

POWER

1. The amount of work done or energy released in a measured time frame, normally expressed as a watt.
2. Work or Energy divided by Time
3. At the crank or rear hub, power is equal to the torque or force applied to the cranks or hub multiplied by the cadence, rotating velocity, or angular velocity of the pedal or hub (Power = Torque x Angular Velocity).
4. A product of how hard a cyclist pushes on the pedals and how fast they pedal.
5. For a moving bicycle, power is equal to the total resistance or forces impeding movement multiplied by the speed of the bicycle (Power = Total Resistance x Velocity).
6. A product of a cyclist's speed and all the forces resisting that cyclists' movement.
7. A direct measure of the exercise intensity.
8. The stimulus, stress, or cause that determines an individual's metabolic, cardiovascular, and psychological response, strain, or effect.
9. The capacity or ability to accomplish something.
10. The ability to supply energy.

WATT

1. The basic unit of power equal to 1 joule per second.
2. 1 joule of energy release in 1 second.
3. A common unit used to express effort or intensity amongst professional cyclists.

HORSEPOWER

A measure of power where 1 horsepower is equal to 746 watts.

FORCE

1. A vector quantity that produces an acceleration of a body in the direction of its application.
2. To push.
3. The amount of pressure applied to the pedals or rear hub.
4. A measure of strength.
5. Power divided by velocity.

TORQUE

1. A force applied through a turning axis at a point some distance away from that axis.
2. A turning or twisting force.
3. Force x Distance.
4. Power divided by angular velocity.

ANGULAR VELOCITY

1. The rate at which a spinning object rotates.
2. How fast something is spinning in units of angle per unit time such as degrees per second.
3. Angular displacement divided by elapsed time during which the displacement occurs.
4. Cadence or the number of revolutions a rotating object such as a pedal makes in a given time frame.

5. At the pedals or rear hub, power is equal to torque multiplied by angular velocity, thus angular velocity is equal to power divided by torque.

WORK

1. A mechanical representation of energy equal to force x distance.
2. The transfer of energy when a force is applied to an object or body.
3. The absolute amount of energy released over a given time period.
4. Power x Time.
5. The intensity of workout, ride, or exercise bout multiplied by the duration.

JOULE

1. A unit of energy equal to the work done by a force of 1 newton acting through a distance of 1 meter.
2. A measure of mechanical energy or the energy released when a force is applied to an object or body.
3. Power in watts multiplied by time in seconds.

KILOJOULE OR KJOULE

1000 Joules.

1. A unit of energy equal to the work done by a force of 1000 newtons acting through a distance of 1 meter.
2. A measure of mechanical energy or the energy released when a force is applied to an object or body.
3. A common unit used to express the total volume or work accomplished during a given workout, ride, or exercise bout.
4. A unit or measure used to express the total training load.
5. The average power output in watts multiplied by the time in seconds divided by 1000.

CALORIE

1. A unit of energy equal to that needed to raise the temperature of 1 gram or ml of water 1 °C.
2. A measure of thermal energy or the energy released when a fuel or substrate is burned.

KILOCALORIE OR KCAL

1. 1000 calories.
2. A unit of energy equal to that needed to raise the temperature of 1 kilogram or liter of water 1 °C.
3. A measure of the amount of energy in food
4. On U.S. food labels, 1 Calorie, spelled with a capital "C", rather than a lower case "c" is equal to 1 Kilocalorie or Kcal.
5. 4.186 Kjoules
6. For a given person, the total energy burned in Kcals is equal to the total Kjoules of work performed on a bicycle divided by 4.186 divided by the percent fraction (i.e., 22% = 0.22) of that person's gross mechanical efficiency.
7. 1 to 1.2 multiplied by the total Kjoules.

DURATION

The total elapsed time.

SECOND

1. A unit of time equal to 1/60th of a minute.
2. The time needed for a cesium-133 atom to perform 9,192,631,770 complete oscillations.
3. The person behind first.

DISTANCE

The length from start to finish along ridden roads measured in meters, kilometers, or miles where 1000 meters is equal to 1 kilometer and 1 kilometer is equal to 0.62 miles.

VELOCITY

1. The distance traveled in a given time frame normally expressed in meters per second, kilometers per hour, or miles per hour.
2. Speed.
3. Power divided by the total resistance impeding movement.
4. A function of a cyclist's power output and all of the forces resisting that cyclist's forward motion.

