



ZIPP SPEED WEAPONRY

2002



## Z<sup>3</sup> Zipp Advanced Technology Group

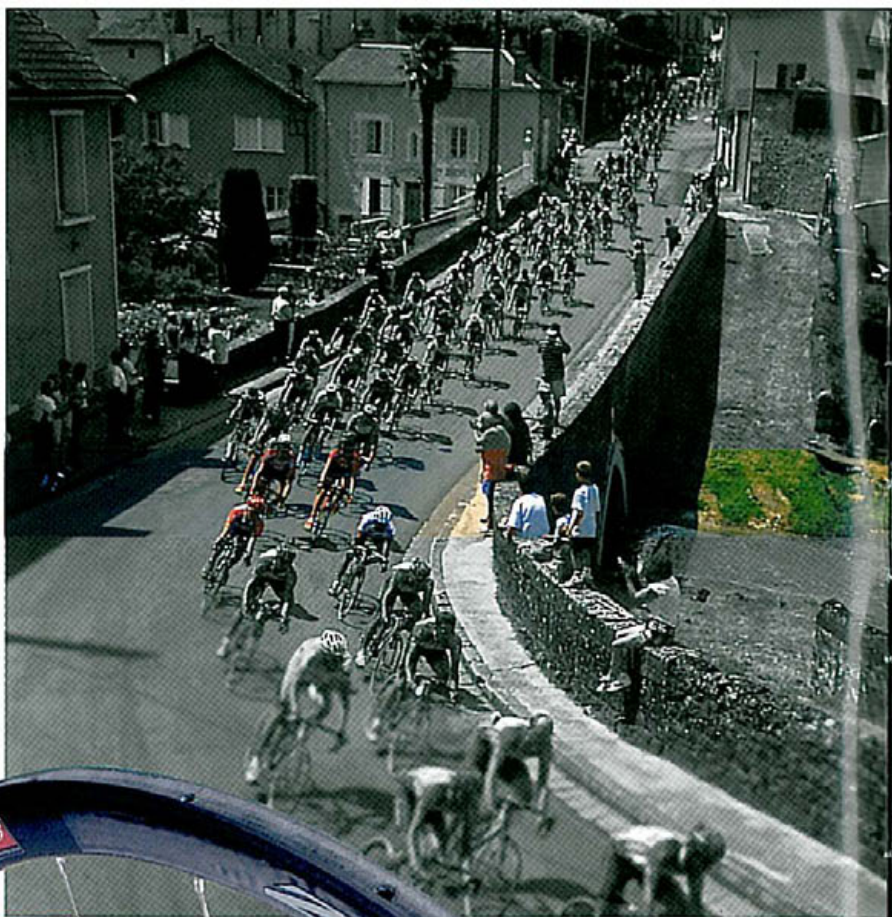
Z<sup>3</sup> is the cutting edge products division of the ZIPP Advanced Technology Group. The on-going mission of the Advanced Technology Group is to seek out, develop and invent the future of cycling through advanced materials and processes.

Products bearing the Z<sup>3</sup> name are no compromise, price is no object, current state of the art in real world technical possibility. Z<sup>3</sup> products are purely performance driven, the ultimate result of the latest new technologies and a blatant disregard for the normal constraints of economics or marketability. Pure performance. This is what we live for.



The ZIPP Advanced Technology Group existed even before we had a name for it. It's part of our company culture, deeply rooted in everything we do. It's our brain trust of dreamers, production specialists, engineers and performance fanatics. The Advanced Technology Group actively looks beyond today. It develops emerging technologies from a broad spectrum of sources through meticulous research carried out in the lab and where the rubber meets the road. It's about the sheer pleasure of seeing just how far the practical limits of the technology can extend.

The culture of our company demands innovation. From the beginning we have anticipated, embraced and encouraged positive change in the pursuit of producing the finest cycling products on the planet. The Advanced Technology Group and Z<sup>3</sup> products division are the logical extension of our relentless search for perfection... a search that is never ending and always fun.



## 303 Z<sup>3</sup>

Imagine if you saw the future. It would be good, right? To our Advanced Technology Group the future is a place where you sprint quicker, climb faster and it feels like a tailwind on every ride. We've created the future. It's here, and you can have it now. Introducing the new model 303 Z<sup>3</sup>, the first product from our new product division of the ZIPP Advanced Technology Group.

At an incredible 960 grams total weight for the set, the 303 Z<sup>3</sup> is our lightest wheelset to date. This is no lightweight "for show only" marketing toy, this is an honest to goodness racing wheelset refined to greatness by our Z<sup>3</sup> performance fanatics. You don't have to go on a diet to ride them because the 303 Z<sup>3</sup> is designed for most real world riders.

The 38mm deep Mid-v<sup>3</sup> rims are meticulously hand crafted from five different types of carbon fiber using the most advanced realization of our proprietary ICT process to date. Average rim weight is decreased to an incredible 260 grams while strength and stiffness are maintained at a level equal to that of traditional rims weighing more than 50% more. Always looking for an edge, the Advanced Technology Group has drawn upon decades of wind tunnel data and NASA developed airfoil modeling software to refine the multi-patented rim profile for maximal performance. Using re-shaping possibilities presented by the refinement of ICT technology, small changes result in a 6% improvement in angular aerodynamics and a 7.5% reduction in side force applied to the rim. Straight into the wind a regenerative airfoil make the rim appear deeper to the wind than it's actual depth. Multiple patents and unmatched manufacturing prowess make this aerodynamic technology a ZIPP exclusive. Quick, confidence inspiring braking performance is assured wet or dry with our exclusive Silica-Ceramic braking surface. No special pads are required. The hubs represent the current state of the art in manufacturing and bearing technology. (See the full hub story.) Even the spokes are custom made specific to this wheelset to meet our demanding specifications for lightweight, strength and aerodynamics.

