



# SPIROERGOMETRY



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## PHYSICAL PERFORMANCE DIAGNOSTIC

- Based on the evaluation of physical performance diagnostics, we can give you training or therapy recommendations or develop a training schedule for you. So, these results are an important foundation of the improvement of the physical condition and performance, and, thus, your quality of life.
- Spiroergometry is essential for conclusive physical performance diagnostics. During spiroergometry, you sit on an ergometer wearing a mask breathing through while exercising. The workload is gradually increased, if possible and medically acceptable, to maximum intensity. At the same time, your heart function is monitored by using ECG electrodes as well as your blood pressure by using a blood pressure meter.

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## PHYSICAL PERFORMANCE DIAGNOSTIC

- The spiroergometry device analyzes the composition of the air you are breathing out. By measuring certain parameters of this air, we can evaluate the endurance performance, the energy metabolism during exercise (indirect calorimetry) and the performance of your cardiovascular system. Examining the condition of heart, lung and cardiovascular system as well as the physical fitness and progress of training are possible.

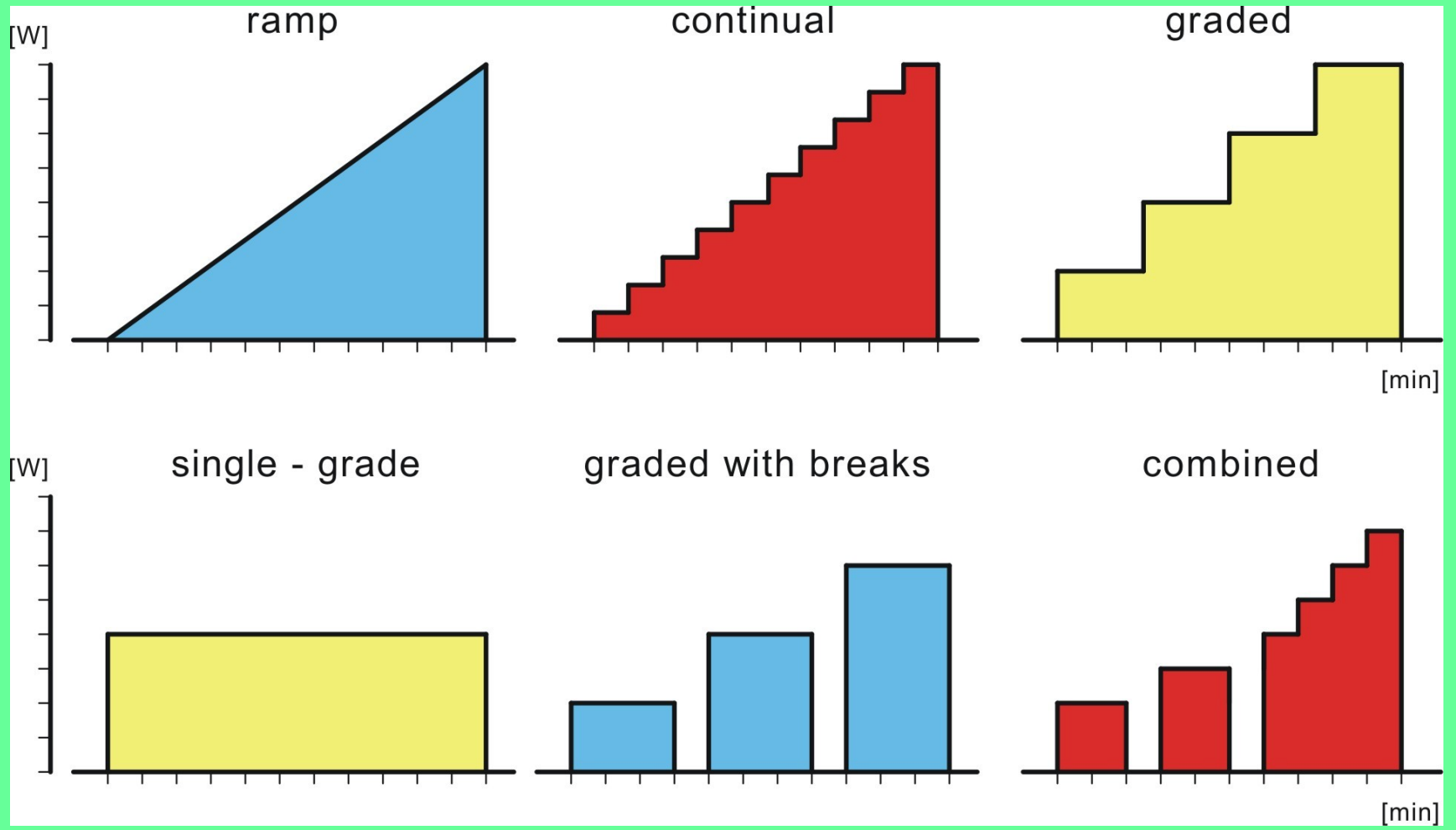


# Physiology Parameters

- Ventilation parameters : BF, tidal volume ( $V_T$ ), ventilation ( $V_E$ ).....
- Exchange of respiratory gases: oxygen uptake ( $VO_2$ ) and output of carbob dioxide ( $VCO_2$ )
- Circulation parameters: HR, BP, ECG
- Metabolism: concentration of lactate (La)

# Calculation of other parameters

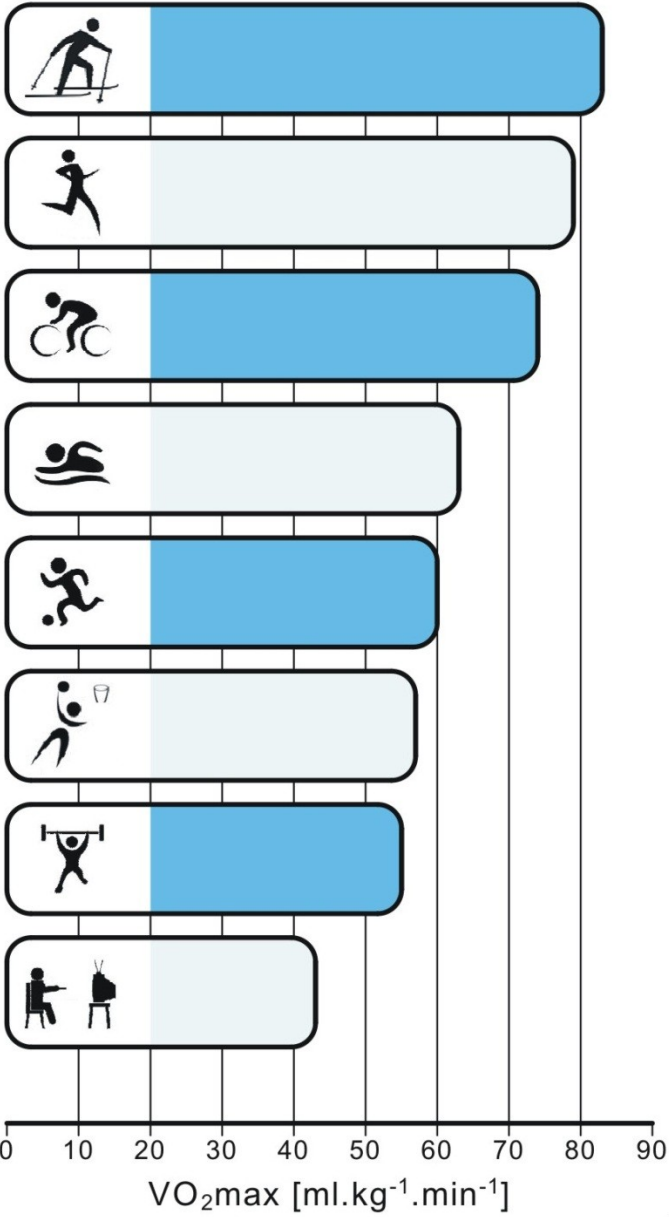
- Respiratory exchange ratio (RER)
- Ventilatory equivalent ( $V_E/VO_2$ ,  $V_E/VCO_2$ )
- Oxygen pulse ( $VO_2/HR$ )



