.3	4.0	75.4	12.5	1,491(3.3)
	53	53.0	73.0	78.0	39.4	6.7	98.8	60.3	4.0	75.4	12.5	1,491(3.3)
	55	55.0	73.5	78.0	39.4	6.7	100.5	62.1	4.0	76.6	14.7	1,560(3.4)
	57	56.5	73.5	77.0	39.4	6.7	101.2	62.7	4.0	78.6	15.0	1,591(3.5)
	59	57.5	73.5	76.0	39.4	6.7	101.2	62.7	4.0	80.3	17.0	1,631(3.6)
	61	59.5	73.0	76.0	39.4	6.7	103.8	65.3	4.0	82.3	18.9	1,666(3.7)
Saber	47 (650C)	49.5	72.0	78.0	39.3	3.8	96.2	57.2	3.5	71.6	12.9	1,385(3.1)
	49 (650C)	50.0	72.0	78.0	39.3	3.8	96.9	58.0	3.5	72.2	13.5	1,426(3.1)
	51 (650C)	51.5	72.5	78.0	39.3	3.8	98.2	59.2	3.5	74.2	15.0	1,528(3.4)
	53 (650C)	53.0	73.0	78.0	39.3	3.8	99.4	60.4	3.5	76.2	16.8	1,538(3.4)
	53	53.0	73.5	78.0	40.6	6.7	99.7	60.0	4.5	76.1	12.2	1,538(3.4)
	55	55.0	73.5	78.0	40.6	6.7	101.7	62.1	4.5	77.8	13.3	1,507(3.3)
	57	56.5	73.5	77.0	40.6	6.7	102.4	62.7	4.5	79.6	16.4	1,518(3.3)
	59	57.5	73.5	76.0	40.6	6.7	102.4	62.7	4.5	81.4	18.1	1,525(3.4)
	61	59.5	73.0	76.0	40.6	6.7	105.0	65.3	4.0	83.4	19.9	1,590(3.5)

