

Cycling Ergonomics **ErgoFit**

What is ErgoFit ?

ErgoFIT is a scientifically formulated bike fitment system developed by Dr Jeroen Swart, a well known sports physician and exercise physiologist and expert in the field of cycling performance and biomechanics.

ErgoFIT provides a tiered fitting approach to provide a solution that is fast, accurate and effective for fitting levels from basic shop fitting though to professional level cyclists.

- Predictive fitting report based on unique intrinsic cyclist characteristics
- Accurate & objective translation of bike fit parameters to bike using traditional or simple X-Y reference guided by laser
- On bike 6 point static digital optimisation process to confirm and validate fit position



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The System

The ErgoFIT 5 system incorporates a database of fittings which are accessed by Name, ID reference number or telephone number.

Each client profile incorporates their unique measurements, existing bikes – including: model, size and final fitting parameters as well as other freeform data such as cleat position, foot correction and any other details the fitter wishes to capture.

ErgoFIT currently caters for the following bike types:

Road
MTB XC (26", 29" and 650B wheels)
MTB Trail bike
Gravel bike
TT bike.

The system allows the fitter to call up previous measurements and revise these fittings or process a new bike fitting for any existing clients.

The Process

Part 1 - Predictive fitting report

This process begins with an in depth individual assessment where the cyclist's training history, flexibility, and static measurements such as leg length, height and arm length are captured.

With this information an ErgoFIT bike fit prediction is generated.

ErgoFIT is unique in the fact that it uses a set of advanced regression algorithms which predict the optimal fit based on an in depth physical assessment of the cyclist.

An important distinction between ErgoFIT and other predictive systems is the use of trochanteric leg length instead of inseam measurements and the incorporation of algorithms that incorporate flexibility and neuro-muscular efficiency. This greatly increases predictive accuracy.

Why is a fit prediction so important?

Without a predetermined set of parameters, it is not possible to determine the correct frame size. An incorrect frame size can be manipulated to create the impression that the bike does fit but there will be consequences such as compromised handling or sub-optimal muscle recruitment patterns:

e.g. a frame that is too large can be adjusted to fit a rider by shortening the stem and moving the saddle further forward. However, this will result in altered handling characteristics such as under-steer and the possibility that the front wheel will slide out in sharp turns or in wet

conditions. In addition, it will result in over recruitment of the quadriceps, placing them at risk of premature fatigue.



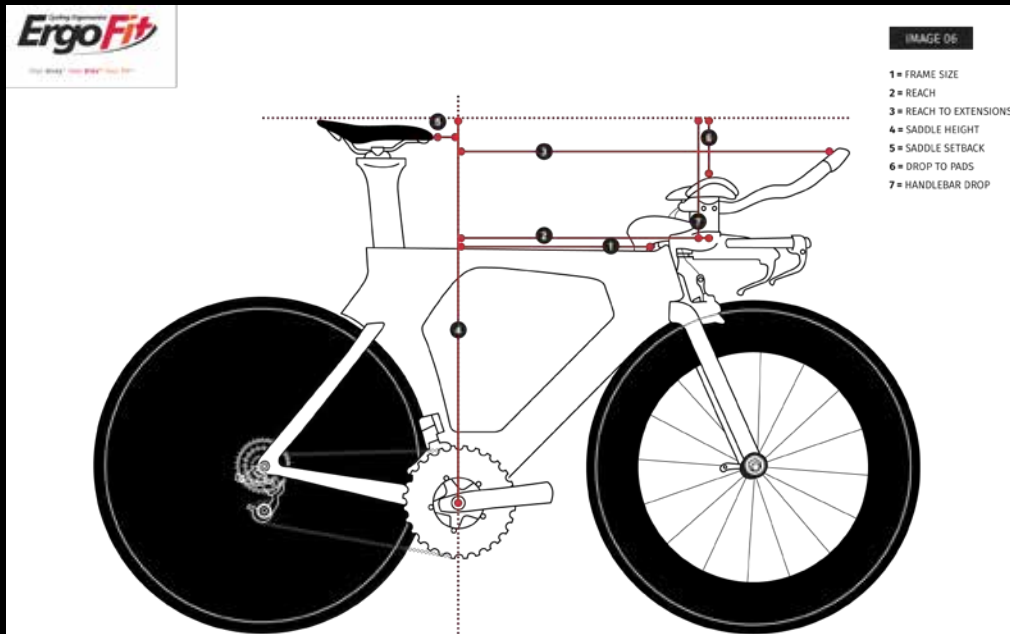
The predictive report establishes a starting ratio for saddle height vs. saddle setback and ratio for handlebar reach vs drop. These ratios are based on regression analysis from over 4000 fittings conducted in a laboratory setting. To elaborate on this:

