# INSCYD

## PPD – Running Protocol

**Testing Manual for:**

- **GPS only data acquisition**

- **GPS data PLUS lactate & VO$_2$ data**

Following the instructions in this manual is mandatory to ensure test data is accurate. Adherence to the protocol will ensure lab level accuracy from the INSCYD metabolic profile.

Not following the protocol can result in flawed data or data which is not usable.

**PLEASE REVIEW THIS ENTIRE DOCUMENT PRIOR TO EXECUTING THE TESTING.**
**If you have questions, please ask your coach.**

### 1. Recovery state & general fitness

Before performing a test or any other kind of exercise, please consult your physician and ensure you are in good health. Please read the liability waiver section of the INSCYD User Agreement.

Ensure you are well recovered before undergoing any tests. This testing should not be carried out immediately after a hard block of training. For better reliability, one or two rest days before the test are ideal.

However, if you want to gather fatigue information, it is recommended to carry out one complete test in a recovered state and one in a fatigued state for comparison. The same applies in the case you want to gather information related to a specific diet, in such a case carry out one assessment under the specific nutrition regime.

Testing can take place over a period of up to **3 days**. Your coach will advice on how to break up the intervals.

### 2. When & where to test

You can perform all tests on the same day, within the same session.
However, if it is more convenient, **you can space them out over three consecutive days, but no more**.

Choose an open road with a clear view to the sky. It is important to ensure the highest quality GPS signal. Don't carry out the test on a track which is covered by trees or in urban areas with tall buildings.

If you want to carry out the test on a running track:
- Ensure your GPS watch is capturing accurate data while running on the track.
- This can be achieved by using Garmins "Track Run" function, a Cronos GPS, or the speed derived from a Stryd pod.

Wind, surface, incline:
- Test on a hard surface: a running track, concrete/roads or a solid path.
- Use a flat road or path
- Make sure there is limited to no effect from the wind. Don't carry out the test on a stormy day.
- For all efforts <u>except the sprint</u>, you may use an "out and back" approach, where you simply make a 180° U-turn halfway into the effort. The benefit of doing so is to normalize the effect of any wind.

**<u>In summary:</u>**

- select a route under open sky: no trees, forest or urban regions with tall buildings
- solid road surface (concrete, solid path, normal road or track)
- choose a flat road with no wind
- In case you run on a 400m track: ensure you have enable "Track Run" on your Garmin device. Make sure you have calibrated your watch and don't change lanes! Click here for further information.

## 3. Prepare your GPS running watch & route:

Please ensure you carry out the test in an area with good GPS reception. Check your running watch to see if it is able to use GLONASS parallel to GPS. If yes, activate GLONASS and GPS – this will increase accuracy. Make sure there is sufficient memory capacity remaining. Set to record data <u>every second</u> (no smart recording!).

**<u>In summary:</u>**
- set to 1s recording (no smart recording)
- activate GPS and GLONASS - if available
- make sure you have enough battery & memory

## 4. Warm up & in between efforts
Make sure you are properly warmed up. At minimum, a 12 minute warm-up is recommended, with one surge (of up to 8 seconds) reaching higher power output/running speed, but without reaching exhaustion. Allow for a minimum of 8 minutes time between the end of this effort and the first test.

Ensure you are recovered and fueled before you start your next effort. It is fine to take on fluids and carbohydrates (especially prior to the longer efforts). Include at least a 15 minute warm-down/recovery after your previous test. Specific recovery times and intensity are listed below

### 5. The efforts

To create a lab level accurate metabolic profile, you need to complete 4 all out (=maximum efforts).

1. **2minute rest (!) followed by <u>20 second sprint</u> (allowed range: 18-24s)**
   - start out as fast as you can
   - most common mistakes I: not resting before the sprint. <u>You NEED TO rest the full 2 minutes BEFORE the sprint</u>. Your sprint data will be **declined automatically** by INSCYD software if two much movement (walking, jogging) is detected in the final 2 minutes before the sprint!
   - most common mistakes II: sprinting too long! Make sure your sprint is 18-24 seconds. Do not pace the sprint – go as hard as possible and hold your speed for the 20 seconds.
   - minimum recommended recovery: 12 min easy jog and/or walk before next interval

*It is recommended to do the sprint (incl. the resting period) <u>twice</u> in order to increase accuracy of the data!*

2. **3 minute <u>maximal effort</u> (allowed range 2:30 – 3:15)**
   - try hold the highest speed possible for 3 minutes
   - It is OK to go fast at the beginning. Over-pacing at the start is fine!
   - Most common mistake: fear of starting too hard, or holding back. If you have something 'left in the tank' at the end, you did not go hard enough – start faster/harder than you think you can maintain.
   - minimum recommended recovery: 15 min easy jog before next interval
3. **6 minute <u>maximal effort</u> (allowed range 5-8 min)**
   - try hold the highest speed possible for 6 minutes.
   - Similar to above – it is ok to over-pace this effort.
   - minimum recommended recovery: 15 min easy jog before next interval
4. **12 minute <u>maximal effort</u> (allowed range 10-30 min)**
   - try hold the highest speed possible for 12 minutes.
   - minimum recommended recovery: 15 minutes jog.

*The 20s Sprint effort is crucial to detect a valid $VLa_{max}$ (glycolytic power). In order to do this, you need to rest the final 2 minutes before the sprint. To ensure lab level accuracy, INSCYD's algorithm automatically declines sprint data without proper resting prior the sprint. No resting before the sprint will result in invalid data and eventually prohibit the calculation of a metabolic profile!*

Due to the energy demands needed to complete four maximum efforts in one session, you might want to split it up into two sessions. Recommended split is: Sprint & 12 minute effort on day 1. 3 minute & 6 minute effort on day 2.

### 6. Data handling

Download the data file in .fit file format from your running watch and send it to your coach. Alternatively, allow your coach access to your Garmin connect account to pull the data automatically into INSCYD for analysis.

## *Happy Testing!*

## Incorporating physiological data into PPD-R

### VO$_2$ data

If you have a valid VO$_{2max}$ measurement, for example from a ramp test leading to exhaustion within a few minutes, you may use the obtained VO$_{2max}$ value. This would be used as a substitute for the 3 minute all out test, or used in addition to the 3 minute effort.

### Known AT/MLSS

In the case you have a valid measurement of the anaerobic threshold of the athlete (aka Maximum lactate steady state), you may use this value as a substitute for the 6 minute and 12 minute efforts.

### Sprint with lactate

This requires obtaining lactate measurements during the rest period before the all-out sprint. It also requires sufficient lactate measurement during a total rest after the sprint. Samples must be frequent enough to ensure you have captured the maximum lactate concentration post sprint effort. If you have this data, you may use this data instead or additionally to the 20s sprint.

### Maximum/all out effort with lactate

In case you have obtained additional lactate measurements before and after a maximal effort lasting between 2.5min to 5min, you can use this in addition to the 3 minute all-out effort. You can also use as a substitute for the 3 minute effort. However, you need to ensure during the post effort a series of lactate values have captured the peak post effort lactate value.