# Concept II Rowing Ergometer

## USE GUIDE

**SPRING 1993**

Welcome to the Concept II Rowing Ergometer


This manual has been written to help you get the most out
of your Concept II Rowing Ergometer.  We recommend that you
read through it before using the machine, and then keep it
on hand for future reference.

CONTENTS

USE OF THE CONCEPT II ROWING ERGOMETER

## IMPORTANT NOTICE

Use of this machine with a worn or weakened part, such as the chain, sprockets, chain/handle connector, handle u-bolt or shock cord, may result in injury to the user. When in doubt about the condition of any part, Concept II strongly advises that it be replaced immediately.

WHAT ROWING CAN DO FOR YOU

Rowing is aerobic exercise.  It will benefit your heart,
lungs, and circulatory system.  Rowing uses the legs,
back, shoulders, buttocks, arms, and stomach, and puts all
of these muscle groups through a wide range of motion. The
large aerobic muscle involvement also makes it possible to
burn off a significant number of calories per hour of
rowing, depending on the intensity of your workout. Rowing
should not be considered weight-lifting since it is done
with relatively low resistances, and will generally not
produce large increases in muscle mass.  It will, however,
firm and tone all of the involved muscles.


CREATING A PROGRAM TO MEET YOUR GOALS

1) SET GOALS

As you start your exercise program with the Concept II
Rowing Ergometer you should ask yourself what your goals
are.  They may be one or more of the following:

       * to lose some weight
       * to get back into shape
       * to train for competitive rowing
       * to cross-train for another sport
       * to aid in rehabilitation
       * to add variety to a general exercise program


2) SELECT A PROGRAM

Because every human body is different, and because we all
have different goals, no one training program will be
perfect for everyone.   You can get workout suggestions
from the Performance Monitor section of this manual, other
Concept II literature, your friends, the local health club,
or sports magazines.  Start by selecting a program that
seems to meet your needs.  For example, if your goal is to
lose weight, your program should include exercise almost
every day.  Your workouts should be as long as is practical
because the more time you spend exercising, the more
calories you will burn.  The intensity of your workout
should be less than maximum so that you can continue rowing
for the longer period of time.  On the other hand, if your
goal is to be in peak condition, you should keep the
intensity level high by alternating hard work with rest
intervals during a workout to maintain high workout
quality.  If your goal is general health and fitness, 20
minutes of aerobic exercise 3 times a week is often cited
as the minimum exercise necessary to maintain fitness.

You should work out 3 to 6 times a week. No matter how good you are about getting started and establishing goals, the critical question is whether you can keep yourself motivated. The key to this is having a good selection of interesting workouts from which to choose. The criteria for these workouts are:

* interest and appeal
* time-efficiency
* effectiveness


3) MONITOR YOUR PROGRESS

Whatever your goal, the most important element of any training program is accurate monitoring of progress. Write down every workout you do in a training log. Record the date, the type of workout done, and the scores you achieved. If weight loss is your goal, keep track of your body weight once a week. If you are cross-training for another sport, monitor your performance in that sport as well. Keeping track of your progress will make your training program more effective and more satisfying.


4) ADJUST PROGRAM IF NECESSARY

You should test yourself near the beginning of your program so you have a basis for later comparison. A good test is the 2500 meter piece for time. This is the standard distance for the annual Concept II World Ranking, as well as for the ergometer races now held across the country, so you will have plenty of scores with which to compare yourself. In fact, watch for the World Ranking entry form in our Fall newsletter and send us your best score to be included in the published ranking. If a 2500 meter piece doesn't appeal to you, choose another workout that you do regularly for score. Then repeat the test every few weeks to check for improvement. If you are not pleased with your results after a month or two, you may wish to change your program.

BEFORE YOUR FIRST ROW


* Consult your physician!  Be sure that it is not dangerous
for you to undertake a strenuous exercise program.

* Review the rowing technique information carefully.  Have
someone watch you row periodically and compare your body
positions to those shown in the pictures.  Improper
technique can result in injury.

* Warm up by beginning every workout with several minutes
of easy rowing.

* Start your exercise program very easily.  Row no more
than 5 minutes the first day, even if it feels great, and
maintain a pace that allows you to keep up a conversation.
This gives your body a chance to adjust to the new
exercise.

* Gradually increase your rowing intensity and time on the
machine over the first week or two.  Do not try to row at
full power until you are thoroughly comfortable with the
technique and have rowed for at least a week.

