



## **ALPINE CANADA FITNESS TESTING Fall 2016**

**Alpine Canada, Alberta Alpine Ski Team, BC Alpine Ski Team,  
Ontario Alpine Ski Team, Quebec Alpine Ski Team, Canadian  
Sport Institute Calgary**



## OVERVIEW

This document provides an overview of Alpine Canada's nationwide physical fitness testing protocol. The goal is to implement system-wide standardized testing to ensure Canadian skiers are developing ski-specific physical fitness abilities as they progress through the athlete development pathway and to track progression of these athletes. This provides positive reinforcement on the importance of dryland training and physical preparation. This is important as physical fitness is critical for alpine ski racers of all ages both for on snow performance and injury prevention.

The tests were chosen based on their simplicity, validity and accessibility for all alpine ski racing performance levels from local ski clubs to the National program. It also assesses important physical fitness abilities for alpine ski racers like aerobic fitness, lower body muscle power, agility and coordination. There may be certain situations where teams have access to more sophisticated testing methods. This nationwide physical fitness testing program does not prevent the inclusion of additional testing. Instead, it provides guidelines and instructions to assess ski-specific fitness abilities that are important for all athletes in the development pathway and that can be implemented in virtually any town or city.

In order to achieve the end result of emphasizing the importance of physical fitness and the ability to track Canadian alpine ski racers as they progress through the athlete development pathway, two important considerations should be mentioned regarding the implementation of this testing protocol: (1) for this testing to have value, it needs to be implemented on a regular basis – ideally, testing should occur two times per year at the start of the dryland training period and as the athletes exit dryland training in preparation for on snow training; (2) the tests need to be repeated in the same manner from testing session to testing session – by carefully following the instructions you will ensure that the test results are not only comparable for a single athlete as he/she moves through the development pathway but also between athletes.

In summary, this represents a critical step forward in Canadian alpine ski racing. A development pathway is not a series of independent stops as a skier ascends the ranks to international competition. Instead, it should be one continuous effort on behalf of all stakeholders to provide a fun, cohesive and exhilarating experience for all athletes. Standardized physical fitness testing that is implemented across various stages of development contribute to this cohesive pathway. Thank you for your participation in the athlete development pathway and for supporting Canadian skiers on their journey to excellence.



## **EQUIPMENT LIST**

Wooden dowel

Measuring tape

2 Inch block of wood

Masking tape

75 cm or higher box

Pull up bar

Standard hexagonal obstacle

Stop watch

30 cm, 35 cm, 40 cm box (age dependent – see table 7a)

Speaker

Cones

30m large open space

Clipboards & Pencils

Athlete Data Recording Sheets



## PRE-TEST PREPARATIONS

Familiarize testers with the test protocols.

Practice the test protocols.

Find a suitable testing venue (e.g. non slip surfaces, preferably indoors, minimize environmental factors).

Prepare athletes and parents for factors influencing performance (e.g. ensure athletes are rested, hydrated, well fed, wear proper footwear).

Ensure all athletes participating in the physical fitness testing understand the testing protocol, physical requirements, and are cleared to participate. It is recommended that all athletes participating in fitness testing sign a waiver prior to participating.