Only a lucky few will own the future. Due to limited availability of materials, approximately 200 hand built sets will be produced. The 303 Z<sup>3</sup> is available only in 700c tubular. See your dealer or call for details.

**303 Z<sup>3</sup> Wheelset:**  
Total average weight  
Average rim weight  
Rim Depth

Braking Surface  
Spoke Count  
Spoke Type  
Hubs

- 700c tubular 960 grams
- 260 grams
- 38mm Multi-patented rim profile and manufacturing technology
- Silica-Ceramic
- 18 front / 24 rear
- Custom extra light bladed stainless steel
- 175 gram rear / 70 gram front
- (See details next page)



**ZIPP ICT INVERSION COMPOSITE TECHNOLOGY**





## Z<sup>3</sup> Series Hubs

The ZIPP 303 Z<sup>3</sup> wheel set requires a very special set of hubs. Available only as original equipment on the 303 Z3 wheels, the model 175 rear and 70 front hubs are the no-holds-barred ultimate realization of current hub technology.

The 175 rear and 70 front are precision machined entirely from our ZIPP exclusive 7XXX alloy. Available in limited quantities, 7XXX is a recently declassified material with 33% greater strength and 40% greater hardness than the previous industry benchmark of 7075 aluminum. 7XXX meets or exceeds the capabilities of 7075 in every measurable area. The fine near optical quality finish and fit of these hubs are achieved courtesy of a custom Citizen double livehead Swiss type watch lathe. This machine is adapted from fine watch making equipment and results in accuracy over 40 times greater than previously available.

Dead on accurate to better than .00005 inches, once we saw this machine we knew it was the only one to realize the full potential of our designs.

The clutch mechanism engages with authority. Three forged self-lubricating E52100 bearing steel pawls are actuated by a single oversized steel return spring for quick transition from coasting to power application. The axle is high density filament wound Carbon fiber married to 7XXX ends. The asymmetric 15mm axle front and rear is 25% larger than standard and designed for optimized bearing placement. The result is a simultaneous reduction in weight and substantial increase in stiffness. Protective Carbon fiber end caps shield the internal mechanism from the elements.

Our financial guy had a fit when he saw the purchase order for these, but the ultimate hub has to have the ultimate bearings. Silicon Nitride (Si<sub>3</sub>N<sub>4</sub>) ceramic bearings are 30% lighter than steel and 40% stronger. So finely balanced, these Ceramic bearings have an incredible maximum spin rate of 250,000 rpm under load. Manufactured exclusively for ZIPP and clean room assembled in matched sets of 12 to 15 balls per bearing, they exhibit variance in size and sphericity of LESS than 1 millionth of an inch among the entire bearing set. Each ball is over 1000 times more round than the best steel bearing of any type, grade or benchmark. The result is a noticeable increase in smoothness and the lowest ball friction coefficient ever achieved. A custom Teflon thermoplastic retainer physically separates and locates each individual ball within the bearing race for optimum performance and longevity. Further protection is provided by a custom formulated 65% fill Isoflex barium-hydrocarbon ceramic specific grease. Double light-contact seals on polished races provide a final near friction free protective barrier against the elements. The bearing races themselves are a hybrid ceramic specific alloy finely ground and polished to a ISO class 9 or better standard and cryogenically treated at -300 degrees Fahrenheit to refine the molecular structure for this application.

Due to the limited availability of the materials used in the manufacture of these ultimate hubs, only approximately 200 sets will be available as original equipment in our 303 Z3 wheel sets.



### Model 70 front hub:

- 70 grams
- Precision machined 7XXX military ordinance grade hub shell.
- Silicon Nitride (Si<sub>3</sub>N<sub>4</sub>) matched ceramic bearings. Less than 1 millionth of an inch total size and sphericity variance per matched set.
- Carbon fiber axle
- 7XXX alloy axle ends
- Carbon fiber protective end caps.
- Drilled 18 hole only.



### Model 175 Rear hub:

- 175 grams.
- Precision machined 7XXX military ordinance grade hub shell and free hub body.
- Shimano and Campagnolo versions. Interchangeable for full cross-system compatibility.
- Silicon Nitride (Si<sub>3</sub>N<sub>4</sub>) matched ceramic bearings. Less than 1 millionth of an inch total size and sphericity variance per matched set.
- Carbon fiber axle
- 7XXX alloy axle ends
- Carbon fiber protective end caps.
- 24 hole only

## The m<sup>2</sup>cm Story

Extensive research has resulted in m<sup>2</sup>cm, an exciting new patent pending technology. Co-Molding has been one of the hottest topics in composites development for the last few years. Essentially, the m<sup>2</sup>cm process is a co-molding system designed to mold and meld in one operation two dissimilar materials in a single unified composite structure. Not just a rim technology, our new m<sup>2</sup>cm process opens a whole new area of product development within and beyond the cycling industry. This research and development is indicative of our on-going work in basic composite and manufacturing technology. The first ZIPP products to benefit from m<sup>2</sup>cm are the 404 model clincher and the completely new 303 model clincher.



## 303 Mid-v Wheelsets



This is the wheelset you have been waiting for! Our fast becoming legendary 303 tubular got even lighter and faster for 2002 while for the first time a truly superb high performance Carbon/Alloy clincher model joins the 303 family.