e.g. Take the example of two twins. One rides on a professional team & the other has never ridden a bicycle. Without the predictive report they could be placed in the same setup. For instance, their saddle setback based on using a plumb-line during a fitting would be identical. Yet it is patently clear that the professional riding twin would require more saddle setback to recruit the gluteals to a greater extent and would require a higher saddle height (due to greater neuro-muscular efficiency) as well as greater reach and drop.

ErgoFiT's predictive report provides reference values to establish these ratios, which can then be refined in the 6 point optimisation or a more advanced dynamic fit. The report therefore provides a valuable starting point rather than simply using guesswork or very inaccurate formula's to establish frame size, saddle height, reach, drop and other important parameters.

Part 2 - Transferring parameters to the bike

Many bike fitting are compromised by the use of measurements which are neither objective nor reproducible. This is especially important for cyclists with multiple bikes or when reproducing a bike fitting on a new bike.



ErgoFIT uses very objective and clear reference points for all measurements. These are standardised using a cross hair laser and can be used for traditional reference points or newer simple X-Y references.



Part 3 - 6 point static digital inclinometer check

The 6 point digital check further optimises the fitment process using our static digital inclinometer system to minimise any subjectivity in the fitment.

The system analyses the 3 major joint positions using 6 key measurements which are taken using the digital inclinometer. The system analyses these values and then provides feedback and advice on which fitting parameters require adjustment. These smaller adjustments are

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then made by the fitter and re-analysed until the system confirms that the fitting is optimised as far as possible using these techniques.

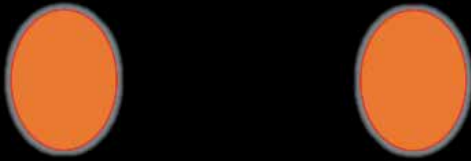


A final report can then be emailed to the client directly or printed and the fitting parameters saved for future reference or further optimisation can be achieved using 2D or 3D kinematics, saddle pressure mapping or pedal force analysis.

Part 4 – Saddle sizing tool

Retail friendly saddle sizing tools generally fail to take into consideration that the rider's individual pelvic position is a key determinant of saddle sizing. These systems only assess pelvis width.

The optimal pelvic orientation is determined by the bike fitting process. Hence assessment of saddle size should be performed with knowledge of the pelvic position. The ErgoFIT system measures pelvic inclination during the 6 point static optimisation. This value can then be used to accurately measure ischial contact point width and using the ErgoFIT saddle sizer. Further saddle position optimisation can be achieved using Gebiomized™ saddle pressure mapping systems.



Summary

- Extremely retail efficient - Speed and accuracy.
- Low threshold of experience required by fitter. Knowledge engine within the system to help augment the knowledge and experience of the fitter.
- Predictive and static fit components are independent - Level of redundancy corrects for errors made by the fitter.
- Incorporates all basic bike fitting components and tools - Frame size, Saddle height, Saddle setback, Reach, Drop, Stem length, Crank length, Saddle sizing, fitting jig.
- Complete database of all customers, including their bikes. Easy to update client profile, check an existing bike fit or start a new bike fitting altogether
- Fully compatible with other fitting systems such as 2D and 3D kinematics and saddle pressure mapping. The ErgoFIT interface provides a platform for data capture and integration.
- Validated by scientifically peer reviewed and published research data.

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References and research studies supporting ErgoFIT.

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