SAFETY

* Do not let the handle fly into the cage!  Place the handle against the cage or in the handle hooks before letting go.

* Abuse of the chain can result in injury.  Never twist the chain or pull from side to side.  Pull straight back on the handle with BOTH hands.  This machine was not designed to be rowed with one hand.

* Keep away from the rotating flywheel.

* Keep clothing free of the seat rollers.

* Perform proper maintenance on your ergometer as recommended in the Maintenance Section of this manual.

HOW TO ROW

There are two parts to the rowing stroke, the drive and the recovery, but the movements are blended together so as to make the stroke smooth and continuous. There should be no stopping at any point in the stroke.

Have someone watch you row and compare your body position to that shown in the pictures. Improper technique can result in injury.

(photo 1) To begin the drive, the rower reaches forward with knees bent, arms extended, and body leaning toward the flywheel. The drive is begun with the legs and the back doing all the work. Note that the arms are straight and the shoulders relaxed.

(photo 2) Halfway through the drive, the legs and back are still doing all the work. The arms are still straight with the shoulders still relaxed.

(photo 3) At the finish of the drive, the handle is pulled by the arms and shoulders into the abdomen. The legs are straight and the body is leaning back slightly. Note that the height of the handle is neither at the chest nor in the lap. Remember that you should never come to a complete stop.

(photo 4) The first motion of the recovery is to extend the arms and swing the body forward at the hips. This puts the handle in front of the knees to avoid interference between the knees and hands as the seat moves forward.

(photo 5) The body is drawn forward with the legs to the starting position for the next stroke. The rower is now ready to begin the next drive, without ever coming to a complete halt.


POINTS TO REMEMBER
    * The handle should always travel in a straight horizontal line from the wheel to the abdomen. The pull should not be up toward the chest, or in a wavy or circular motion.
    * After the finish of the drive, the arms should be extended before the knees are bent to prevent collision of knees and hands.
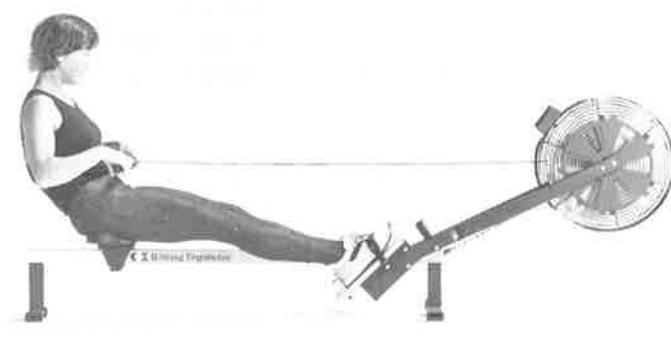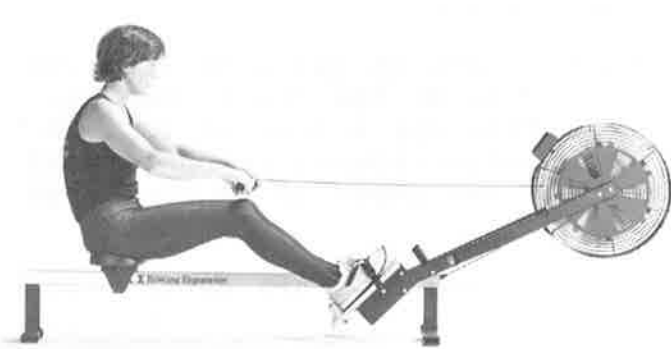    * The stroke should be one continuous, fluid motion without hesitation or jerking.

1

2

3

4

5

## CHANGING THE RESISTANCE

* Many people mistakenly believe that in order to get the hardest workout, they have to row with the heaviest resistance setting. This is not true. In fact, most national caliber rowers do NOT use the heaviest setting because it gives a heavier, slower feeling than rowing in a racing boat. Many people find it best to row in a heavier setting when first learning how to row. This is because they are not yet able to apply power quickly. As you are better able to coordinate the many segments of the stroke into one efficient motion, you will probably find that lighter settings will be most effective, especially for long pieces. This will allow you to fully utilize your aerobic capacity without being limited by muscular fatigue. You should choose a resistance setting that feels comfortable for you and allows you to attain your best performance for the duration of your workout.

