

Performance Point

Calculation of Sweat Rate Made Easy!

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December 2007

Exercising in the heat presents various challenges to athletes. It has been well documented that losses of fluids through sweating can lead to dehydration which has a detrimental affect on performance. Strategies to minimize the effects of dehydration have been previously presented in several Performance Points (Hydration, May 2006; Sweat Analysis, November 2006; Heat Adaptation, August 2007). Ongoing research in the areas of heat stress and heat adaptation at the Canadian Sport Centre Pacific illustrates that many athletes typically maintain a constant state of mild to moderate dehydration. Fluid replacement guidelines state that fluid intake after exercise should exceed any fluid deficit by up to 150%. It is difficult to replace fluid loss adequately if the amount lost is unknown. The calculation of sweat rate quantifies the amount of fluids lost, providing more tangible guidelines for fluid replacement. The following is a simple step by step breakdown of sweat rate calculation. Since it takes 30-40 minutes to fully "turn on" sweating, this calculation can underestimate sweat rates when used for exercise periods of short duration.

Sweat Loss and Sweat Rate

1. Equipment required: weigh scale (accurate to 0.1kg), stopwatch, and a pre-measured water bottle in milliliters (ml)
2. Measure body weight to the nearest 0.1kg prior to exercise
3. Measure volume of fluids to be ingested during exercise (in ml) and place in water bottle
4. Start stopwatch when exercise begins; drink fluid as normal; record volume of fluid left at end of session
5. Stop stopwatch when exercise ends; record time
6. Take post exercise body weight (make sure you are dry and that all wet clothing has been removed)
7. Measure out any remaining fluids from water bottle; record leftover measurement (in ml)

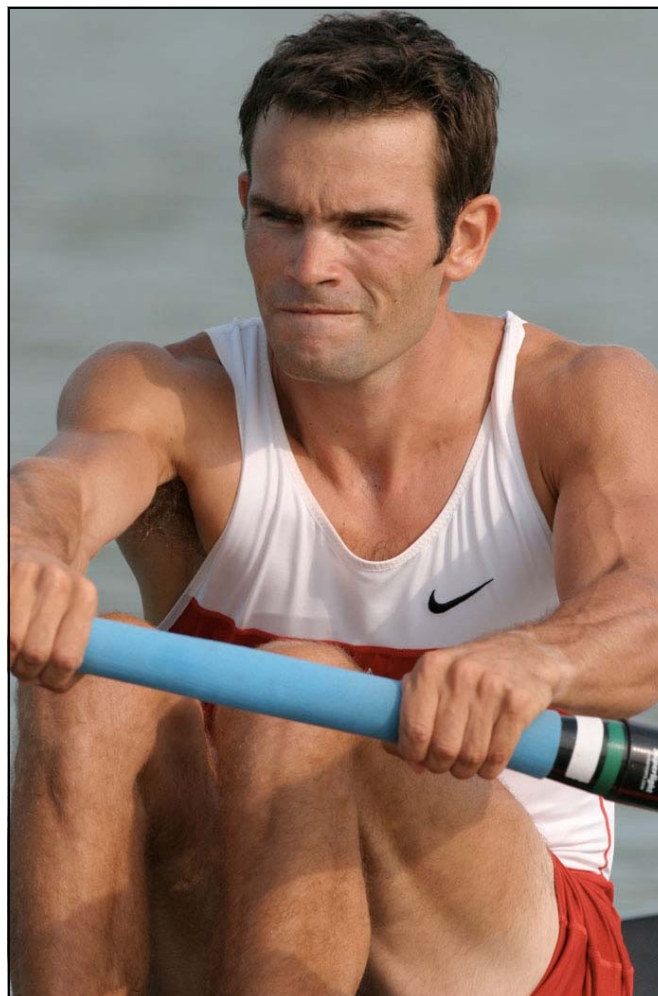
Calculation	Sample Calculation
Deficit = (pre weight – post weight) x 1000 Pre weight : _____ (kg) Post weight: _____ (kg) Deficit: _____ (kg) x 1000	Pre weight: 51.0 kg Post weight: 50.0 kg Deficit = (51.0 kg – 50.0 kg) x 1000 = 1.0 kg x 1000 = 1000 ml
% Body Mass Lost = (deficit / 10) / pre weight	% Body Mass lost = (1000 / 10) / 51.0 = 1.96% ↓ body weight
Fluid Intake = (pre fluids – post fluids) Pre Fluids: _____ (ml) Post Fluids: _____ (ml)	Pre fluids: 1000 ml Post fluids: 250 ml Fluid Intake = (1000 ml – 250 ml) = 750 ml
Sweat Loss = deficit (ml) + fluid intake (ml)	Sweat Loss = 1000 ml + 750 ml = 1750 ml or 1.75 L
Time = practice duration or exercise time = # of minutes / 60 minutes (per hour)	Time = 45 minutes = 45 minutes / 60 minutes (per hour) = 0.75 hours
Sweat rate = sweat loss / time	Sweat rate = 1.75 L / 0.75 hours = 2.33 L / hour

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Rower	Low Sweat Rate	Normal Sweat Rate	High Sweat Rate
Heavyweight Male	< 1.3 L / hour	1.3 - 2.0 L / hour	> 2.0 L / hour
Lightweight Male	< 0.8 L / hour	0.8 - 1.1 L / hour	> 1.1 L / hour
Lightweight Female	< 0.5 L / hour	0.5 - 0.76 L / hour	> 0.76 L / hour



Iain Brambell, two-time Olympian and Executive Director of BC Athlete Voice; Photo Credit: Rowing Canada Aviron

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