CADENCE

The number of pedal revolutions per minute.

ELEVATION

The total vertical distance in feet or meters above sea level where 1 meter is equal to 3.224 feet.

ELEVATION GAIN OR RISE

The total vertical distance in feet or meters traveled or climbed over a given distance ridden.

PERCENT GRADE

1. A measure of the steepness of a climb where a 100% grade or 45-degree road angle is equal to a 1-meter vertical increase in elevation (rise) for each 1-meter traveled horizontally (run).
2. The rise or vertical increase in elevation divided by the run or horizontal distance traveled multiplied by 100 (rise ÷ run x 100).
3. 100 x Tangent (slope).
4. The elevation gain divided by the square root of the actual distance traveled squared minus the elevation gain squared (Elevation Gain / [square root (Actual Distance² - Elevation Gain²)])

SHALLOW GRADE OR HILL

A road with a percent grade between 2 to 4%.

MODERATE GRADE OR HILL

A road with a percent grade between 4 to 6%

STEEP GRADE OR HILL

A road with a percent grade between 6 to 8%

WICKED STEEP

Any road, trail, path, climb or mountain greater than 8% in grade.

CATEGORY 1 TO 4 CLIMB

A rating system used to rank the difficulty of a climb that is based on a combination of the length, grade, and location of the climb on the course. A category 1 climb is considered the most difficult while a category 4 climb is considered the least difficult.

HORS CATEGORY CLIMB

1. A climb that is so difficult that it is beyond categorization.
2. Any climb longer and steeper than a category 1 climb.
3. The most difficult climb in the Tour de France.

RATE OF ASCENT

1. The vertical speed traveled or climbed in feet per hour or meters per hour.
2. The VAM or vertical ascent in meters per hour.
3. A reflection of a cyclist's power output on climbs steeper than 7% in grade. At an 8% grade, a rate of ascent of 1800 meters per hour requires a power output of 6.3 watts per kg and is considered the upper limit for climbing speed in professional cyclists.

INTENSITY

1. The actual or perceived difficulty of a given workout, ride, or exercise bout.
2. The power output or rate of energy expenditure.
3. How hard a workout, ride or exercise bout is.
4. The heat or temperature.

5. The degree of difficulty.
6. Stress, when measured directly as the actual power output.
7. Strain, when measured as the response to a given power output (e.g., heart rate, perceived exertion, oxygen consumption)
8. The percent of some reference maximal or sub-maximal value.

ABSOLUTE INTENSITY

The actual intensity value. For example, 300 watts, 175 beats per minute, or a 7 on a 1 to 10 RPE chart.

RELATIVE INTENSITY

The intensity represented as a percentage of some maximal or sub-maximal reference value. For example, 300 watts would be 80% of VO₂ max power or 100% of LT power.

NORMALIZED INTENSITY

The intensity normalized to some other factor such as body weight or aerodynamic drag. For example, for a 70 kg person, 300 watts would be represented as 4.3 Watts per Kg.

RATING OF PERCEIVED EXERTION (PE OR RPE)

1. An individual's rating of effort or intensity typically scored on a 1 to 10 scale where 1 is equal to rest and 10 is equal to a maximal or all out effort.
2. An individual's rating of effort or intensity scored on a 6 to 20 scale, where 6 is equal to rest and meant to be equivalent of a resting heart rate of 60 beats per minute and 20 is equal to a maximal effort or a heart rate of 200 beats per minute.

STRESS OR STIMULUS

1. A direct measure of the exercise intensity such as the power output.
2. The total amount of work done in Kjoules calculated from direct measures of power output.

STRAIN OR RESPONSE

1. An indirect measure of the exercise intensity such as the cardiovascular (i.e., heart rate), metabolic, or psychological response to a given power output.
2. A measure of the total training load or work done that is based on a person's response to a workout or bout of exercise rather than on the actual work.
3. An index of the effect a given pattern or distribution of power output or stress has on a given individual that is analogous to a wind chill factor or heat index.
4. A composite representation of the difficulty of a ride or workout that is based on indirect measures of exercise intensity rather than direct measures of exercise intensity.
5. A composite representation of the exercise intensity based on a manipulation of the actual or direct measure of power.