# Geometry

	Frame Size	Top Tube Length (cm)	Head Tube Angle	Seat Tube Angle	Chainstay Length (cm)	BB Drop (cm)	Wheelbase (cm)	Front Center (cm)	Fork Rake (cm)	Standover (cm)	Head Tube Length (cm)	Frame Weight g (lbs)
Teramo	S	52.5	73.0	74.0	40.6	6.8	96.1	56.5	4.5	72.6	11.0	1,261(2.9)
	M	54.0	73.0	73.5	40.6	7.1	97.5	57.5	4.5	73.2	12.7	1,288(2.8)
	M/L	56.0	73.5	73.0	40.6	7.1	98.0	58.4	4.0	76.0	15.0	1,310(2.9)
	L	57.0	73.5	73.0	40.6	7.1	99.0	58.9	4.0	76.5	16.9	1,334(2.9)
	XL	59.0	73.0	72.5	41.1	7.1	101.2	61.2	4.0	77.6	20.0	1,359(3.0)
Solano/Firenze	49	51.0	72.0	74.0	40.6	6.7	95.4	55.7	4.5	75.1	9.9	S1,361(3.0)/F1,296(2.9)
	51	52.5	72.5	74.0	40.6	6.8	96.5	56.8	4.5	76.2	9.9	S1,394(3.1)/F1,327(2.9)
	53	54.0	73.0	74.0	40.6	7.1	97.5	57.9	4.5	77.5	11.4	S1,415(3.1)/F1,347(3.0)
	55	55.5	73.0	73.0	40.6	7.1	97.5	58.0	4.0	79.2	13.0	S1,451(3.2)/F1,380(3.0)
	57	56.5	73.0	73.0	40.6	7.1	98.5	58.9	4.0	81.1	15.0	S1,471(3.2)/F1,399(3.1)
	59	57.5	73.0	73.0	40.6	7.4	99.4	59.9	4.0	82.7	16.7	S1,506(3.3)/F1,431(3.2)
Blue Ridge	49	52.0	71.5	74.0	45.5	7.8	101.7	57.4	5.0	76.0	15.0	1,635(3.6)
	51	53.5	71.5	74.0	45.5	7.8	103.3	59.0	5.0	77.2	15.0	1,641(3.6)
	53	55.0	72.5	73.0	45.5	7.8	103.1	58.8	5.0	78.2	15.0	1,676(3.7)
	55	56.0	72.5	73.0	45.5	7.8	104.1	59.8	5.0	79.8	16.5	1,720(3.8)
	57	57.0	72.5	73.0	45.5	7.8	105.1	60.8	5.0	81.7	18.3	1,755(3.9)
	59	58.0	72.5	73.0	45.5	7.8	106.1	61.8	5.0	83.6	20.3	1,795(4.0)
Niota Ti	61	59.5	72.5	73.0	45.5	7.8	107.7	63.3	5.0	85.2	22.1	1,835(4.0)
	S	21.75/55.3	70.5	73.0	17.0/43.2	13.5/34.1	41.27/104.0	24.27/61.6	1.5/3.81	29.83/75.8	4.25/10.8	2,223(4.9)
	S/M	22.5/57.2	70.5	73.0	17.0/43.2	13.5/34.1	42.02/106.7	25.02/63.6	1.5/3.81	30.57/77.7	4.25/10.8	2,240(4.9)
	M	23.5/59.7	70.5	73.0	17.0/43.2	13.5/34.1	43.02/109.3	26.02/66.1	1.5/3.81	30.95/78.6	4.75/12.0	2,260(4.9)
	L	24.5/62.2	70.5	73.0	17.0/43.2	13.5/34.1	44.02/111.8	27.02/68.6	1.5/3.81	31.02/78.8	5.25/13.3	2,359(5.2)
Niota	S	21.75/55.3	70.5	73.0	17.0/43.2	13.5/34.1	41.27/104.8	24.27/61.6	1.5/3.81	29.83/75.8	4.25/10.8	2,410(5.3)
	S/M	22.5/57.2	70.5	73.0	17.0/43.2	13.5/34.1	42.02/106.7	25.02/63.6	1.5/3.81	30.57/77.7	4.25/10.8	2,428(5.4)
	M	23.5/59.7	70.5	73.0	17.0/43.2	13.5/34.1	43.02/109.3	26.02/66.1	1.5/3.81	30.95/78.6	4.75/12.0	2,450(5.4)
	L	24.5/62.2	70.5	73.0	17.0/43.2	13.5/34.1	44.02/111.8	27.02/68.6	1.5/3.81	31.02/78.8	5.25/13.3	2,557(5.6)
Tanasi	14	21.0/53.3	71.0	73.0	16.8/42.5	11.9/30.2	39.3/99.9	22.7/57.6	1.5/3.81	28.2/71.7	4.8/12.3	1,256(2.8)
	16.5	22.6/57.5	71.5	72.5	16.8/42.5	11.9/30.2	40.8/103.6	24.1/61.2	1.5/3.81	29.9/75.8	5.0/12.6	1,306(2.9)
	18	23.5/59.7	71.5	72.5	16.8/42.5	11.9/30.2	41.7/105.9	25.0/63.5	1.5/3.81	31.0/78.7	5.4/13.8	1,332(2.9)
	19.5	24.3/61.6	71.5	72.5	16.8/42.5	11.9/30.2	42.5/107.8	25.8/65.5	1.5/3.81	31.8/80.8	5.4/13.8	1,409(3.1)
Unicoi	14	20.9/53.0	71.0	73.0	16.8/42.5	11.7/29.7	39.4/100.1	22.7/57.8	1.5/3.81	28.7/72.8	4.8/12.3	1,978(4.4)
	16.5	22.6/57.5	71.5	73.0	16.8/42.5	11.7/29.7	41.0/104.0	24.3/61.7	1.5/3.81	30.1/76.5	4.8/12.3	1,987(4.4)
	18	23.5/59.7	71.5	73.0	16.8/42.5	11.7/29.7	41.9/106.3	25.2/64.0	1.5/3.81	30.8/78.2	4.8/12.3	2,010(4.4)
	19.5	24.3/61.6	71.5	73.0	16.8/42.5	11.7/29.7	42.7/108.3	26.0/66.0	1.5/3.81	31.8/80.8	5.3/13.5	2,101(4.6)
Pisgah	12	21.0/53.3	71.0	73.0	16.8/42.5	12.0/30.5	39.3/99.8	22.7/57.6	1.5/3.81	26.9/68.0	4.8/12.3	1,316(2.9)
	14	21.0/53.3	71.0	73.0	16.8/42.5	12.0/30.5	39.3/99.9	22.7/57.6	1.5/3.81	28.2/71.7	4.8/12.3	1,360(3.0)
	16.5	22.6/57.5	71.5	72.5	16.8/42.5	12.0/30.5	40.8/103.6	24.1/61.2	1.5/3.81	29.8/75.8	4.8/12.3	1,432(3.2)
	18	23.5/59.7	71.5	72.5	16.8/42.5	12.0/30.5	41.7/105.9	25.0/63.5	1.5/3.81	30.7/78.0	4.8/12.3	1,467(3.2)
	19.5	24.3/61.6	71.5	72.5	16.8/42.5	12.0/30.5	42.5/107.8	25.8/65.5	1.5/3.81	31.8/80.7	5.5/13.8	1,475(3.3)

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