* Remember that the faster the wheel spins, the more resistance you will feel. This is because the fan blades built into the flywheel create wind resistance to slow the flywheel down.

* Use the wind damper to fine-tune the feel of the stroke. Opening the damper increases the resistance.

* There are two sprockets on the flywheel axle. The small sprocket provides a heavier resistance range, the large sprocket provides a lighter one. Do NOT change sprockets while the wheel is spinning.

* To change the sprocket, sit on the seat with your feet on the floor to either side of the front leg. With your right hand, pull the handle out a foot or so from the cage. As you slowly let the handle return, reach forward with your left hand and guide the chain on to the other sprocket.

* The intensity of your workout is not determined by the setting of the damper or sprocket, but by your own effort. The performance monitor shows you how much power you are producing, regardless of the resistance settings. An output reading of 400 watts produced in the heavy sprocket is equal to a reading of 400 watts in the light sprocket range although the feel will be different. This is because power output is a function of both force and speed. In the heavy sprocket, you will be applying more force, but at a slower pulling speed. In the light sprocket, there will be less force, but your pulling speed will be greater.

USING THE ELECTRONIC PERFORMANCE MONITOR

DESCRIPTION OF DISPLAY

There is no "on" or "off" button on this monitor. Simply
starting to row will cause the display to function. The
RESET button will also activate the monitor if it is off.
The monitor will automatically shut itself down after about
3 minutes of inactivity.

There are 4 different display areas on the Performance
Monitor:

Elapsed Time - keeps track of the time of your workout.

Stroke Rate - indicates your stroke cadence in strokes per
minute. This display updates each stroke at the end of the
drive to show the rate of the stroke you just completed.



Stroke Output - gives you instant feedback on your
performance each stroke. This display updates each stroke
at the end of the drive to show you the value of your
effort for the stroke just completed.


Total Workout - keeps an average or cumulative record of
your workout.

OUTPUT UNITS

SELECTION OF UNITS:

The STROKE OUTPUT and TOTAL WORKOUT displays offer you
output data in a choice of three units. To change units,
simply press the SELECT UNITS button. Each time you press
it, the next choice of units will appear. Starting with
watts, one push of SELECT UNITS will bring up the
pace/meters option; another push will bring up the calories
option; a third push will bring you back to watts again,
and the cycle repeats.

After you finish your piece, you can look at your score in
all of the unit choices by repeatedly pressing the SELECT
UNITS button.


DESCRIPTION OF UNITS:

Watts - Watts are a unit of power. If you choose watts for
your display units, you will see how much power you
produce. If you row with an average power output of 100
watts, you are putting out enough power to light a 100 watt
light bulb for the length of time that you row! The STROKE
OUTPUT display shows how many watts you were producing
during the stroke you just finished. The TOTAL WORKOUT
display shows your average power production for the time
you have been rowing.
     This unit choice is ideal for helping you achieve a
constant work level. If you predetermine the average watt
level you wish to maintain for a work piece, you can use
the TOTAL WORKOUT display as a pacer. At any time, you can
see if you are behind or ahead of your goal.


Pace and Meters - Pace, expressed in units of time,
indicates your speed as if you were rowing on the water in
a racing shell. At each stroke, it measures the time it
would take to row 500 meters (500 meters = 1 mile on the
old style Concept II speedometer) at that level of effort.
For example, if you rowed every stroke at a pace of 2:05
for 500 meters, your elapsed time would be 2:05. (Note,
however, that it is not practical to row every stroke at
exactly the same pace.)
     This concept will be especially familiar to competitive
on-the-water rowers who often gauge their speed by timing
themselves for the 500 meter distance. This is a very
useful measure of your output: as your speed increases, the
pace decreases.
     The STROKE OUTPUT shows your pace, while the TOTAL
WORKOUT shows your cumulative meters rowed.

Calories - in this unit selection, STROKE OUTPUT shows the
rate at which you are burning calories each stroke, in
calories per hour.  TOTAL WORKOUT keeps track of cumulative
calories burned during your workout.  Since every human
body is a little different in the way it metabolizes
energy, and since some people are more efficient rowers
than others, the caloric data can only be approximate. Our
formula is based on research done using the Concept II
Rowing Ergometer and is a very good approximation.
The following is the formula we use:

calories burned =
((4 x Ave.watts/1.1639)+ 300 cal/hr) x time rowed(hrs)

INITIALIZATION OF MONITOR: Every monitor is initialized
before it leaves Concept II.  Occasionally shipping can
cause a monitor to lose this initialization.  YOU WILL ALSO
NEED TO REINITIALIZE THE MONITOR AFTER YOU CHANGE THE
BATTERIES.

