

KEISER TESTING PROTOCOLS AND PROCEDURES

Testing is an essential part of the evaluation process as it helps establish a physical baseline and allows for analysis of progress (adaptations) under a particular training plan. A physical baseline consists of measurable variables that are collected through a testing process, including speed, power, and force capabilities. This information becomes valuable when prescribing a training plan to meet a participant's goals. Future testing can then be used to evaluate the physical adaptations that occur after completion of a training plan. Special care must be taken to ensure that these testing procedures are reliable and duplicable. A well designed warm up should always be implemented before any physical activity.

In this section, we will discuss simple testing protocols for 3 of the 5 main trainable qualities.

- **Strength**
- **Power**
- **Speed**

Strength Protocols and Procedures

Strength is commonly used to describe many variables associated with human performance. In regards to this section, we will refer to strength as it relates to overcoming the maximum amount of force regardless of velocity (high force-low velocity). Strength protocols should be utilized if the objective is to test a participant's absolute or maximum force capacity. Special care should be taken to ensure proper technique when using these testing protocols. Regardless of the type of resistance used, the testing procedures require no specialized testing equipment. Below is a common protocol for determining a 1RM (one rep max), also referred to as a strength baseline. Once a strength baseline is established, any future increase in 1RM corresponds to increased maximum force capacity.



- **1RM REP TEST**

The 1RM Rep Test calculates a 1RM by having the participant do as many reps as possible with a load between 85-92.5% of an estimated max. The corresponding load and reps achieved are inputted into a 1RM calculator to establish an estimated 1RM. From a risk-reward standpoint, some performance specialists may choose to utilize the 1RM Rep Test over the 1RM Max Test. This can be beneficial for less experienced participants.

- 1** Perform Keiser Warm Up.
- 2** Select a resistance that allows the performance of 3-6 reps (85-92.5% of estimated 1RM).
- 3** Perform exercise and record resistance used and the # of reps performed until failure.
- 4** Use formula below to calculate the projected 1RM.

1 RM CALCULATOR

$$(\text{Resistance}) \times (.03) \times (\# \text{ of reps Performed}) + (\text{Resistance}) = \text{Estimated 1RM}$$

(Example: 150lbs was performed for 5 reps)

$$(150) \times (.03) \times (5) + (150) = 172.5 \text{ lbs.}$$

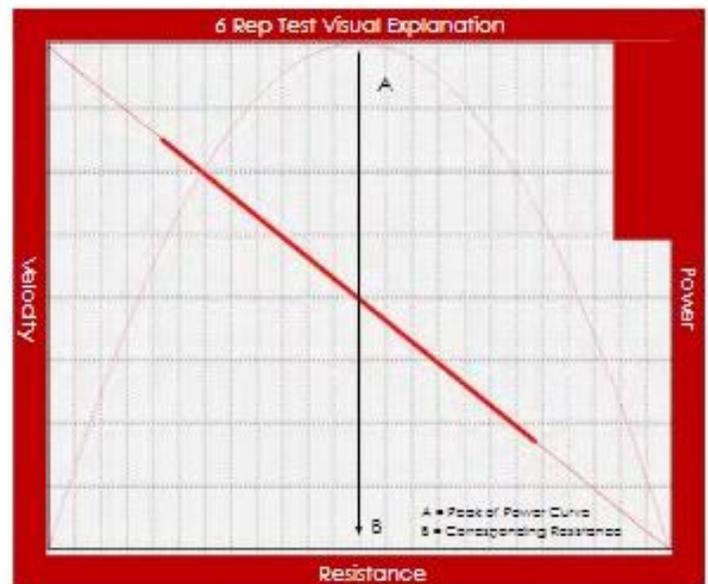
Power Protocol and Procedures

Power, which is moderate force at moderate velocity, is commonly described as strength at speed. As covered earlier, power, which is measured in watts (W), can be equated as $Power = Work / Time$ or $Power = Force \times Velocity$. Most performance specialists regard power output as the most important measurable variable associated with exceptional human performance as increased anaerobic power capacity is positively correlated to increased athletic performance. Power becomes the most important variable when a participant needs to accelerate at the fastest possible speed, in the shortest possible time. All Keiser platforms (racks, single station strength machines, and cable trainers) have built-in protocols utilizing Keiser software technology to determine the resistance where max power is achieved and how many watts are generated at any resistance along the strength continuum. Once we know where max power occurs, we then need to determine how many watts can be generated on a specific exercise. Once a power baseline is established in watts, any increase in wattage, utilizing the initial Keiser Optimal Power Resistance (KOPR), corresponds to increased power production.

