



2015 NHL SCOUTING COMBINE FITNESS TESTING SUMMARY

The following tests will be performed outside of the Fitness Testing Day window, however a list of the top ten results for each category will be available at the conclusion of each event. Results will be posted to centralscouting.nhl.com.

BODY COMPOSITION	
TEST (Measurement)	DESCRIPTION
BodPod	A BodPod will be used to obtain a precise measurement of body composition. The BodPod measures body mass, fat free mass, fat mass and percent body fat. This test is an air displacement technology that utilizes whole-body densitometry to determine body composition (fat vs. lean) and has a short test time (approximately two, 50 second increments of air measurement) and about 5 minutes for total test time.

MUSCULOSKELETAL FITNESS	
TEST (Measurement)	DESCRIPTION
Grip Strength	The athlete adjusts a hand grip dynamometer to his hand size, fully extends his arm and squeezes the dynamometer as forcefully as possible. The test is conducted on both hands.

AEROBIC FITNESS

TEST (Measurement)	DESCRIPTION
VO2max (CardioCoach)	<p>Cardio-respiratory (aerobic) fitness refers to the capacity of the cardiovascular and respiratory systems to supply oxygen to the muscles. High intensity activities which are continued for two minutes or longer, or repeated bouts of high intensity exercise with minimal recovery time, are limited by this capacity. Aerobic fitness is assessed by measuring the amount of oxygen utilized (VO2 max) during maximal exercise employing volume determination and analysis of expired air. In addition, heart rate is monitored continuously, providing data for heart rate based training. This test will be performed on the Matrix IC7 indoor cycle using the KORR CardioCoach VO2 cart.</p> <p>The seat height of the cycle is adjusted to the athlete's height; The heart rate strap is fit snugly across the athlete's chest utilizing electro-gel and heart rate signal pick-up is verified on the CardioCoach unit; The silicon face mask and headgear are adjusted for a snug fit and the mask is tested for air leaks.</p> <p>The CardioCoach is programmed with a test protocol pre-approved for the NHL Combine (table below). It will automatically prompt the appraiser through a graded exercise test.</p> <p>The CardioCoach continuously monitors heart rate and VO2 throughout the test and records data at 30 second intervals. VO2 is detected at Peak Heart Rate to determine VO2 Max.</p> <p>The end point is determined by either:</p> <ol style="list-style-type: none"> a.) the athlete physically stops pedaling; b.) athlete experiences difficulty breathing or chest pain or c.) the appraiser stops the subject because the athlete can no longer maintain the required rpm despite intense effort. <p>Athletes are allowed to stand up and pedal and should be encouraged to do so until they absolutely cannot maintain the required rpm any longer.</p> <p>Once the test ends, the athlete can remove the mask, but should continue pedaling for a two minute cool down. The heart rate monitor will remain in place during the cool down for a measurement of Cardiac Recovery Rate.</p>

Work Level	Time (min)	Resistance (kp)	Watts	Speed (RPM)
1	0-2	2.0	140	70
2	2-4	3.0	210	70
3	4-6	4.0	280	70
4	6-7	4.5	360	80
5	7-8	5.0	400	80
6	8-9	5.5	440	80
etc.				

The following tests will be performed on Saturday, June 6 and are open to NHL Clubs and members of the media. Unless noted, a list of the top ten results for each category will be available in real-time. Results will be posted to centralscouting.nhl.com.