Initialization procedure:  Press the [RESET] button and
keep it depressed while you press the [↑] button.  Now
release [RESET] and finally release [↑].

BATTERY INFORMATION: please see Maintenance section.

AUTOMATIC MODE

The automatic mode is the best mode to use for warming up
before a hard workout, or if you want to keep track of
total calories burned, total meters rowed, or total time of
a workout. As you start to row, the time display will
start timing your workout and all other displays will
operate as usual.

To Begin a Workout:

1) If the monitor is off, simply start rowing. (That's why
we call it automatic mode.)

2) If someone has been rowing and there are numbers on the
display, press RESET then start to row.

3) If you wish to look at units other than those displayed,
use the SELECT UNITS button to select the desired units.


What happens if you stop rowing in the middle of your work
piece in automatic mode?
     If the monitor counts 6 seconds without a stroke being
taken, it automatically backs up the ELAPSED TIME 6 seconds
to the time of your last stroke and waits for you to start
rowing again. If no rowing occurs for 2 1/2 minutes (and
no buttons are pushed), the monitor will automatically turn
itself off. This means you can rest or strip warm clothes
for up to 2 1/2 minutes without losing the data from the
first part of your piece.
     Similarly, at the end of your piece, the display of
your performance will remain on the monitor for 2 1/2
minutes, before automatically turning off. This allows
plenty of time to record your score. The display can be
extended indefinitely by pushing the SELECT UNITS button
more often than every 2 1/2 minutes.


SAMPLE WORKOUT: 30 minute row including warmup
(Note: This is not suitable for a first-time row. Build up
to it gradually.)
     Get on the ergometer and start rowing very easily.
After rowing for 5 minutes easily (at your limbering up
pace), gradually start to increase your effort, keeping an
eye on the STROKE OUTPUT display. Do not increase your
effort too much too soon as you will want to build your
effort to a maximum over the next 20 minutes. After 25
minutes of rowing, decrease your effort to something close
to your warmup pace. Row at this level as a warmdown and
stop when the time reaches 30 minutes. Record your total
workout score.
Physiologically: 20 minutes of aerobic exercise 3 times a
week is often cited as the minimum exercise needed to
maintain fitness.

SETTING UP WORKOUTS, SAMPLE WORKOUTS


PRESET TIMED WORKOUT


This mode allows you to preset the length of time you want
to row.  As soon as you start to row, the ELAPSED TIME
display will start to count down toward 0, always showing
you how much time is left in your workout.  The STROKE
RATE, STROKE OUTPUT, and TOTAL WORKOUT displays will
operate as described previously.  When your workout time is
up, the displays will freeze for 2 1/2 minutes, allowing
you to record your performance.  The monitor will then
revert to automatic mode. You can preserve your score for
an additional 2 1/2 minutes by pressing the SELECT UNITS
button.

This type of workout lets you structure the time of your
work piece, and precisely shows your output for that
predetermined time.


To Set Up a Workout:

1) Press RESET.

2) Press the button labeled WORK TIME in the lower left
hand corner of the monitor.  One digit of the ELAPSED TIME
display will begin to flash. (If you get strange figures in
the display the first time you try this or after you change
the batteries, please see Troubleshooting).

3) Set the desired elapsed time for your workout by using
the SET DIGITS buttons as follows:
     * The arrow pointing right  →  selects the digit
that you are going to change.  Each time you push it, it
causes one digit to the right in the time display to flash.
     * The arrow pointing up  ↑  increases the value of
the blinking digit by 1 each time it is pushed.

NOTE: The maximum work time that you can set is 59:59 (59
minutes and 59 seconds.  The minimum is 00:10 (10 seconds).

4) When the desired elapsed time is displayed, press READY.
The ELAPSED TIME display should stop blinking, and you are
ready to row.

5) If you prefer other digits than are currently displayed,
use the SELECT UNITS button to select the desired units.


Your current workout will remain in the monitor's memory
until another workout is set up - even if the monitor is
turned off.

