Using the ***Rolling Resistance Calibration Program*** before every training session will insure accuracy and high repeatability from one training session to the next. Once measured, the rolling resistance value will remain in the Handlebar Controller memory until the power is turned off. When the power is turned off and then on again, the measured rolling resistance value will be replaced by the default rolling resistance value of 2.00 lbs and recalibration will again become necessary.

A common misconception is that the "optimum rolling calibration number" is 2.00 lbs. because this happens to be the default value displayed when you first power up the CompuTrainer. This is not true. With conventional road tires 2.00 lbs. might be considered an **absolute minimum value** when riding flat course, but higher values may be needed to eliminate tire slip if grades exceed that of a level road. For an in-depth discussion on this issue, refer to the technical appendix on page 23 for further information prior to running any test.

NOTE: 2.00 is NOT Optimal, neither is 2.10. It is the absolute MINIMUM calibration number.

And as too Why doing this correctly is so important read the following.

Rolling Calibration

The Rolling Calibration Procedure is the second essential element in obtaining accurate results with your CompuTrainer. With the Rolling Calibration Procedure you are giving the CompuTrainer micro-computer the key ingredient needed to determine when and how much load it needs to apply at any given point in time. If this procedure is overlooked, or done incorrectly, there will be no reference point established from which to derive all the complex calculations CompuTrainer must use for both its load creation and wattage display calculations.

So, what can you do to assure greatest accuracy? First would be to set enough Press-On Force as established above. Second, and key, is to warm the system up to a stabilized temperature. The standard suggestion is to warm up at about 150 watts for 10 minutes. As stated on page 15, if the values obtained during the Rolling Calibration test continue to drop on successive runs, then the system is not warm enough.

NO REFERENCE POINTS, interpreted as GARBAGE RESULTS. Get this wrong and your race is bogus, made up, false, luck of the draw etc. Computrainers MUST BE CALIBRATED CORRECTLY to get reproducible and reliable results.

If you get it wrong you can be off by quite a bit. NOT warming up the unit and tire is the worst. You should refuse to race someone without warm up. Their power will be artificially high.

Important Notes:

An error during calibration of 0.01 lb. equates to a change in load of 1/2 watt at a speed of 25 m.p.h.. You may wish to repeat Step 3 more than once to confirm your rolling resistance value repeats to within .05-.10 lbs. If the value continues to drop for two consecutive measurements, this indicates that the tire and Load Generator may have not yet reached a stabilized operating temperature. Warm up the system several more minutes and repeat Step 3.

It is **not** necessary that the calibration numbers read *exactly* the same on a daily basis, this assuming the values don't vary too much, i.e. 2.00 pound compared with 3.00 pounds. Because rolling drag is "always there", setting too much rolling drag for a flat course would make loads feel like hill climbs. You should always set the press-on force appropriate to the workload to be encountered. If a flat course, then less press-on force. Hill climbs will require more. For advice on setting an optimum Press-On Force number, see the technical appendix on page 23 of this manual.

So, if someone doesn't warm up and the unit measures and gets a Calibration number of 2.10 and the unit and tire warms up the resistance will actually drop. Maybe as low as something like 1.60 which is very possible. In this case, they are getting 25 watts added to their number artificially at 25 mph. This is

significant.

Tips to prepare for and properly adjust Press-On Force:

1) You should clean the tire *daily* with an evaporating cleaner such as Isopropyl Alcohol. This will remove any mold release (a compound used to allow easy removal of tire from the mold during its manufacturing process), or road oils. *We advise cleaning the tire before every training session and especially after riding outdoors.*

2) Daily check and iInflate your tire to its maximum rated tire pressure.

3) Use a tire with the least amount of visible tread for the most "tire to friction roller" contact. Smooth tires are preferable. A Continental™ HomeTrainer tire is a perfect tire.

4) Set the Press-On according to the anticipated maximum workload. More press-on for hill climbing and less for time-trial (flat) courses. For advice on optimal Press-On Force, please refer to the Technical Appendix found at the rear of this manual.

Tire Slip

To obtain the greatest accuracy from your CompuTrainer, tire slip must be avoided. The problem is that tire slip is very hard to perceive unless it is extreme. In the operating instructions found on page 11 regarding Press-On Force, RacerMate has given specific suggestions to avoid tire slip. These should be followed prior to calibrating your CompuTrainer. Keep in mind... the adjustment of the tire to roller interface and rolling calibration are the only user controlled components of CompuTrainer where accuracy can be lost or attained.