Lightning fast acceleration is yours with the lightest production tubular and clincher Mid-v rims on the planet. With our exclusive ICT carbon fiber process and our new m<sup>2</sup>cm clincher technology, we feel these are the finest production Mid-v rims anywhere. After multiple World and National championships, Olympic medals, Tour De France stage wins and more local and regional victories than you can count, lots of other folks are starting to agree.

Of course light weight is nothing without strength, so the rims are more than double the lateral and vertical stiffness of a traditional rim weighing up to 50% more. 2002 303 wheels feature a newly refined rim profile for even greater aerodynamic performance, strength, stiffness, and increased ride comfort. Tubular versions feature our exclusive Silica-Ceramic braking surface for superior dry and wet weather performance. No special pads are required. On the new 303 clincher, a precision machined and welded aluminum braking surface provides sure and dependable braking. This welded and machined rim is the first ever available on a structural carbon fiber rim. Our patent pending new m<sup>2</sup>cm technology makes it possible.

In conjunction with our ICT carbon fiber process, m<sup>2</sup>cm technology results in a aerodynamically superior 40mm deep clincher rim over 100 grams lighter than the average 30mm deep conventional alloy rim. Lateral stiffness is more than double than that of traditional rims while the vertically compliant carbon element ensures a comfortable riding experience over the all too common rough roads.

The 303 wheelset is designed for maximum aerodynamic performance in a Mid-v rim while reducing the effects of cross winds. Clincher tires exhibit different aerodynamic properties than tubular tires, so we subtly alter the shape of the clincher profile to maximize the aerodynamic characteristics of clincher tires. And because true aerodynamic performance isn't always about going in a straight line, we designed the 303 to attack corners with razor edge precision. The 303 can heel over into and out of the corners like no other aerodynamic wheelset. We achieve this by superior lateral rim stiffness and by minimizing the pressure differential from one side of the rim to the other while maximizing head-on aerodynamic performance. New refinements in our ICT carbon molding technology have allowed us to refine further the already legendary performance of the rims used in the 303 wheelset. Small changes in the shape of the 2002 rims result in a 6% improvement in angular aerodynamics and a 7.5% reduction in side force in a cross wind. Straight into the wind and at minimal angles a regenerative airfoil make the rim appear deeper to the wind than it's actual depth. Multiple patents and unmatched manufacturing prowess make this aerodynamic technology a ZIPP exclusive. The stainless steel drawn oval spokes used in the 303 wheelset are the proven best shape for all wind angles. They provide great aerodynamics, stiffness and strength.



The 303 is fast, incredibly light, stiff, handles great and accelerates like a rocket. It is ideal for criteriums and excels in road racing. The new 303 clincher is an outstanding choice for fast riders demanding lightweight, aerodynamics and great overall ride characteristics. Multisport athletes looking for a great wheel for draft legal or technical courses under exceptionally hilly or windy conditions will love the performance of the 303. Mix with a model 404 rear if you like. The 303 makes a great alternative wheel for the extreme conditions often found on Kona. The 650c size while just as strong as it's 700c sibling, is ideal for lighter weight riders who find deeper rims difficult to control under exceptionally windy conditions.

Hand built with meticulous hand craftsmanship and the most advanced production methods available, the 303 wheelset in classic tubular or new clincher is destined to become one of the most popular "secret weapons" of cyclists everywhere.





**Total average wheelset weight:**

**Average rim weights:**  
**Rim Depth:**

**Spoke Count:**

- Tubular 650c 994g / Tubular 700c 1140g
  - Clincher 650c 1224g / Clincher 700c 1380g
  - Tubular 700c 280g / 650c 245g, Clincher 700c 415g / 650c 370g
  - Tubular 38mm / Clincher 40mm Multi-patented rim profile and manufacturing technology.
  - Tubular wheels feature ICT Carbon/graphite composite rim w/ Silica Ceramic braking surface. No special pads required.
  - Clinchers feature ICT Carbon/graphite / Alloy m<sup>2</sup>cm rim with sub 180g welded and machined alloy extrusion braking surface.
  - Tubular 700c 20" frt. / 28" rear, Clincher 700c 20" frt. / 24" rear, Tubular and Clincher 650c 16" frt. / 20" rear
  - Stainless Steel drawn ovalized spokes w/ alloy nipples. ZIPP 202 rear hub / 202g and ZIPP 84 frt. hub / 84g.
- Available in Shimano and Campagnolo system compatible versions. Quick Change free hub body system for full cross system compatibility.

Aluminum Valve Extensions will fit any presta valve stem. Two sizes: Small for rims up to 40mm



and large for rims up to 60mm.

### ZIPP 415 and 370 Carbon fiber and alloy clincher rims:

New for 2002, these are the lightest Mid-v clincher rims on the planet. At over 100 grams lighter than the weight of any 30mm alloy rim, the 40mm deep 700c model 415 and model 370 650c are in a class of their own. Structural carbon fiber employing our exclusive ICT technology and a sub 180 gram alloy extrusion are brought together in a new patent pending process. The result is a rim with stiffness nearly double that of rims weighing twice as much, but with the lowest rotational mass of any clincher rim available. Stopping is no problem thanks to the precision welded and machined alloy rims, another first on a structural carbon fiber rim. m<sup>2</sup>cm is a patent pending process exclusive to ZIPP. No other clincher rim even comes close.



ZIPP 415 700c rims average 415 grams and are available in 16, 18, 20, 24, 28 and 32 hole counts.

ZIPP 370 650c rims average 370 grams and are available in 16, 18, 20 and 24, 28 hole counts.