SAMPLE WORKOUT: 20 minute row
        After your usual warmup, set the work time for 20
minutes, and start to row.  See what average watt output
you can maintain or how many meters or calories you have
accumulated by the end of the 20 minutes.  Record these
numbers as your score for the workout.  Repeat the workout
every few weeks to monitor your training progress.
Physiologically:  This workout achieves the minimum
effective workout of 20 minutes, and also gives you a score
to keep in your records to help monitor your progress.


PRESET TIMED INTERVALS

This mode is designed to lead you through interval
training.  It allows you to preset a work time interval and
a rest time interval.  As soon as you start to row, the
ELAPSED TIME display counts down your work time to 0.  When
the work time is up, all displays freeze except the ELAPSED
TIME display, which counts down your rest time to 0.  When
the rest time is up, the work time is again counted down
and the work output displays begin to show the work done in
the next work interval.  The process repeats itself until
you have done the desired number of repetitions.
Interval training can be a very effective conditioning
tool.  Some sample workouts will be given below.

To Set Up a Workout:

1) Press the RESET button.

2) Press the button labeled WORK TIME.  One digit of the
ELAPSED TIME display will begin to flash.

3) Set the desired work time using the SET DIGITS buttons
as follows:
        * the arrow pointing right →  selects the digit
that you are going to change.  Each time you push it, it
causes one digit to the right in the time display to flash.
        * the arrow pointing up ↑  increases the value of the
flashing digit by 1 each time it is pushed.
When the desired work time is displayed, go on to step 4.
(Do NOT push READY).
NOTE: the maximum work time that you can set is 59:59. The
minimum is :10.

4) Press the button labeled REST TIME.  The ELAPSED TIME
display will still be flashing, but now it indicates the
rest time.

5) Set the desired rest time using the SET DIGITS buttons
again as described above.
Note: The maximum rest time you can set is 9:59 (9 minutes
and 59 seconds).  The minimum is 00:10 (10 seconds).

6) When the desired work and rest times have been set, press the READY button.

7) If you wish to watch other units than the ones currently displayed, use the SELECT UNITS button to select the desired units. You are now ready to row.

8) On newer monitors, the number of intervals you have rowed will be displayed in the STROKE OUTPUT display during the rest interval.

This workout will remain in the monitor's memory until another workout is set up, even if it is turned off.


SAMPLE WORKOUTS:

Short Rest Intervals: 40 seconds work/20 seconds rest
      Set the work time for 00:40 and the rest time for 00:20. Perform these intervals for around 20 minutes, rowing at 80%-90% effort during the work time and very easily during the rest time. At the end of each work interval, read your score in the TOTAL WORKOUT display. Try to keep improving.
Physiologically: The short rest should be just long enough to refresh you psychologically for the next hard piece, yet it won't be long enough to let your heart rate drop significantly.

Power Poppers: 20 seconds work/1:40 rest
      Set the work time for 00:20 and the rest time for 01:40. Be sure that you are well warmed up before you start. Row as intensely as you can for the work interval, and note your score at the end. Enjoy the long rest, then try to beat your score on the next piece! Do just 8 repetitions, keeping the quality high. You may wish to do this workout with a heavier resistance than usual.
Physiologically: This workout combines strength training and cardiovascular conditioning.


PRESET DISTANCE WORKOUT

This mode allows you to preset the distance for which you intend to row. As soon as you start to row, the distance in meters will be counted down to 0 in the TOTAL WORKOUT display. The other displays will operate as usual. At the end of your workout, the elapsed time will be displayed to the nearest tenth of a second. Your time will be displayed for 2 1/2 minutes before the monitor reverts to automatic mode. You can preserve your score for an additional 2 1/2 minutes by pressing the SELECT UNITS button. This mode is ideal for races and test pieces.

To Set Up a Workout:

1) Press RESET

2) Press the button labeled METERS at the bottom of the
monitor.  One digit of the TOTAL WORKOUT display will begin
to flash in meter mode; and the monitor will automatically
display the pace/meters units.  (If strange figures appear
in the display when you try this for the first time, please
see Troubleshooting).

3) Set the distance to be rowed using the SET DIGITS
buttons as follows:
     * the arrow pointing right —→ selects the digit
that you are going to change.  Each time you push it, it
causes one digit to the right in the meters display to
flash.
     * the arrow pointing up ↑ increases the value of the
flashing digit by 1 each time it is pushed.
Note: the maximum distance that you can set is 9999 meters.
 The minimum is 10 meters.   Remember that 500 meters is
the equivalent of 1 mile on the old Concept II odometer.

