

## - National Rowing Centre of Excellence -

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### Distance – Power Ergometer Testing procedures - Adaptive -

#### Introduction

The laboratory test protocol adopted firstly by Rowing Australia and now by the NRCE aims to provide very detailed physiological information of the rower's submaximal capacity and efficiency as well as measures maximal performance parameters as accurately as possible.

The information from laboratory testing gives a very accurate picture on the training and performance status of the rower but it is not conducive to measurements on a large group of individuals on a regular basis nor is it able to be conducted in the field environment when a crew may be training away from a SIS/SAS location. For these reasons among others the NRCE believe it is important to introduce a battery of ergometer measurements that address the limitations of the current laboratory protocol.

The battery of ergometer measurements will be completed by all aspiring Juniors, Under23 and Senior A athletes throughout the domestic and international season. The test battery (all out efforts at distances of 100m, 250m, 1000m and 3000m and a 30 min sub-maximal piece at stroke rate 20) would be completed within a one week period and would be undertaken in the same manner that the current ergometer tests are i.e. at the rowing sheds while supervised by the coach or nominated individual.

The data from these ergometer tests provides highly useful information on the power / time continuum of each individual rower which can be used to infer changes in anaerobic capacity and maximal aerobic power as well as show direct changes in 100m, 250m, 1000m and 3000m ergometer performance. Importantly, the group data can be used by each coach to objectively assess the effectiveness of their training cycles since the last series of tests. For the 2009-2012 Olympic cycle the standard ergometer protocols will change to reflect new information that has been presented by Ivan Hooper.

***NB. Implementation of the new drag factor settings will take immediate effect from February 2009 onwards. All tests should be conducted on 'fixed' ergos (no sliders). See below for more details.***

#### **What are the advantages of adopting a regular ergometer test battery?**

It will provide a more representative picture of short to medium term changes in all aspects of rowing fitness. Currently, laboratory tests occur twice in the domestic season with the timing of these tests aimed at ensuring adequate rowing specific fitness is in place ready to begin the next phase of training / competition. With the adoption of a more frequent ergometer test battery, coaches will gain a greater understanding of each individual's fitness traits and how they change through a training cycle as well as be able to accurately measure the net effect of shorter training cycles. 2. Athletes will be required to produce maximal efforts over all tests a number of times each season.

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One of the possible reasons for our inability to produce 'above expectations' performances on the world stage, could be linked to our reluctance to perform maximally on a regular basis. The ergometer tests are difficult and do require maximal efforts but the NRCE believe that this will help to improve our athlete's ability to 'learn to race' - as well as reset or recalibrate the athlete's perceptions of their most current maximal capabilities across the test distances. 3. The more information we can gather about each athlete throughout the year can only serve us better in the future.

### **How can the ergometer test battery assist with training prescription and modification?**

The relationship between power output and time (or ergometer distance as it can be expressed in rowing) has been used for decades to measure shifts in a variety of fitness traits within an individual as a result of training or detraining.

The power / time continuum (sometimes referred to as Critical Power) is currently used by the Danish rowing association to tailor training programs to meet the individuals strength and weaknesses of their elite rowers (<http://www.concept2.co.uk/guide/guide.php?article=personalising>) and is based on the assumption that different power outputs have varying levels of sustainability governed directly by the interrelated energy systems available to fuel mechanical work (i.e. alactic, lactic and aerobic). Quite simply the test battery asks the question; "Given full fuel reserves - how quickly can an individual complete a set amount of work"? For adaptive athletes, the international studies and data collection are really just beginning. From the data, a power output / time relationship for each athlete is established and then compared with their previous data as well as with data from other athletes.

### **How will the data be used?**

As part of our aim to 'Performance Manage' our best athletes, the collection, analysis, interpretation and evaluation of the data gained from the complete testing regime will be done by the Sports Science Coordinator in conjunction with the relevant National Head Coach and National High Performance Director. Routine dialog between the NRCE and SIS/SAS Head Coaches and Physiologists will ensure that all parties agree on how the athlete is progressing. If required, a specific meeting with the athlete, SIS/SAS Head Coach, Physiologist and NRCE will be used to re-evaluate the benchmarks and objectives set for the medium to long term time frame for that particular athlete.

In addition, the SIS/SAS squad results will be also be evaluated to assist the NHPD, the National Head Coach and SIS/SAS Head Coaches and Adaptive Coordinators with modification of the training plan if required. SIS/SAS Head Coaches and / or Physiologists will be required to send in summary data on designated NRCE specific templates from each testing time point. This is no more than is currently required for either National Selection ergometer tests (1000m or 3000m). Summary data will then be generated and analysed by the NRCE Sports Science Coordinator and disseminated back to the SIS/SAS groups.