### ZIPP 280 and 245 Carbon fiber tubular rims:

These 38mm deep carbon tubular rims are the lightest production rims manufactured by ZIPP using our proprietary ICT process. New for 2002 is a refinement to the multi-patented rim profile that increases performance over a wider range of wind angles and conditions. Used on our popular 303 tubular wheelset, we also offer these rims individually affording you the opportunity to build a custom wheelset incorporating the lightest, strongest rims available. These are all-around performers for criteriums, road racing and special purpose track and multi-sport applications. They are built to deliver high speed predictable handling and rapid acceleration. Includes our Silica-Ceramic braking surface for great braking in wet or dry conditions. No special brake pads are required.

ZIPP 280 700c rims average 280 grams and are available in 16, 18, 20, 24, 28 and 32 hole counts.

ZIPP 245 650c rims average 245 grams and are available in 16, 18, 20, 24 and 28 hole counts.





# Tubular 404

## 404 Deep Section Carbon/Graphite Composite Tubular Wheelset:

The 404 composite tubular is the classic ZIPP wheel ridden to hundreds of World and National championships, dozens of Olympic medals, world records and thousands of individual victories large and small. Riders worldwide have come to depend on the 404 for superb aerodynamics, great handling and durability. This is our most versatile wheelset offering true world beating performance across a wide range of applications.

TT and road specialists will appreciate the superb performance of the 404. This is our most aerodynamic racing wheelset. It is ideal for time trials, long solo breaks and any application where quickness and ultimate sustainable top-end speed are paramount.

Multi-sport athletes everywhere have made the 404 the premier choice world wide for good reason. The 404 excels in multi-sport events with superior performance proven aerodynamics, durability and comfort.



The overall lightness of the 404 wheelset is truly amazing. For 2002 the 404 gets even lighter thanks to our new 202 and model 84 hubs, but the real story of the weight and performance lies with the rims. Our exclusive ICT process results in 58mm deep section rims more that double the lateral stiffness of conventional alloy rims while the weight at the outer edge is up to 75% less than that of traditional rims. This combination of low edge mass and high stiffness results in a ride quality and quickness that has to be experienced. It's quick. It's fast at speed and handles like a dream through the corners. You have to slow down sometime, so the 404 features our exclusive Silica-Ceramic braking surface for responsive deceleration wet or dry. No special pads are required.

Light weight alone does not make a fast wheel. The key to total performance lies in a keen understanding and application of aerodynamics. Thousands of hours of research coupled to tens of thousands of road miles and a fanatic attention to detail have gone into today's 404. You don't ride in a wind tunnel (unless you are really strange) so our wheels are always designed for the real world.

Total average wheelset weight:  
Average rim weight:

Spoke Count:  
Rim Depth:

1153g 650c / 1275g 700c  
340g 650c / 370g 700c ICT Carbon/graphite composite rim w/ Silica Ceramic braking surface.  
No special brake pads required.  
16 ftr./20 rear 650c and 18 ftr./24 rear 700c  
58mm Stainless Steel drawn ovalized spokes w/ anodized alloy nipples  
ZIPP 202 rear hub/202g and ZIPP 84 front hub/84g  
Available for Shimano and Campagnolo systems.  
Quick Change free hub body for full cross system compatibility.



## 404 Track Specific Tubular Wheelset

We understand the subtle and important nuances of track competition and have developed a rim with a very specific laminate ONLY for velodrome competition. Track competitors, particularly Sprinters, are looking for lateral stiffness and wheels with a predictable quick reaction to steering and power input. To accomplish this we have re-invented our laminate structure to create the personality a track rider needs in a wheel. The rims are specifically designed for the higher frequency lower amplitude surface imperfections specific to track surfaces. Laced into straight pull custom built ZIPP track hubs with oversized sealed bearings and threaded axles, this wheelset rocks!





- Spencer Smith  
- 3 Time World Champion



## Clincher

### 404 Deep Section Carbon/Graphite and Alloy Composite Clincher

You have to love the convenience of today's clincher technology. Now you can love the performance even more with the NEW 2002 404 clincher wheelset. The NEW 404 clincher is great for both Roadies and Triathletes alike. Any rider looking for the highest aerodynamic performance in a clincher race wheel, who wants to race and train on the same wheel and who demand light weight and durability will find the 404 clincher an excellent choice.

Extensive research has resulted in  $m^2cm$ , an exciting new patent pending technology. As applied to the new ZIPP 404 clincher, the result is a lighter, stronger, stiffer and yet more comfortable rim. An ICT process Carbon Fiber rim element is hand built and molded inside the precision alloy extrusion in a single seamless procedure. The dissimilar materials are melded into a unified whole that exhibits the best properties of each. There are no shortcuts in this demanding process; what you get is the result of hours of meticulous hand labor married to cutting edge technology.

A first time anywhere feature on a structural carbon fiber rim is the welded and machined alloy braking surface. Possibly the finest rim extrusion in the world, at 180 grams we achieve a variance of plus 1% in extrusion weight where the best previous industry standard was plus 10% on conventional rims. The result is the lowest rotational rim mass of any alloy clincher available, quick acceleration and efficient transfer of power courtesy of lateral stiffness more than double that of any conventional rim.

Aerodynamics are, of course, what all ZIPP wheels are known for and the 404 clincher is no exception. Our multi-patented rim shape is designed to offer the best performance over the widest range of real world conditions. Clincher tires exhibit different aerodynamic characteristics than tubular tires, so we subtly alter the 404 clincher profile to maximize the rim for the characteristics of clinchers. No other manufacturer we know of goes to such lengths to ensure maximum performance.

**Total average wheelset weight:**

**Average rim weight:**

**Rim depth:**

**Spoke Count:**

1393g for 650c / 1537g for 700c

460g for 650c / 505g for 700c

58mm Multi-patented rim profile and manufacturing technology. ICT Carbon/Graphite and alloy composite w/ sub 180g heat treated alloy extrusion. Welded and Machined braking surface.