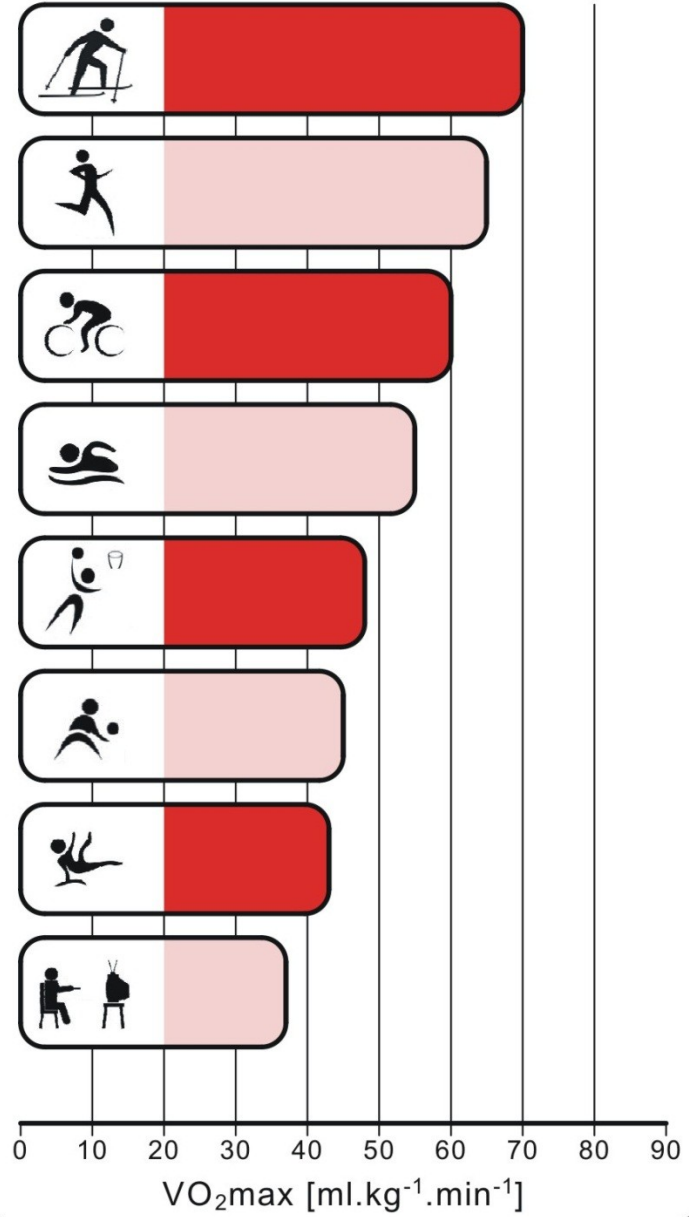
# $\text{VO}_2\text{max}$ – max. oxygen uptake

- is the maximum capacity of an individual's body to transport and use oxygen during incremental exercise, which reflects the physical fitness of the individual
- is expressed either as an absolute rate in litres of oxygen per minute (L/min) or as a relative in millilitres of oxygen per kilogram of bodyweight per minute (mL/kg/min)
- The later expression is often used to compare the performance of endurance sports athletes.