PEAK SUSTAINABLE POWER OR PEAK POWER

1. The highest average power output that can be held for a given duration.
2. For most individuals a peak sustainable power or peak power output lasting 4 to 8 minutes is equivalent to an intensity that elicits their VO₂ max, or maximal capacity to consume oxygen.
3. For most individuals a peak sustainable power output lasting 20 to 40 minutes is equivalent to an intensity that elicits their lactate threshold or a value of blood lactate 2 to 3 mM above their baseline blood lactate.
4. For most individuals a peak sustainable power output lasting 40 minutes to 2 hours is equivalent to an intensity that elicits their lactate threshold, or a value of blood lactate just above to 1 mM above their baseline blood lactate.

5. In cycling, the peak sustainable power for any given duration is analogous to their best performance for a given time. For example, a runner might have a personal best of 5 minutes in a mile run and 35 minutes in a 10 km run, whereas a cyclist might have a personal best or peak sustainable power of 400 watts for 5 minutes and 340 watts for 35 minutes.

PEAK POWER CURVE

The relationship between time and a person's capacity to maintain a given power output. In general, the highest peak absolute power outputs occur in short 1 to 5 second burst, with a exponential drop between 30 seconds to 2 minutes, and a slower drop between 5 minutes to an hour, and a subtle downward slope in power from an hour on.

WORK FROM RPE

1. The total amount of work in Kjoules calculated by estimating the average power output from a rider's perceived exertion rather than the actual power.
2. An estimate of the total work or energy released that is based on the rider's rating of perceived exertion.

STRESS TO STRAIN INDEX

The ratio between the actual work done calculated from direct measures of power and the work done calculated from perceived exertion. Theoretically, if an index of 1.0 indicates that a rider's perception of effort matches what actually happens. An index below 1.0 indicates that the rider feels the effort was easier than what actually happened. Finally, an index above 1.0 indicates that the rider feels the effort was harder than what actually happened. The index allows us to relate the actual stress to an athlete's strain. That is, it allows us to better understand how a given amount of work affects the rider. If the index is below 1.0, there is a minimal effect while above 1.0 there is a strong effect.

TRAINING ZONES

Discrete bins or intervals specific to a particular energy or physiological system. From short maximal efforts to long maximal efforts these energy systems run along a continuum from anaerobic to aerobic metabolic pathways. Common reference points for this continuum include the power at lactate threshold and power at VO₂ max.

ZERO WATTS

1. Time on the bicycle when the athlete is not pedaling or transferring any measurable power output to the pedals or rear hub. For the team captain or leader, accumulating a high percentage of time at zero watts can be extremely important to their ability to conserve energy and maintain reserves for a strong finish.

RECOVERY ZONE

1. An easy exercise intensity where there is minimal stress or strain on the body.
2. On a 1 to 10 rating of perceived exertion scale, the recovery zone corresponds to a 1 to 2 or "really easy" to "easy".
3. On a 6 to 20 rating of perceived exertion scale, the recovery zone corresponds to a 6 to 10 or "very very light" to "very light."
4. An exercise intensity dependent solely on aerobic metabolism of primarily fat.
5. An exercise intensity that can be held for an indefinite time frame.

ENDURANCE ZONE

1. A moderate exercise intensity where there is some stress or strain on the body
2. On a 1 to 10 RPE scale, an intensity corresponding to 3 to 4 or "moderate" to "sort of hard".
3. On a 6 to 20 RPE scale, an intensity corresponding to a 10 to 13 or "fairly light" to "somewhat hard."

4. An exercise intensity depending on the aerobic metabolism of both fat and carbohydrate.
5. An exercise intensity that can be held as long as the athlete were supplied with an influx of carbohydrate (i.e., allowed to eat).

LACTATE THRESHOLD (LT) ZONE

1. A hard intensity zone marked by a sudden increase in breathing rate.
2. On a 1 to 10 RPE scale, an intensity corresponding to a 5 to 7 or "hard" to "really hard."
3. On a 6 to 20 RPE scale, an intensity corresponding to a 13 to 16 or "somewhat hard" to "very hard".
4. A range of exercise intensity beginning at a slight inflection or rise in the blood lactate over a resting baseline to an intensity corresponding with a blood lactate 2 to 3 mM above a resting baseline.
5. A demarcation between aerobic metabolism to a mix of anaerobic and aerobic metabolism.
6. An all out exercise intensity that can be held between 40 minutes to 2 hours depending on the availability of stored carbohydrate or glycogen within the body.