650c 16 ft. / 20 rear and 700c 18 ft. / 24 rear

Stainless Steel drawn ovalized spokes w/ anodized alloy nipples. ZIPP 202 rear hub/202g and ZIPP 84 ft. hub/84g.

Available for Shimano and Campagnolo systems. Quick Change free hub body for full cross system compatibility.



### Deep Section Rims

#### ZIPP 505 and 460 Rims

Adding the convenience of a clincher and the aero performance of a multi-patented 58mm deep to ZIPP's ICT and  $m^2cm$  make this rim a winner. The machined and welded aluminum braking surface is a first for a structural carbon rim and makes braking smooth, sure and predictable.

ZIPP 505 700c rims average 505g and are available in 16,18,20,24,28 and 32 hole counts.

ZIPP 460 650c rims average 460g and are available in 16,18,20,24 and 28 hole counts.



#### ZIPP 360 and 330 Tubular Rims

These 58mm deep tubular carbon fiber rims are rapidly becoming the choice for athletes at every level. With a multi-patented shape, their extreme light weight and micro-porous Silica Ceramic braking surface, these rims find themselves in competitions world wide. Equally at home on the Kona highway or tearing up Tour de France stages, these rims are built for performance.

ZIPP 360 700c rims average 365g and are available in 16,18,20,24,28 and 32 hole counts.

ZIPP 330 650c rims average 340g and are available in 16,18,20,24 and 28 hole counts.





## 909 Wheelset

For time trial and multisport competition nothing is faster than a disc on the rear and a deep section wheel on the front. These are the wheels ridden at a blistering 58.874kph in the 2001 Giro de Italia by Rik Verbruggen to the fastest average speed of any professional stage victory in history.

The 909 is the lightest, most aerodynamically efficient combination of its kind. No hype, no speculation, just speed. If you are serious about going fast, this is the logical choice. Because ZIPP discs are very light, gone are the days when discs should be considered a flat course wheel only. A 650c disc weighs in at about 912g while the 700c weighs about 950g. In both cases nearly a third of the weight is in the hub, with the outer edge weighing less than 85g. With unsurpassed lateral stiffness, low overall weight and a low outer rim area mass the ZIPP disc accelerates like no other wheel. Combine this with a total frontal area of only 19mm and you have a wheel built for serious performance.

The 58mm deep front wheel is the ideal depth and configuration for optimal aerodynamic performance and handling. Stainless Steel drawn and ovalized spokes provide great aerodynamics in all conditions, durability and strength. The 909 front incorporates our exclusive ICT manufacturing process. As with all ZIPP Deep Section wheels, superior aerodynamics, lateral stiffness, comfort and durability are combined to provide a wheel with superb overall characteristics.

Both the Disc and Deep Section front are equipped with our Silica-Ceramic braking surface for smooth, quick stopping power wet or dry. No special pads are required.

This is not a wheelset for Saturday afternoon Joe-Bobs. This is for the fighter pilot, the determined, for anyone who challenges himself or herself to be the best. Professional triathletes and roadies worldwide choose this wheelset as the ultimate speed weapon of choice. Discover for yourself the exhilaration of absolute performance. And remember, at speeds of over 700mph, ZIPP strongly recommends the use of protective clothing and eye shields!