4) When the desired distance is displayed, press the READY
button.  You are ready to row.

5) When your distance is completed your time will be
displayed to the nearest tenth of a second as follows:  the
minutes and seconds will be displayed in the usual place;
and the additional accuracy of tenths of a second will be
shown in the stroke rate display area.  This feature was
designed specifically for ergometer races.

6) If you don't complete a preset distance workout, press
the RESET button to insure that the monitor powers down.


SAMPLE WORKOUT:
     2500 meter piece (5 mile piece on the old Concept II
odometer) - this is the distance usually rowed in the
increasing number of winter indoor rowing regattas!  It is
a good way to see how you compare to ergometer rowers
across the country.
     Set the distance for 2500 meters.  Be sure you're well
warmed up.  Row as well as you can.  Record your time,
including tenths of a second.  Watch the Ergo Update for
results of the Ergometer races, and compare your score.
Physiologically:  This length piece makes a very good test
piece because your performance will reflect your current
aerobic capacity.

HOW THE PERFORMANCE MONITOR WORKS

Discussion of Power Calculation and Accuracy

The accuracy of the Performance Monitor makes it possible
to compare results on all ergometers regardless of
resistance settings. The power output as measured and
displayed by the monitor is not affected by local factors
such as proximity to walls or other ergometers, local air
currents, or altitude. All Concept II Ergometer scores
computed by the monitor may be directly compared even if
they are rowed under different conditions.

The monitor precisely measures the flywheel speed and
acceleration. It uses this information plus the moment of
inertia of the flywheel to calculate the power applied to
the wheel.

Comparison of Watts and Pace/Meters Units

        The monitor calculates watts by measuring the work
done during the drive and dividing by the time of the full
stroke cycle (recovery and drive). Pace and meters are
calculated from the power dissipated throughout the full
stroke cycle using formulas which account for the effect of
water drag on a boat.
        You will notice this difference particularly in the
first few strokes. The watts and calories will appear
quite high, reflecting the large amount of energy required
to get the flywheel moving. The pace will be quite slow,
reflecting the fact that it takes a few strokes to get "the
boat" moving.


Truncation of Pace Display

In pace/meters units, the STROKE OUTPUT is a truncated
number. In other words, a pace reading of 1:57 means that
your actual calculated pace lies between 1:57 and 1:57.99.
If your target pace is 1:57, you should aim for 1:56,
especially considering the slower pace readings of the
first few strokes.


Stroke Rate

The stroke rate display may indicate an artificially high
stroke rate on the first stroke of both the work interval
and the rest interval in a pre-set interval workout,
depending on where you are in the stroke cycle when the
timing begins.

The following statement applies to the Performance Monitor:


This equipment generates and uses radio frequency energy
and if not installed and used properly, that is, in strict
accordance with the manufacturer's instructions, may cause
interference to radio and television reception.  It has
been type tested and found to comply with the limits for a
Class B computing device in accordance with the
specifications in Subpart J of Part 15 of FCC Rules, which
are designated to provide reasonable protection against
such interference in a residential installation.  However,
there is no guarantee that interference will not occur in a
particular installation.  If this equipment does cause
interference to radio or television reception, which can be
determined by turning the equipment off and on, the user is
encouraged to try to correct the interference by one or
more of the following measures:

Reorient the receiving antenna
Relocate the computer with respect to the receiver
Move the computer away from the receiver
Plug the computer into a different outlet so that computer
          and receiver are on different branch circuits
If necessary, the user should consult the dealer or an
          experienced radio/television technician for
          additional suggestions.  The user may find the
          following booklet prepared by the Federal
          Communications Commission helpful:

          "How to Identify and Resolve Radio-TV
           Interference Problems "

This booklet is available from the US Government Printing
Office, Washington, DC, 20402, Stock No. 004-000-00345-4

# Concept II  Rowing Ergometer -- Workout Log

| Date | Meters Rowed | Cum. | Time Rowed | Cum. | Average Pace or Calories Burned | Comments |
|------|------|------|------|------|------|------|
|      |      |      |      |      |      |      |

# Concept II  Rowing Ergometer -- Workout Log

| Date | Meters | | Time | | Average Pace or | Comments |
| | Rowed | Cum. | Rowed | Cum. | Calories Burned | |
|------|--------|------|-------|------|-----------------|----------|
| | | | | | | |