RACE PACE ZONE

1. An extremely hard or all out intensity zone.
2. On a 1 to 10 RPE scale, an intensity corresponding to a 7 to 8 or "really hard" to "really really hard."
3. On a 6 to 20 RPE sale, an intensity corresponding to a 16 to 18 or "very hard" to "very very hard."
4. An exercise intensity dependent primarily on the aerobic and anaerobic metabolism of carbohydrate.
5. An all out exercise intensity that can be held between 10 minutes to 30 minutes.

MAX ZONE

1. An all out or maximal intensity zone.
2. On a 1 to 10 RPE scale, an intensity corresponding to a 9 to 10 or "really really hard" to "maximal."
3. On a 6 to 20 RPE scale, an intensity corresponding to an 18 to 20, or "very very hard" to "maximal."
4. An exercise intensity that elicits the causes the body to reach its maximal capacity to consume oxygen (i.e., an exercise intensity that elicits VO2 max).
5. An all out or maximal effort that can be held between 2 to 8 minutes or an average of 4 minutes.

SUPRA-MAX ZONE

1. A very short, all out effort that exceeds the power output associated with VO2 max or a person's max zone.
2. An exercise intensity that is almost entirely dependent on the anaerobic metabolism of stored ATP, Phosphagens, and carbohydrates.
3. An all out effort lasting 1 second to 2 minutes.

VO2 MAX

1. The maximal amount of oxygen that a person can consume and process measured in liters of oxygen per minute (absolute) or in milliliters of oxygen per minute per kilogram of body weight (normalized to body weight).
2. The upper limit of aerobic metabolism.
3. A strong predictor of endurance performance in a mixed population of individuals.
4. An exercise intensity corresponding with the maximal power output a person can hold between 2 to 8 minutes.

LACTATE THRESHOLD

1. An exercise intensity where the production of lactate or appearance of lactate in the blood exceeds the removal or disappearance of lactate from the blood.

2. An exercise intensity characterized by a sudden increase in breathing rate or ventilation.
3. An exercise intensity where individuals begin to feel a burning sensation in working muscle.
4. An exercise intensity considered to be hard.
5. An exercise intensity that can be held for a prolonged period of time ranging from 40 minutes to 2 hours.
6. Amongst athletes with similar VO₂ max values the power at lactate threshold is the strongest predictor of performance.

LACTATE THRESHOLD BREAK POINT

1. The power output or exercise intensity where blood lactate just begins to increase above its resting baseline.
2. An exercise intensity characterized as somewhat hard.
3. The upper end of the endurance training zone and the bottom end of the lactate threshold zone.
4. An exercise intensity that can be held for 1 to 3 hours or as long as there is available stored carbohydrate or glycogen.

LACTATE THRESHOLD > 1MM

1. The power output or exercise intensity where the blood lactate is equal to 1 mM above its resting baseline.
2. An exercise intensity characterized as hard.
3. The mid point of the lactate threshold training zone.
4. An exercise intensity that can be held for 1 to 2 hours.

LACTATE THRESHOLD 4 MM

1. The power output or exercise intensity at a blood lactate level of 4 mM or 2 to 3 mM above baseline.
2. An exercise intensity characterized as very hard.

3. The upper limit of the lactate threshold zone.
4. An exercise intensity that can be held for 30 minutes to 1 hour.

VAM - VERTICAL ASCENT (METERS/HOUR)

How quickly the rider is climbing a hill. The rate of ascent in meters/hour. This feature is most effectively used in interval mode. Start an interval at the bottom of a large climb. Stop the interval at the top. See how quickly you're gaining elevation.

NP - NORMALIZED POWER

An estimate of the power the rider could have maintained for the same physiological "cost" if the output power was constant.

IF - INTENSITY FACTOR

Comparison (ratio) of a ride's normalized power to the rider's threshold value.

TSS - TRAINING STRESS SCORE

A value based on a ride's duration and intensity (IF). 100 points equals a one hour ride at rider's FTP.