

**SOME ARTISTS WORK IN
BRONZE OR STONE.
WE PREFER ALUMINUM.**

cannondale

**THE MOST
IMPORTANT
COMPONENT OF
A CANNONDALE
IS THE PASSION
OF THOSE
WHO CREATE IT.**

Here at Cannondale, we're passionate about creating the world's most outstanding high-performance bicycles. Bicycles that transcend the constraints of conventional design to move you both physically and spiritually. Physically, because you get more performance from your cycling on a Cannondale. And spiritually, because reaching your full potential is as satisfying to your psyche as it is to your body.

To achieve this goal takes knowledge and commitment. The kind gained first hand on hair-raising single-track trails, quad-burning intervals and motor-paced road workouts. The result is a bicycle that reacts like no other you've ever ridden. Here's why.

IT'S ALUMINUM.

Aluminum delivers a combination of benefits that other frame materials can't match. Benefits that directly affect performance, like lightness. Aluminum is 40% less dense than titanium, and 65% less dense than chrome-moly steel, which allows Cannondale to craft some of the lightest frames on the planet; a mere 3.2 lbs. on a 56 cm. Criterium frame, and 3.6 lbs. on a 20" mountain bike frame. Density also directly affects your cycling comfort because it determines a

material's ability to dampen vibration. More dense materials, like titanium and chrome-moly, tend to reverberate vibrations. Aluminum's low density helps dampen vibration and road shock that would travel through your bike frame, and be absorbed by your body frame.

But using aluminum isn't enough. To fully capitalize on aluminum's benefits, you need a design that looks beyond current standards.

Chart A: Frame Weight Comparison Chart (Mountain Bikes)

FRAME SIZE	BIKE MODEL	FRAME WEIGHT (LBS.)
20.0	Cannondale	3.60
17.5	Marin Team Titanium	3.75
18.0	Fisher Paragon	4.00
20.0	Trek 8900 Carbon/Aluminum	4.30
18.2	Bridgestone MB-O, Logic tubeset	4.40
19.5	Fat City Monster Fat	4.80
18.0	Schwinn High Sierra M.O.S.	5.50
20.5	Specialized Stumpjumper	5.75
20.5	Diamond Back Ascent	5.85

The Cannondale Aluminum Frame

1. A faster ride is provided by flex resistant, energy efficient large diameter tubes. 2. Cannondale frames weigh as little as 3.2 lbs., thanks to their lightweight aluminum tubes. 3. True "unibody" construction results from a unique hand-welded, heat-treated manufacturing process. 4. A nearly "custom" frame-to-rider fit is achieved with Cannondale's lug-less construction. 5. Our Made In The U.S.A. decal: Every Cannondale frame is hand-built at our Bedford, Pennsylvania, factory. 6. A broken rear derailleur hanger isn't a problem with Cannondale's replaceable derailleur hanger.

IT HAS LARGE DIAMETER TUBES.

When you pedal a bicycle, your energy gets divided. Some of the effort is transferred to the drivetrain, powering you forward. The rest is wasted by flexing and twisting the frame. In fact, frame flex is at its worst when you need the most power: while sprinting to the finish line or tackling a steep hill – anytime you're out of the saddle and jamming on the pedals.

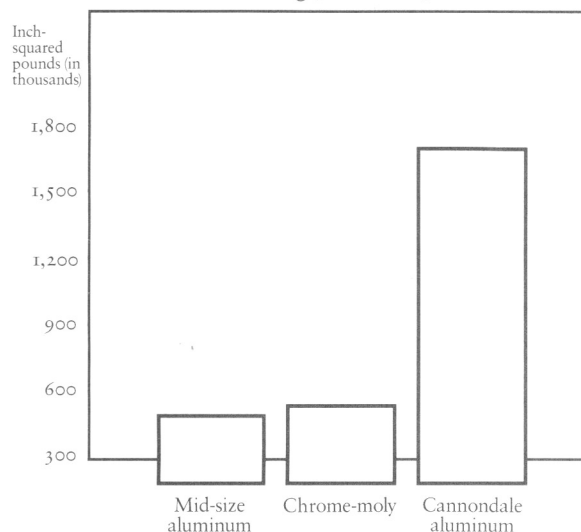
How can frame flex be reduced? Two ways. The more traditional method involves shortening the lengths of the frame's tubes. This approach is effective – a shorter tube is more resistant to flexing – but achieves efficiency at the expense of comfort. The ultra-tight geometry created by shorter tubes means a harsh, bone-jarring ride. Combined with chrome-moly or titanium's penchant for transmitting vibration, this traditional solution is far from perfect.

A second and more dramatic way to increase a tube's resistance to twisting and bending is to increase its diameter. (Merely doubling a tube's diameter increases its resistance to flexing sixteen times.) However, this isn't a practical option when designing chrome-moly or titanium frames. A chrome-moly mountain frame with the same tube dimensions of a 3.6 lb. Cannondale aluminum frame would weigh over 10 lbs. An identical frame with titanium tubes would be over two pounds heavier than a Cannondale.

Cannondale's large-diameter tubes are far more resistant to flexing than standard or mid-

size tubing of any material (see Chart B). Our criterium geometry racing frame successfully resists frame flex better than any bicycle frame ever tested on *Bicycling* magazine's frame deflection testing machine, the Tarantula.

Chart B: Resistance to Flexing (Downtube)



IT'S TIG-WELDED AND HEAT-TREATED.