### Males



### Females



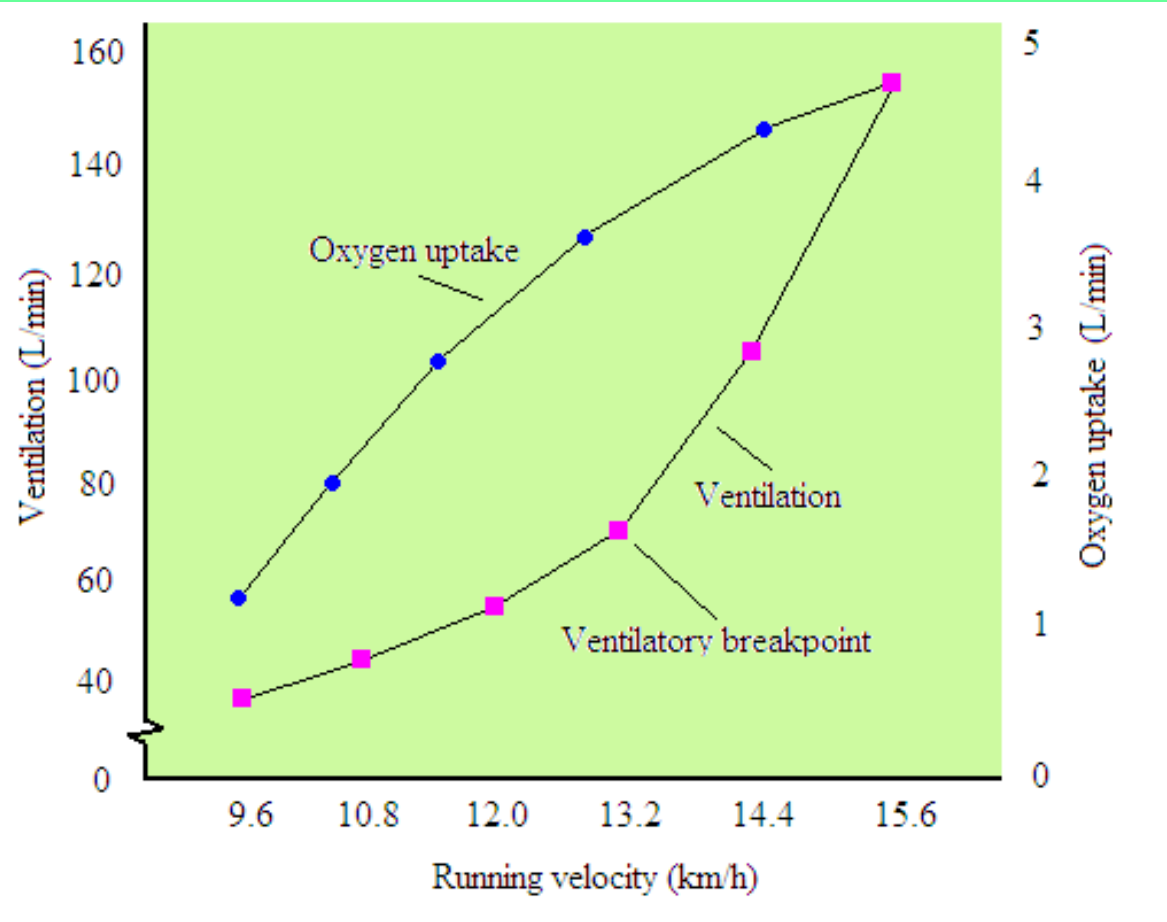


# VENTILATORY ANAEROBIC THRESHOLD

- Ventilatory threshold is as the highest intensity of exercise above which a sustained lactic acidosis occurs.
- Response of the respiratory system to an incremental exercise shows primarily a linear increase in pulmonary ventilation ( $V$ ),  $\text{CO}_2$  output ( $\text{VCO}_2$ ) and respiratory exchange ratio ( $\text{RER}=\text{VCO}_2/\text{VO}_2$ ) with the intensity of exercise (or level of  $\text{VO}_2$ ). At a certain point all the three parameters start to increase more rapidly than  $\text{VO}_2$ .

# VENTILATORY ANAEROBIC THRESHOLD

- The level of anaerobic threshold is one of the indices of aerobic capacity.
- It express the ability of an individual to perform endurance workout, at a higher or lower percentage of his/hers  $\text{VO}_2\text{max}$  and/or maximum power output.
- It also represents, as an intenisty of maximum sustainable steady state, the optimal individualised stimulus for the development of cardiorespiratory fitness, i.e. for physical training, especially in endurance sports.





INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

**Thank you for your attention.**

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