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Timely and accurate completion of these templates will form part of the regular review of each States SIS/SAS program.

### **The following information is designed as a detailed guide to the testing methods. Power-Distance Ergometer Test Battery**

For consistency and comparability it is vital that the power-distance ergometer test battery is completed in an identical manner each time. This includes the training undertaken on the days in between ergometer measurements as well as the order in which the tests are completed. As such and to avoid any confusion, the NRCE believes it is imperative that the training for the 2 days prior to the testing week and the majority of the testing week itself is 'prescribed'. The testing week will occur within a rest/recovery week and frequency and duration of activities are programmed accordingly. There will be minimal, if any, flexibility on the dates of the testing week and to ensure comparability both within and across programs all training groups will be asked to present to the testing week in similar physical states each time. For adaptive athletes, the 1<sup>st</sup> testing period in February 2009 will be open and should be integrated in current training program to best suit. The April block of testing will then fall into line with all other testing of elite athletes in Australia (able bodied or adaptive)

### **Laboratory Environment and Subject Preparation**

#### **Training**

The athlete must **not** train on the Sunday preceding the first test on Monday morning. The table below outlines the time or distance, modality and intensity of the training in the sessions between each ergometer test.

#### **Diet**

A normal meal (incorporating a high carbohydrate component) should be eaten on the evening preceding each test and, if scheduling allows, also on the day of the test. No alcohol should be consumed in the 24 hours preceding the test. The athlete should give special attention to ensuring good hydration in the lead-up to each test.

***Special Note: In order to make accurate comparisons within an individual across testing dates it has been decided that NO ergogenic aids will be permitted prior to undertaking any of the ergometer tests. Opportunities for Senior A athletes to trial ergogenic aids (caffeine, sodium bicarbonate, pseudoephedrine etc) or perfect previous ergogenic strategies will be encouraged to occur during internal training sessions or regattas only.***

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### Adaptive ergo testing week requirements

| Day       | Time           | Requirement   |
|-----------|----------------|---|
| Saturday  | PM             | Light training  |
| Sunday    | All day        | No training – active recovery or stretching etc   |
| Monday    | After 08:00 AM | 100m all-out followed in 20 min by:<br>250m all-out and cool down, then active recovery |
|           | PM             | 30 min test (rating capped)<br>TA & LTA at 20 spm<br>A1x at 26 spm                      |
| Tuesday   | AM             | 8-10 km endurance row (or change to afternoon. One training on this day)                |
|           | PM             | Off   |
| Wednesday | AM             | 3000m all-out   |
|           | PM             | Very light training (max 1hr on water, no work)   |
| Thursday  | AM             | OFF or active recovery  |
|           | PM             | OFF   |
| Friday    | AM             | 1000m all-out<br>(or change to afternoon. One session on this day)                      |
| Saturday  |                | Resume normal Aerobic training  |
| Sunday    |                | Resume normal Aerobic training  |

**Ergometer ‘Drag Factors’ should be applied for Ergometer training and testing from February 2009.**

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- a. LTA - Men – 105, Women – 95
- b. TA - Men – 90, Women – 90
- c. A Men – 90, Women – 90

\* Fixed ergometers only (no sliders)

### Preparation

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#### Equipment Checklist

- Concept IID/E rowing ergometer
- Heart rate monitor (can provide very useful information for some individuals)
- Stopwatch
- Lactate Pro analyser (can provide very useful information for some individuals)

\*\* Note: Ergo testing should be done in comfortable conditions (temperature range 19-25C)

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### **Power-Distance Test Administration:**

Athletes will be allowed to individualise their warm-up prior to each ergometer measurement but are asked to replicate as closely as possible the same specific warm-up adopted for each distance the next time they undertake the test.

The following list represents the order in which each test should be completed.

1. The athlete should weigh-in and report the weight to the supervising coach or scientist
2. Attach a heart rate monitor (if required) and ensure it is working correctly
3. Adjust the ergometer drag factor to that appropriate to your category (see Table 1 or Table 2, depending on whether sliders are being used)
4. Undertake individual warm-up
5. Select the appropriate distance (or time for the 30 min test) for the ergometer test on the Concept work monitor
6. Start rowing when instructed by the coach or scientist
7. Complete the required distance in the shortest possible time
8. At the end of the test, the coach or scientist will record the relevant data from the work monitor
9. Where relevant, an earlobe or fingertip blood sample can be collected and analysed at the completion and 4 min post completion of the test (if requested)