## TESTING ORDER

### Movement Competencies

1. Overhead Squat with Dowel
2. Single Leg Full Squat Test

### Lower Body Power

3. Standing Long Jump
4. Penta Jump

### Upper Body Strength

5. Pull Up Test

### Change of Direction

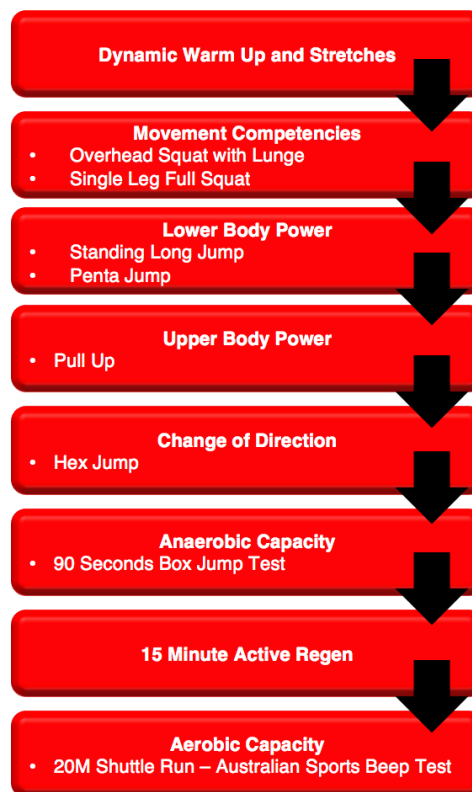
6. Hex Jump Test

### Anaerobic Capacity

7. 90s Box Jump Test

### Aerobic Fitness

8. 20m Shuttle Test





## MOVEMENT COMPETENCIES

### Overhead Squat with Dowel

**Equipment:** Wooden or plastic dowel, 2-inch block of wood, measuring tape.

**Protocol:** Measure the length of the leg of the athlete by taking the length from below the knee cap to the bottom of the athlete's foot. The athlete will stand with his/her feet apart to the length of the measurement with both feet pointing forward. Position a dowel on the top of the head and move both hands out until elbows come to 90°, and then fully extend the elbows and lockout directly overhead. Perform 5 squats as low as possible while maintaining overhead dowel position.

**Video:** [Overhead Squat with Dowel](#)

**Scoring:** Score out of 3 based on quality of the movement.

**3:** Upper torso vertical or parallel to shins, femur below parallel to ground, knees align over toes, dowel aligns over feet.

**2:** Elevate heels by 2 inches, upper torso vertical or parallel to shins, femur below parallel to ground, knees align over toes, dowel aligns over feet.

**1:** Upper torso not vertical or parallel to shins, femur not below parallel to ground, knees not align over toes, dowel not aligns over feet.

**0:** Pain while performing the movement.

**Contraindications:** Lower body injury that limits squat performance or upper body injury that limits overhead position with the dowel.

**Table 1: Targets for Overhead Squat with Dowel**

| Age   | Male   | Female |
|-------|--------|--------|
| 14-16 | 2 to 3 | 2 to 3 |
| 17-18 | 2 to 3 | 2 to 3 |
| 19-20 | 2 to 3 | 2 to 3 |



## MOVEMENT COMPETENCIES

### Single Leg Full Squat Test

**Equipment:** Box 75 cm or higher

**Warm Up:** Perform 2-5 repetitions each side of a bodyweight lunge.

**Protocol:** The athlete starts with one foot on the edge of the box. The athlete squats down on one leg to a count of three seconds until hip touches the heel, pauses for one second, and stands back up on the command of the tester until both the knee and hip are fully extended.

**Video:** [Single Leg Full Squat](#)

**Scoring:** Score out of 3 based on quality of the movement.

**3:** Upper torso vertical or parallel to shins, femur below parallel to ground, knee is aligned over toes.

**2:** Upper torso vertical or parallel to shins, femur above parallel to ground, knee is aligned over toes.

**1:** Upper torso not vertical or parallel to shins, femur not below parallel to ground, knees not align over toes.

**0:** Pain while performing the movement.

**Contraindications:** Lower body injury that limits squat performance.

**Table 2: Targets for Single Leg Full Squat Test**

| Age   | Male   | Female |
|-------|--------|--------|
| 14-16 | 2 to 3 | 2 to 3 |
| 17-18 | 2 to 3 | 2 to 3 |
| 19-20 | 2 to 3 | 2 to 3 |



## LOWER BODY POWER

### Field Test: Standing Long Jump

**Equipment:** Tape measure, non-slip floor, masking tape, clearly marked takeoff line

**Warm Up:** Perform 1-3 submaximal repetitions.

**Protocol:** Place tape measure on flat ground on a non-slip surface. Place line of masking tape starting at 0 cm. The athlete starts with the heels lined up with masking tape line. The tester will issue the command “Jump”. Using a two-foot takeoff, the athlete will perform a maximal effort jump with the goal of maximizing the horizontal jump distance. The athlete will land on two feet. Measure the jump distance from the masking tape to the heel that is closest to the takeoff line.