MUSCULOSKELETAL FITNESS	
TEST (Measurement)	DESCRIPTION
Standing Height	A wall-mounted stadiometer or measuring tape and set square should be employed. The subject must be without footwear, heels together with the backs of the feet touching the wall. The body should be fully erect, the shoulders relaxed and the arms stretched downward. To make the measurement, rest the set square on the top of the head and against the wall tape. Height is measured to the nearest 0.2 cm from the highest point on the top of the head.
Wingspan	The athlete extends his arms straight out to the sides. Wingspan is measured to the nearest 0.2 cm from the middle finger tip to middle finger tip.
Standing Long Jump	The athlete stands with feet slightly apart with toes behind the jumping line. Using an arm swing to assist, the athlete jumps as far as possible. The distance from the jumping line to the heel mark in the best of three trials is recorded to the nearest centimeter.
Jump Station (Kistler Force Plate System)	<p>A Kistler Force Plate System will be used to objectively measure the direction, strength and timing of the forces the athlete produce during hockey related movement. The test will provide immediate feedback allowing teams to assess movement efficiency, physical performance and injury potential.</p> <p>The force plate is used to get a performance profile which is the ground reaction force (GRF) profile created by an athlete during movement. GRF is the force exerted by the ground on a body in contact with it. For example, a person standing motionless on the ground exerts a contact force on it (equal to the person's weight). Even on ice, the interaction with the ground determines performance, injury, and conditioning. This GRF interaction highlights the need for athletes to develop the right sequence or performance markers as opposed to just muscle groups or body parts.</p> <p>The vertical jump combines the two qualities of sprint (quick) and agility (smooth) components. Ideally, athletes quickly load the vertical jump on their downward descent, before smoothly stopping and using this energy to accelerate upwards to jump. By analyzing the whole force vs time curve, teams can individualize and identify what the athlete needs to improve upon in order to dramatically increase their performance and reduce injury rates.</p>
Calculation	The test will include six (6) separate maximum effort vertical jumps separated by ten seconds of rest. The three (3) best jumps are taken and averaged to get the final scoring and rankings.

MUSCULOSKELETAL FITNESS	
TEST (Measurement)	DESCRIPTION
Pro Agility Test	5-10-5 yard shuttle (or 15-30-15 feet) evaluates multi-directional speed, agility and whole body reaction plus control.
Bench Press	Conducted using a standard padded bench with the athlete lifting 70-80% of his body weight (pre-determined) utilizing free weights (including the barbell) in time with the metronome. Repeated bench presses are performed at a rate of 25 per minute in time with the metronome (set the metronome at 50 so that each click signals a movement either up or down). The athlete lies on his back on the bench and grips the barbell with thumbs approximately shoulder width apart. The buttocks must remain on the bench with the feet on the floor. The starting position of the bar is touching the chest at approximately the axillary line and the bar is pushed to full extension of the arms. The number of consecutive repetitions completed before the athlete falls behind the cadence is recorded. (pre-determined lift weight chart below)

Body Weight (lbs.)	Test Weight Performed (lbs.)
154 and below	120
155-164	130
165-174	135
175-184	145
185-194	150
195-204	160
205-214	170
215-224	175
225-234	185
235 and above	195

MUSCULOSKELETAL FITNESS	
TEST (Measurement)	DESCRIPTION
Pull Ups	Evaluates athletes forearm and upper arm flexor muscular strength plus endurance along with core stabilization. Records the maximum number of consecutive repetitions performed with the correct technique.
Y-Balance Test Station	The Y-Balance is a dynamic test performed in single-leg stance that requires strength, flexibility, core control and proprioception. It has been used to assess physical performance, demonstrate functional symmetry and identify athletes at greater risk for lower extremity injury. The Y-Balance Test incorporates three movement directions (anterior, posteromedial and posterolateral). The goal of this test is to maintain single-leg stance on one leg while reaching as far as possible with the contralateral leg. Each test is repeated three times with the maximum reach in each direction recorded: <ul style="list-style-type: none"> - Right/Left Anterior reaches - Right/Left Posteromedial reaches - Right/Left Posterolateral reaches ** results of this test will not be available

ANAEROBIC FITNESS	
TEST (Measurement)	DESCRIPTION
<p>Wingate Cycle Ergometer Test (30 seconds)</p>	<p>The athlete sits on a cycle ergometer so that when the pedals are turned the leg that is in the "down" position is just slightly less than fully extended. The feet should be secured to the pedals in stirrups.</p> <p>The athlete warms up by pedaling at a low resistance for two minutes.</p> <p>To start the test, the athlete pedals at a progressively quicker cadence so that by the time the designated workload has been reached, he is pedaling at his maximal capacity. The athlete pedals at his maximal capacity against the designated workload for 30 seconds.</p> <p>Revolutions are recorded for each five second period, then power output is calculated for both the peak five second period and the 30 second duration.</p>
Recorded Values	<p>Peak Power Output (Watts plus Watts/kg)</p> <p>Mean Power Output (Watts plus Watts/kg)</p> <p>Minimum Power Output (Watts plus Watts/kg)</p>
Calculation: Fatigue Index	<p><i>Fatigue Index = (Peak Power Output - Minimum Power Output) / Peak Power Output) x 100</i></p>

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