



***HANZŌ***

*An Aero First*

***FACTORBIKES.COM***

**HANZŌ** / *An Aero First*



# Approaching aero development in a radically new fashion

Our engineers capitalized on the latest revisions to the UCI rules for bicycle design



## Pushed tube section depth to the limit

- Tuned aero profiles optimized for TT velocities yield arguably the world's fastest UCI legal TT frame
- By combining the UCI required 3:1 profiles in the extension mast with the continuous airfoil section of the head tube we have been able to push the rules to their absolute maximum extent for aero performance.



### **Minimized the frontal width to reduce projected area**

- Factor aggressively pursued drag reduction through area reduction
- Thanks to the revised UCI rule allowing a minimum cross section on all tubes to be as small as 1cm from the previous minimum of 25mm

### **Radical Simplicity**

- Extreme approach to Bill of Materials (BOM) minimization
- BOM minimization avoids the chaos and clutter of using an excessive amount of parts and unnecessarily complicated designs

### **Integration and Compatibility**

- Large tire clearance, hidden Di2 Junctions, and collaboration with the hottest custom extension manufacturers make the HANZŌ exceptionally rider-friendly

# *Thinnest ever true airfoil fork and frame combination*



**The HANZŌ uses never before applied airfoil sections for the full 16cm of length allowed by the alignment of the head tube and down tube boxes**

## **Narrowest head tube ever**

Super thin front end with the fork combines with the frame shape to create a true airfoil

## **Extended airfoil section**

Optimized for bare minimum drag by facilitating full laminar attachment at low yaw angles in undisturbed airflow.

## **True continuous curvature airfoils used in all sections**

Carefully selected airfoils to reduce drag for all yaw conditions

## *High Bypass Ratio frame design*

**Wide wheel interface clearances reduce interaction effect between fork/frame and wheel aerodynamics, even under high yaw conditions.**

Aerodynamic performance of wheel/frame interfaces are heavily dependant on very closely matched profiles.

- Too far apart, and the effect is negative.
- Too close together and the rider's wheel and tire selection is extremely limited

The HANZŌ's wide wheel/frame clearance allows for unimpeded free stream flow around both the wheel and the frame members, and can accommodate 28mm tires



# Adjustability and Compatibility

## **Mono riser for penalty-free pad stack**

With a super narrow 3:1 compliant mono riser, there is virtually no frontal area penalty for increasing stack height, unlike systems with bolted style double risers where the increase in stack significantly increases the amount of frontal area on the bike.

## **World class compatibility**

We have developed relationships with most major 3rd party component manufacturers specializing in TT bikes. We've worked directly with suppliers such as AeroCoach and WattShop to give them the CAD profiles for the mast allowing a variety of solutions to be available to riders.



# Matching ride responsiveness with aero gains



## Sculpted Down tube profile

- Aero section starting at the head tube
- Truncated mid-way to work seamlessly with an aero water bottle
- Forms the rigid backbone of the frame



## Gusseted bottom bracket

- UCI-legal 8cm gusset at BB improves aero performance and stiffness
- The aero section continues from the truncated downtube profile spanning the complete 16cm allowable distance



# Form and Function: a finely tuned rear triangle



## Seat Tube/Seatstay junction

- Wide seatstays smooth the airflow coming off the rider's legs
- Enhances the already exceptionally stiff frame elements



## Seat post/ Seat tube tail

- Reusing the SLiCK seatpost allows for a Di2 battery in the post assuring rider convenience
- The seat tube tail hugs the rear wheel for extra wheel wrap minimizing the amount of contra-rotating flow

# Where to cut your Kamm tail



## **Kamm tail weight savings**

Cutting an airfoil section saves weight without losing aero advantage

## **Not all Kamm tails are equal**

A messily cut-off Kamm tail can be detrimental to the design since if the radius at the cutoff point is too great, then the air flow stays attached, recirculates, and becomes turbulent.

## **Factor's edge: owning the factory**

We incorporate the level of precision required in the manufacturing process to optimize this design feature.



## *HANZŌ and the Hour Record*

When Alex Dowsett started discussing with us his desire to attempt the Hour Record again, we used it as a perfect opportunity to test the HANZŌ and our efforts to make it the fastest aerodynamic bike available.

Having put more than a year's worth of design effort into the HANZŌ track bike, we are proud of the results and of our involvement in Alex Dowsett's attempt, which started out as a straightforward record attempt, and then grew into something much more meaningful.

- **Track adapted version of the Hanzo TT bike**
- **Features 3D printed titanium chainstays printed by Silca**
- **Exceptional aerodynamic performance at low yaw**



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