The test consists of 3 maximal effort jumps with a 20-second rest in between jumps.

**Video:** [Standing Long Jump](#)

**Scoring:** The best jump distance.

**Contraindications:** Lower body injury that impairs vertical jump performance.

**Table 3: Targets for Standing Long Jump**

| Age   | Male       | Female     |
|-------|------------|------------|
| 14-16 | 1.9 to 2.3 | 1.6 to 2.0 |
| 17-18 | 2.4 to 2.6 | 2.0 to 2.2 |
| 19-20 | 2.8 to 3.1 | 2.3 to 2.6 |



## LOWER BODY POWER

### Field Test: Penta Jump

**Equipment:** Tape measure, non-slip floor, masking tape, clearly marked takeoff line

**Warm Up:** Perform 1-3 submaximal jumps in a consecutive manner.

**Protocol:** Place tape measure on flat ground on a non-slip surface. Place line of masking tape starting at 0 cm. The athlete starts with the heels lined up with masking tape line. The tester will issue the command “Jump”. Using a two-foot takeoff, the athlete will perform a five consecutive maximal effort jumps in a continuous manner. The goal is to maximize the horizontal jump distance. The athlete will land on two feet. Measure the jump distance from the masking tape to the heel that is closest to the takeoff line. In the event the athlete loses balance on landing, discard the result and repeat the test.

The test consists of 2 maximal effort trials.

**Video:** [Penta Jump](#)

**Scoring:** The best total jump distance.

**Contraindications:** Lower body injury that impairs vertical jump performance.

**Table 4: Targets for Penta Jump**

| Age   | Male         | Female       |
|-------|--------------|--------------|
| 14-16 | 9.7 to 11.5  | 8.2 to 9.7   |
| 17-18 | 11.8 to 13.1 | 11.2 to 10.9 |
| 19-20 | 13.4 to 15.5 | 11.5 to 13.1 |





## UPPER BODY STRENGTH

### Pull Up Test

**Equipment:** Neutral grip pull up bar.

**Warm Up:** 3-5 pull ups with band assistance or 5 pull downs on a pulley machine.

**Protocol:** Using a neutral grip, the athlete begins at full elbow extension and must pull his/her chin over the bar without kicking or swinging. The tester stabilizes the athlete between each repetition.

The test consists of 1 attempt.

**Video:** [Pull Up](#)

**Scoring:** The maximal number of correctly performed repetition.

**Contraindications:** Upper body injury that limits pull up performance or a history of shoulder instability.

**Table 5: Targets for Pull Up Test**

| Age   | Male    | Female |
|-------|---------|--------|
| 14-16 | 4 to 6  | 2 to 4 |
| 17-18 | 6 to 8  | 3 to 5 |
| 19-20 | 8 to 10 | 4 to 6 |



## CHANGE OF DIRECTION

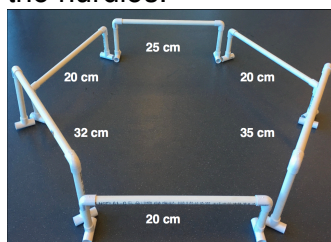
### Hex Jump Test

**Equipment:** Standard hexagonal obstacle, stopwatch.

**Warm Up:** Perform 1 revolution per side.

**Protocol:** The athlete starts with both feet together inside of the hexagonal obstacle. At the start command, the athlete jumps laterally across the starting 20cm hurdle and back. Turn and jump over the next hurdle over and back for 2 full revolutions.

The test consists of minimum 2 attempts and maximum 3 attempts in both clockwise and counter-clockwise directions. All attempts in clockwise are performed first, then counter-clockwise follows. An attempt is considered disqualified if the athlete makes contact with the hurdles.