*Total average wheelset weight:*

*Disc average weight:*

*Front wheel average weight:*

- 650c tubular is 1408 grams and 700c is 1496 grams

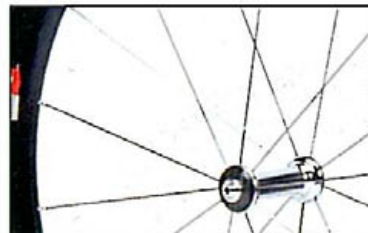
- 650c 912g / 700c 950g

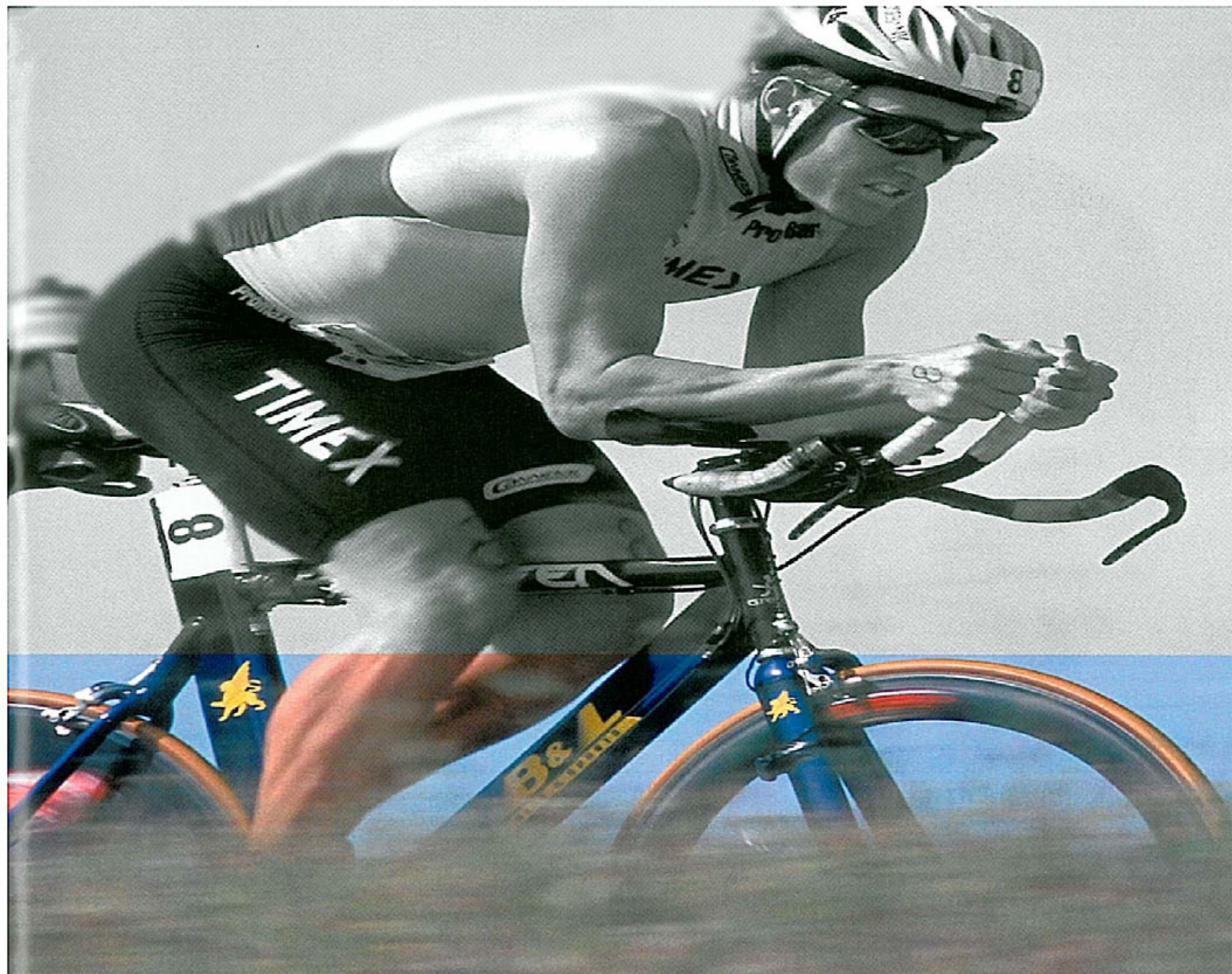
- 650c 496g / 700c 546g

*Multi-patented rim profile and manufacturing technology*

*Silica Ceramic braking surface front and rear.*

*No special pads required.*





## Zipp 'ICT' Inversion Composite Technology

In early 1999 the ZIPP Advanced Technology Group, then unknown to anyone outside the ZIPP corporate family, began work on a new technology that would drive our entire future product line. The design parameters were clear: an all carbon structure, utilization of the various new material technologies, drastic weight reduction and, of course, the best durability of any wheel on the market. 18 months of research into new materials, many long days and over 200 prototype wheels ridden tens of thousands of miles by ZIPP pros and test riders allowed us to achieve the result known today as ICT, Inversion Composite Technology. ICT based products are the lightest, strongest series of rims and wheels ever produced.

The basic construction of ZIPP ICT rims rely on the world's first and only continuous banding of unbroken radial fibers, a ZIPP exclusive technology. This radial monocoque forms the structural "core" of the wheel and is responsible not only for a significant increase in stiffness, but also affords a significant increase in strength over any other wheel we have tested. The purely radial fibers, each no more than 3 to 5 microns in diameter, form the basis of our highly directional fiber system. Throughout the rim, precise unidirectional fiber orientation results in lowered weight, superior strength and increased stiffness. Meticulous hand craftsmanship and technologically advanced processes result in pinpoint application of only the specific material required for the structural needs of the rim at any given location. Fiber orientation is so specific that woven materials are used only in select areas subject to high load bearing, such as the nipple seat area. This strategically placed woven material combats high stress due to rim drilling and significantly increases toughness and durability with no weight penalty.

For 2002 we have refined ICT technology even further. Experience, more hard work and the development of improved resin and fiber systems have resulted in greater rim stiffness, increased ride comfort and improved impact strength. The new 2002 ICT based rims are our best ever.



### Zipp Regenerative Airfoil Concept

All Zipp rims feature our multi-patented regenerative airfoil shape, this is the classic 'Bulge' in the sidewall of the rim. This shape is so special because it actually utilizes the airflow, which has separated coming off of the tire, and reintegrates this back into the flow. The result is incoming airflow actually sees the rim and tire as being smoother and more curved than it actually is. The pictures below show the separation off of the tire tread, and how it propagates the length of the section. On the standard section, the rim sidewall must remain straight for quite a distance before the flow reintegrates, then the rim terminates abruptly leaving a large turbulent wake. This rim could taper to a sharp trailing edge, but the flow would then never reintegrate resulting in even higher drag. On the Zipp profile, the separated flow is forms a bubble around which incoming air flows, this allows the Zipp rim to gently curve into an optimized trailing edge resulting in the smallest turbulent wake and therefore lowest drag of any deep section rim. The side benefit of this is a reduction in cross-wind drag as the flow circulates around the body more easily, and the total aerodynamics are not nearly as affected by tire choice as were previous designs.





# DISCS

## ZIPP 900 and 840 Discs

ZIPP discs have long been one of our signature products. They are manufactured completely flat only 19mm in total cross section to present an extremely small frontal area. Hand laid unidirectional Carbon skins are cured to a honeycomb core with no raised surfaces. This allows maximum air flow over the disc surface and between the bike frame and wheel. Cured utilizing aerospace composite manufacturing methodology, the resulting product is unsurpassed in lateral stiffness, responsiveness and overall low weight. Perimeter rim mass is less than 85g resulting in a quickness of acceleration that is significantly better than virtually any conventional wheel while the low overall weight puts this disc in a class all its own. No longer are discs to be considered a flat course only wheel. Ridden at a blistering pace in time trials, triathlons and on the track by professional and elite competitors to more World and National championships than we can count, the ZIPP discs continue to prove their unsurpassed speed and performance.