To eliminate errors from slip while adjusting and calibrating your CompuTrainer, RacerMate derived the following chart to help, as a guideline, in establishing minimum Press-On Force values. You should adhere to these values give or take 2 tenths of a pound (+/- .20). The chart on the left is for typical road courses and the chart on the right should be used in the event of a Sprint or MAX test where quick, short bursts of power will be seen. Use of the optional Continental Hometrainer tire can significantly reduce these values by 1.00 to 2.00 lbs or more!

Flat Course - use 2lbs† Press-On Force
Up to 2.5% Grade - use 2.5 lbs† Press-On Force
Up to 5.0% Grade - Use 3.0 lbs† of Press-On Force
Up to 7.5% Grade - Use 3.5 lbs† of Press-On Force
Up to 10.0% Grade - Use 4.0 lbs† of Press-On Force
Up to 12.5% Grade - Use 4.5 lbs† of Press-On Force
Up to 15.0% Grade - Use 4.99 lbs† of Press-On Force*

†Plus/minus .20 lbs acceptable.
*5.0 lbs exceeds the maximum value you can save.

Rolling Drag for Road Courses

Up to 250 Watts - use 2lbs† Press-On Force
Up to 300 Watts - use 2.5 lbs† Press-On Force
Up to 400 Watts - Use 3.0 lbs† of Press-On Force
Up to 500 Watts - Use 3.5 lbs† of Press-On Force
Up to 650 Watts - Use 4.0 lbs† of Press-On Force
Up to 700 Watts - Use 4.5 lbs† of Press-On Force
800 Watts and Higher - Use 4.99 lbs† of Press-On Force*

†Plus/minus .20 lbs acceptable.
*5.0 lbs exceeds the maximum value you can save.

Rolling Drag/Press-On for Sprint/MAX tests

So, for Indoor races use the chart on the left. Ask the operator to describe the course. If you hear 10% grade than you need to be closer to 4.0 on the calibration or else you are slipping. If you have a clean Home Trainer tire you can go lower.

Unfortunately the people that make the course are the ones that can influence a good or bad race. The Computrainer is a great tool but it has its limitations. If a course has a long flat section with a 10% in it you are creating the worst situation. WHY? Because you should be setting the press on force and calibrating to 4.0 BUT if you do then during the flat section you are getting ripped. If you don't set it to

4.0 you get slippage. So, it starts with good course creation.
Lastly, power meters are sensitive to temperature. As metal changes temps is changes properties. So, to get good accurate results from your power meter you need to make sure you are not leaving your power meter in the car (28 degrees) all day long then bringing it into a shop at 68 and expecting accurate numbers. As the metal warms you should be changing calibration. So, if you want to see the same number on your power meter as you see on your properly calibrated Computrainer then you need to keep the power meter at room temp prior to the ride.

Bike Power Meter Accuracy

The mobile bike power measurement systems from SRM and Power Tap use strain gages to measure torque or twisting force on the crank arm or on the rear hub. Torque is multiplied by axle RPM to determine rider power. Strain gage technology and accuracy are discussed on an internet site[2]. Strain gages are subject to both zero drift and span drift. To understand these two types of drift, think of a bathroom scale. Zero drift is the failure of the scale to read zero when you get off. Span drift is an incorrect reading of weight when you step on the scale. Both forms of drift, zero and span, result from change in strain gage properties with temperature and with aging of the glue used to attach the gage element to the measurement point. Strain gage systems can be calibrated using weights to produce a known force on the bike pedals. There are potential errors in weight calibration because the force can both twist the measurement element and also bend it. Strain gage signals due to twist or torque is data and any due to bending is an error. Reported accuracy in terms of mean error scores for SRM and Power Tap factory calibration over a range of 50 - 1000 W were 2.3 +/- 4.9% and -2.5 +/- 0.5%, respectively[3]. Accuracy for SRM and PT was not largely influenced by time and cadence; however, power output readings were noticeably influenced by temperature (5.2% for SRM and 8.4% for PT). During field trials, SRM average and max power were 4.8% and 7.3% lower, respectively, compared with PT. Calibration and strain gage errors are also discussed in reference 4, which reports also a comparison of SRM, Power Tap and Polar mobile bike power measurement systems. This article[4] suggests checking zero on each ride and checking span calibration at frequent intervals.