- **KEISER 6 REP TEST**

The Keiser 6 Rep Test is utilized to determine the resistance at which max power is achieved (60% 1RM or 50% of absolute strength) on any given piece of equipment. This resistance is called the Keiser Optimal Power Resistance (KOPR).

- 1 Press and hold both thumb buttons until '6r' displays in the RESISTANCE window. Then release buttons and resistance will display.



- 2 Set resistance low level (10% of your maximum).
- 3 Perform 1 repetition at maximum speed. Pause 10 seconds. Repeat twice. (Note: During this phase, 'P1' must be displayed in the Target Reps display.)
- 4 Increase the resistance to a high level (80-90% of your maximum).
- 5 Perform 1 repetition at maximum speed. Pause 10 seconds. Repeat twice. (Note: During this phase, 'P2' must be displayed in the Target Reps display.)
- 6 The flashing number in the current power window is your KOPR.



• KEISER MAX POWER TEST (KMPT)

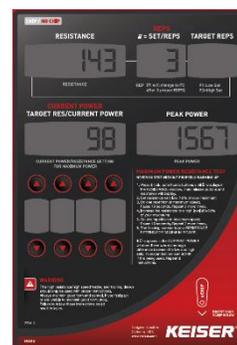
Once we know the resistance where Max Power occurs, we then need to determine how many watts can be generated. The KMPT utilizes the KOPR to measure the maximum number of watts generated for a given exercise. The number of watts generated creates a max power baseline that can be used to measure power development over time. Simply retake the test at the conclusion of a training regimen utilizing the same resistance and compare the results. Once a baseline is established, any increase in wattage corresponds to an increase in power production. Any increase in power production is contributed to an increase in velocity (Power = Force x Velocity).

- 1** Perform Keiser Warm Up.
- 2** Using the participant's KOPR, perform 1 set of 3 to 5 reps and record the highest watts achieved in that set. (Note: If the power output drops below 90% before completion of 5 repetitions, terminate the set and proceed to step #3.)
- 3** Rest 3 minutes and perform the second set. Record the wattage. (Note: If the power output drops below 90% before completion of 5 repetitions, terminate the set and proceed to step #4.)
- 4** Rest 3 minutes and perform the last set of 3-5 reps. Record the wattage. (Note: If the power output drops below 90% before completion of 5 repetitions, terminate the set.)
- 5** The highest amount of watts achieved during the 3 sets is the Keiser Max Power (KMP) for a given exercise and will serve as the Max Power Baseline.

*Test can be performed unilaterally and bilaterally to determine deficiencies

Shows current resistance setting, which can be adjusted up or down with the yellow buttons on the handles.

Shows the current power percentage, based on the peak power/wattage.



Shows the number of reps performed.

Shows your peak power/wattage.

Speed Protocol and Procedures

Speed, as it pertains to resistance training, corresponds to low force production at high velocities. Speed training has been correlated to elastic and reactive capabilities. Speed capacity is also positively correlated to increased limb speed. Speed becomes the most important variable when a participant needs to move in a very quick reactive manner (i.e. movements that are performed by a goalie). Low inertia forms of resistance, such as pneumatics, are the preferred method for training speed. Free weight movements can be used to train speed, although they must be performed in a ballistic manner to accommodate for momentum. When utilizing free weights, external devices and software must be implemented to determine speed output matrices. Additionally, weight stack machines are typically not viewed as a safe or effective modality to train or test speed capacity. In this section, we will cover the Keiser speed testing protocol and procedures.

• KEISER MAX SPEED TEST (KMST)

The KMST utilizes 50% of a participant's KOPR (around 30% 1 RM) to measure the maximum number of watts generated for a given exercise. The number of watts generated can be used to measure speed development over time. At the conclusion of a training regimen, simply retake the test utilizing the same resistance and compare the results. Once a baseline is established, any increase in wattage corresponds to an increase in speed production and vice versa.

- 1** Perform Keiser Warm Up.
- 2** Using 50% of the participant's KOPR, perform 1 set of 3 to 5 reps and record the highest watts. (Note: If the power output drops below 90% before completion of 5 repetitions, terminate the set and proceed to step #3.)
- 3** Rest 3 minutes and perform the second set. Record the wattage. (Note: If the power output drops below 90% before completion of 5 repetitions, terminate the set and proceed to step #4.)
- 4** Rest 3 minutes and perform the last set of 3-5 reps. Record the wattage. (Note: If the power output drops below 90% before completion of 5 repetitions, terminate the set.)
- 5** The highest amount of watts achieved during the 3 sets will be the Speed Baseline.