Wheelchair and hand-cycle competitors also enjoy the performance and stiffness of ZIPP Discs. Wheelchair discs are equipped with an in-house CNC machined hand rim mounting system and co-cured mounting inserts.

ZIPP 840 650c and 900 700c discs are available in tubular only.

Total average weight:



- 840 650c 912g / 900 700c 950g
- Available in a Rear Track configuration.
- Rear Track discs convert to 8 speed freewheel with optional axle kit.
- Dedicated Front Track Discs are also available.
- Cassette versions are available in Shimano or Campagnolo models.
- Optional Quick Change free hub bodies ensure full cross system compatibility. Silica-Ceramic braking surface. No special pads are required.



Front Track



Rear Track



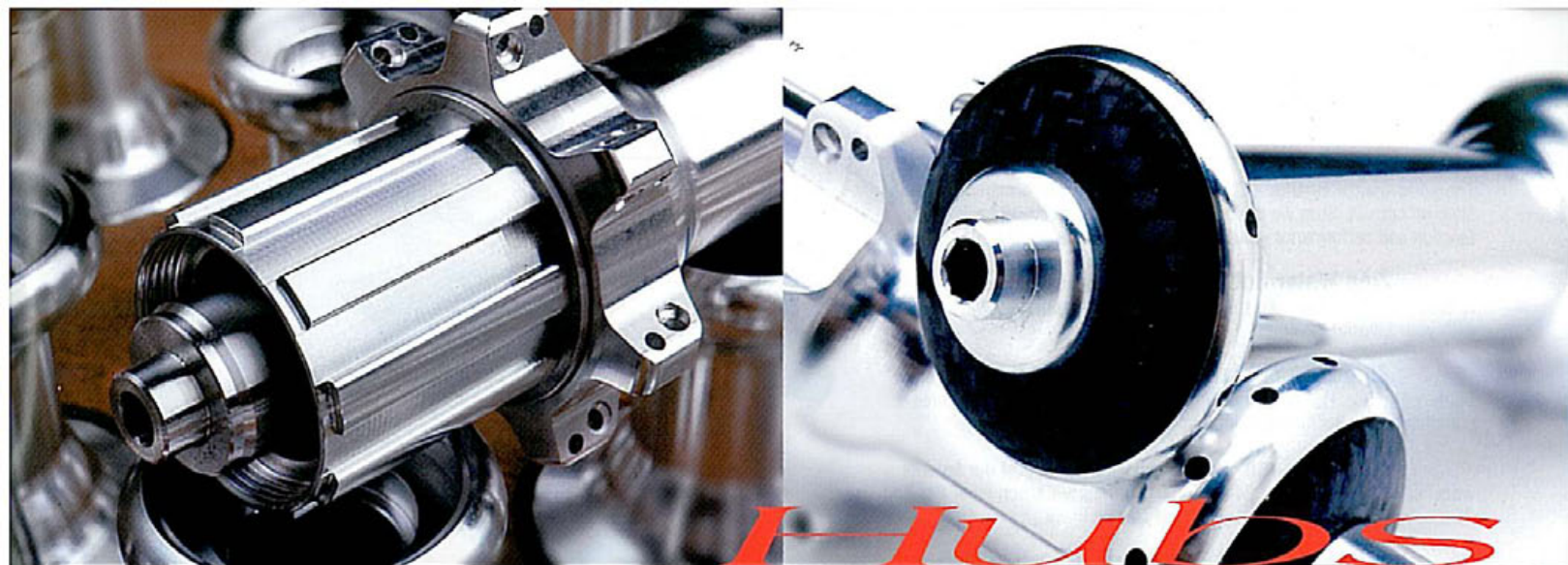
Wheel Chair



Campagnolo



Shimano



## 2002 ZIPP hubs, a new standard of excellence

When you make the finest rims on the planet, it's only natural to turn your attention to hubs. For 2002 ZIPP is proud to present our finest range of production hubs ever, the model 84 front and 202 rear. The NEW 'Made in the USA' ZIPP 84 front and 202 rear hubs join our classic track hub set at the center of all the action.

Lighter weight, attention to detail and flawless application of the latest technology characterize the 2002 ZIPP hub range. The model 84 and 202 hubs utilize proven materials and classic technologies seamlessly integrated with cutting edge material and manufacturing processes. Each is the result of thousands of hours of research, development and testing.

Advances in bearing technology allow a 20% decrease in weight while bearing contact area is increased 50% over previous models. While the industry standard is 50 millionths of an inch variance and 25 millionths is considered "high precision", the bearings used in the 202 rear hub are manufactured in ultra precision matched sets to an ISO class 5 ball tolerance of less than 10 millionths of an inch total variance in size or sphericity. To realize maximum performance and longevity from such precision, each bearing set is fitted with a custom Teflon thermoplastic self lubricating retainer that significantly reduces friction over steel or brass retainers used in other cartridge type bearings.

At ZIPP our basic philosophy of design is simple. Make it light, make it strong and make our customers happy with products that work as hard as they do. Technology is fun. Enjoy.