The easy way to build a bicycle frame is with lugs, the prefabricated joints or collars found where frame tubes intersect. Slide the appropriate length tubes into place inside the lugs, secure them by gluing or welding, and you've created a bicycle frame. But the tooling required to produce lugs is expensive, so many manufacturers compromise and use identical lugs on different size frames, limiting the ability to customize tube lengths to the rider.

Cannondale bicycles are hand-built without lugs. Every tube is cut to optimum size for each frame, then TIG-welded (Tungsten Inert Gas) together by hand.

After welding, a Cannondale frame is heat-treated. As with any metal, aluminum weakens around the area that's welded. Heat-treating restores the tubes to their original strength, creating a single, cohesive unit of aluminum, or true "unibody" construction.

A TIG-welded, heat-treated manufacturing process is a difficult and time-consuming procedure. In fact, Cannondale is the only large-scale bicycle manufacturer to employ it. Other manufacturers, lacking the knowledge or the commitment required for TIG-welding and heat-treating, use heavier butted tubes to offset the loss of strength caused by welding. Or, they use glue to avoid welding altogether.

IT'S MADE IN AMERICA.

Few bicycle companies actually manufacture the bicycles they sell. Instead, they have them produced overseas by one of a handful of giant factories specializing in mass production. The same factories that also crank out bikes for their competitors. In fact, strip the paint and decals of many of these bikes and they're virtually interchangeable.

Every Cannondale is hand built at the Cannondale factory in Bedford, Pennsylvania. As the only large-scale manufacturer of high-performance bicycles relying solely on U.S. labor, Cannondale has a keen competitive edge that translates into a superior product. In other words, it's far easier to monitor quality control and bring innovative products to market when

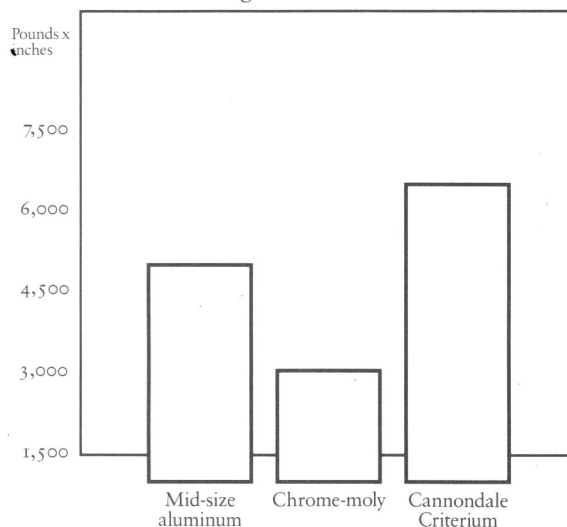
your factory is down the block instead of half-way around the world.

IT'S A CANNONDALE.

Large diameter aluminum tubing, TIG-welded/heat-treated construction and American manufacturing aren't the only things that set Cannondale apart from the competition. We're proud of our long tradition of innovation. From less obvious features – like our trick replaceable rear derailleur hanger – to dramatic innovations like the E.S.T. suspension mountain bike, Cannondale has established a firm position at the forefront of bicycle frame design. And our intensive use of sophisticated Computer Aided Design equipment helps us to continually renew this tradition.

It all comes back to passion. At Cannondale, a bicycle can never be too fast, too light or too comfortable. After all, you never stop striving to improve your performance. Why should we?

Chart C: Downtube Strength



WHY ARE CANNONDALE BICYCLES SO HARD TO FIND?

Crafting a Cannondale frame takes time, patience and attention to detail. Each bicycle receives a minimum of four hours' hand labor. The very things that make a Cannondale so desirable also make them impossible to produce in huge numbers. Consequently, we're forced to limit the number of bike shops that carry them. Of the thousands of shops across the country, fewer than 15% are permitted to carry Cannondale bikes. However, those that do carry Cannondales represent the most professional, progressive, independent bicycle retailers in the nation.

OTHER BIKE COMPANIES STRESS THE STRENGTH OF THEIR FRAMES. HOW DO THEY COMPARE TO A CANNONDALE?

Poorly. Typically, the comparison is made between identical tubes of different materials, completely ignoring the fact that strength is as dependent on the configuration of the tube (diameter and wall thickness) as it is on the material itself.

A more accurate comparison is obtained by examining the tubes actually used on bicycles. The downtube on a Cannondale mountain bike is more than twice as strong as the downtube on a typical chrome-moly frame, and

26% stronger than a typical "mid-size" aluminum downtube (see Chart C).

Finally, a definition of strength is in order. Tensile strength is the amount of force required to break a tube into two pieces. Yield strength is the amount of force required to permanently bend a tube. A frame's strength, whether tensile or yield, is actually a measure of its ability to withstand a crash, and is in no way a measure of its performance under normal riding conditions.

WHERE CAN I LEARN MORE ABOUT CANNONDALE?

Our yearly catalog is a great place to start. It has more specific information on our different frames – from mountain and racing, to cross-training, tandem and touring – and the components used on various models.

But to really learn about a Cannondale, you've got to ride one. Only by putting a Cannondale through its paces can you truly experience the explosive performance and sure handling that make a Cannondale a cut above.

Most bike shops encourage test rides. We challenge you: Take one of our bikes out for a test ride, and see if you don't actually feel the added performance provided by a Cannondale. For the name of your nearest Cannondale retailer, please call us at 1-800-BIKE-USA (in continental U.S.A.).

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