### Model 84 Front Hub

New for 2002, the model 84 front hub incorporates our latest technology. Every single part is precision machined from our proprietary heat treated 7075 aluminum then clear anodized to ensure both beauty and long lasting strength. Flange diameter increased 6mm provides increased wheel stiffness and allows for use of shorter spokes. The new asymmetric axle design requires fewer parts, optimizes bearing placement for maximum bearing longevity and is both lighter and stiffer with an oversized 15mm diameter. The axle assembly is completed with our new Carbon Fiber protective end caps. By incorporating the latest in steel bearing technology, bearing weight has decreased by 20% while bearing contact area increased 50% over previous models. The bearings are manufactured in matched sets to a tolerance of less than 10 millionths of an inch total variance in size or sphericity. To ensure the maximum longevity from such precision, each bearing set is fitted with a custom manufactured Teflon based Thermoplastic self lubricating retainer instead of steel or brass. The retainer individually separates and locates each ball within the bearing race to it's optimum position.



- 84 grams
- 7075 hub shell, axle, spacer and end caps.
- Solution heat treated and artificially aged.
- Clear anodized
- 15mm asymmetrical oversized axle.
- Carbon fiber protective dust covers
- Custom '10 millionths of an inch total variance bearings with class 5 precision races.
- 65% grease fill with custom Teflon thermoplastic self-lubricating ball retainer.
- Drilled for 16, 18, 20, and 24 hole spoke counts

### Model 202 Rear Hub

Incorporating the latest advances in materials and manufacturing technology, the new 202 gram model 202 rear hub from ZIPP Speed Weaponry sets a new standard in lightness, strength and stiffness for a full production rear hub.

model 202 rear hub from ZIPP Speed Weaponry sets a



Utilizing a custom Citizen double live head Swiss type watch lathe, the hub shell and axle are precision machined from proprietary heat treated 7075 aluminum. This new machine technology is capable of accuracy over 40 times greater than that of systems previously available and a finish quality of near optical standards. The free hub body is machined on the same precision instrument using a material only recently declassified for non-military use. Exclusive to ZIPP, 7XXX alloy is 33% stronger than 7075 aluminum and over 40% harder. In all other categories of measurement, it equals or exceeds the previous standards of 7075.

The new asymmetric axle system provides wider optimized bearing placement for greater longevity while contributing to increased overall hub stiffness. The new 15mm oversized axle is 25% larger and 244% stiffer for maximal power transmission. The non-drive side hub flange diameter has also been increased resulting in a lower spoke tension differential and increased wheel stiffness. As a finishing touch, the axle assembly features our new Carbon Fiber end cap. Efficient, quick and reliable power transmission is provided courtesy of three self-lubricating steel pawls forged from the finest E52100 bearing steel. The pawls engage the oversized precision drive ring with authority via a single oversize steel return spring. In keeping with our overall philosophy, the mechanism is both elegant and strong.

The bearings are rated to spin rates of 30,000 rpm under full load. (A free ZIPP T-shirt and sponsorship if you can ride that fast!) While the industry standard is 15%, we are not satisfied with less than a 65% fill of custom Isoflex barium-hydrocarbon based grease formulated specifically for this application. Further protection is provided by twin double contact seals fitted to each highly polished bearing race. Precision polishing reduces friction to less than that of virtually any non-contact seal. In keeping with our traditional design goals, the bearings are an international standard size and all parts of the hub are user serviceable.

- 202 grams
- Proprietary 7075 hub shell, axle and spacers.
- Solution heat treated and artificially aged.
- Clear anodized.
- 7XXX ordinance spec. free hub body
- 15mm oversized asymmetric axle for optimum bearing placement.
- Carbon fiber end caps
- Custom '10 millionths of an inch total variance bearings with class 5 races.
- 65% grease fill with custom Teflon thermoplastic self-lubricating ball retainer.
- Available in both Shimano and Campagnolo versions.
- Quick change free hub bodies interchange for cross-system compatibility.
- Machined and drilled for 20, 24 and 28 hole spoke counts.

# Accessories

The performance fanatics at Zipp remind you that performance, fun and style do coexist. Sure we make great wheels with an eye to superlative function and performance – but we want you to look good too!

**A. Zipp Water Bottle**, building the best wheels on the planet is thirsty work – so is riding 'em, so try our Zipp approved water bottle with your favorite beverage.

**B. Zipp Carbon Water Bottle Cage** will hold any water bottle with style. Holds firmly with an easy in and out design. Comes complete with attachment bolts 38g.

**C. Zipp Bar Tape** is embossed with the logo of our favorite wheel company and comes with Zipp's proprietary Carbon Fiber Bar End Plugs. Available in fashionable Red and classic Black..

**D. Zipp Carbon Bar End Plugs**, yes, that's real carbon fiber. The perfect finishing touches to compliment the bike that's your pride and joy. Standard equipment with Zipp Bar Tape or available separately.

**E. Zipp Carbon Fiber Headset Spacers** look and work great, light and lovely with the tastefully printed Zipp name. Available in 1" & 1 1/8" dia. and lengths of 4, 8, 12 and 30mm.



**F. Zipp Quick Releases** are back and better than ever due to popular demand. They feature titanium shafts, stainless steel springs and black anodized alloy end nuts and levers. Laser etched Zipp Logo included at no additional charge. 85g for the set. Will hold any wheel securely, even our competitors.

**G. Zipp Hats** Hide your embarrassing "helmet hair" or just hang out in one of our new hats: High quality fitted twill 'Ball Cap' style red only S/M or L-XL. Or proweight runner's style white only, one size fits most.

**H. Zipp Valve Extensions** okay, they aren't stylish, but they are an aero-wheel must have item. Will fit any presta valve stem. Two sizes: Small for rims up to 40mm and large for rims up to 60mm.

**I. Zipp Logo T**, what could be better than a classic heavy weight 100% cotton black t-shirt? Why, one with our stylish Zipp logo, of course. Wear it because it looks and feels so good. Zipp Speed Weaponry Logo is printed large across the back and tastefully small on the front. Available in M, L and XL



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