**Figure 1:** Setup for hex jump test. See appendix for technical specifications.

**Scoring:** Record time from start command to the completion of two revolutions when both feet return to the inside of the obstacle. Best times in each direction are summed up and the sum is recorded as the final score.

**Video:** [Hex Jump](#)

**Contraindications:** Lower body injury that limits jumping performance.

**Table 6:** Targets for Hex Jump Test

| Age   | Male           | Female         |
|-------|----------------|----------------|
| 14-16 | 23 s to 20.1 s | 23 s to 20.5 s |
| 17-18 | 22 s to 19.7 s | 22 s to 19.7 s |
| 19-20 | 21 s to 19 s   | 21 s to 19.3 s |



## ANAEROBIC CAPACITY

### 90-Seconds Box Jump Test

**Equipment:** Box Height Age Dependent (See Table 7a below)

**Warm Up:** Perform 3-5 jumps each side. Technical feedback should be provided during the warm up.

**Protocol:** The athlete starts by standing on top of the box. Upon start command, the athlete jumps down laterally to one side and back up, then jump down laterally to the other side and back up. The aim is to get as many repetitions as possible in the time allotted. The athlete is not allowed to step up onto the box.

This test consists of 1 attempt.

**Video:** [90 Seconds Box Jump](#)

**Scoring:** Each jump to the top of the box counts as a repetition. Record the maximal number of correctly performed repetition.

**Contraindications:** Lower body injury that limits jumping performance.

**Table 7a: Box Height and Test Duration**

| Age   | Male        | Female      |
|-------|-------------|-------------|
| 14-16 | 35 cm, 60 s | 30 cm, 60 s |
| 17-18 | 40 cm, 90 s | 35 cm, 90 s |
| 19-20 | 40 cm, 90 s | 35 cm, 90 s |

**Table 7b: Targets for 90-Seconds Box Jump Test**

| Age   | Male       | Female   |
|-------|------------|----------|
| 14-16 | 80 to 100  | 67 to 89 |
| 17-18 | 94 to 106  | 78 to 92 |
| 19-20 | 100 to 110 | 84 to 94 |



## AEROBIC FITNESS

### 20m Shuttle Test

**Equipment:** Tape Measure, speaker, audio device with Australian Sports 20m beep test, large open space that is 30 meters in length.

**Audio:** [Australian Sports 20M Beep Test](#)

**Warm Up:** Perform dynamic warm up and static stretching for 10 minutes.

**Protocol:** The athlete will follow the instructions on the audio device, and run to the sound of the beep until the athlete is no longer able to complete a level. The testers must watch the athletes carefully and only give athletes 2 opportunities to reach the marked end points should they fall behind. When the athlete falls short of the line twice in a row, the test is stopped.

**Video:** [20M Shuttle Run](#)

**Scoring:** Record the last stage completed.

**Contraindications:** Lower body injury that limits running performance.

**Table 8: Targets for Australian Sports 20m Beep Test**

| Age   | Male          | Female       |
|-------|---------------|--------------|
| 14-16 | 10-1 to 12-2  | 9-5 to 11-6  |
| 17-18 | 11-4 to 13-7  | 10-6 to 12-7 |
| 19-20 | 11-6 to 13-10 | 11-1 to 13-2 |



## **RECORDING RESULTS**

During the testing session each athlete should be provided a results worksheet they can carry from testing station to testing station. The worksheets should be collected at the end of the testing.

Station evaluators should be provided with clipboards and pencils. It is best practice to have two evaluators at each station; one evaluator to record and one evaluator to conduct the assessment.

The individual result worksheets can be used to upload the data to the standardized Google Form using the provided link.

## **SUBMITTING RESULTS**

Results can be submitted to Alpine Canada using this link: [Testing Results Input Form - Google](#)

## **RESOURCES:**

**20M Shuttle Audio Track Link:** [Australian Sports 20M Beep Test](#)

**Webinar:** [Alpine Canada Coach Education Physical Fitness Testing Recorded Webinar](#)

**Alpine Canada Physical Fitness Video Playlist:** [YouTube Playlist](#)



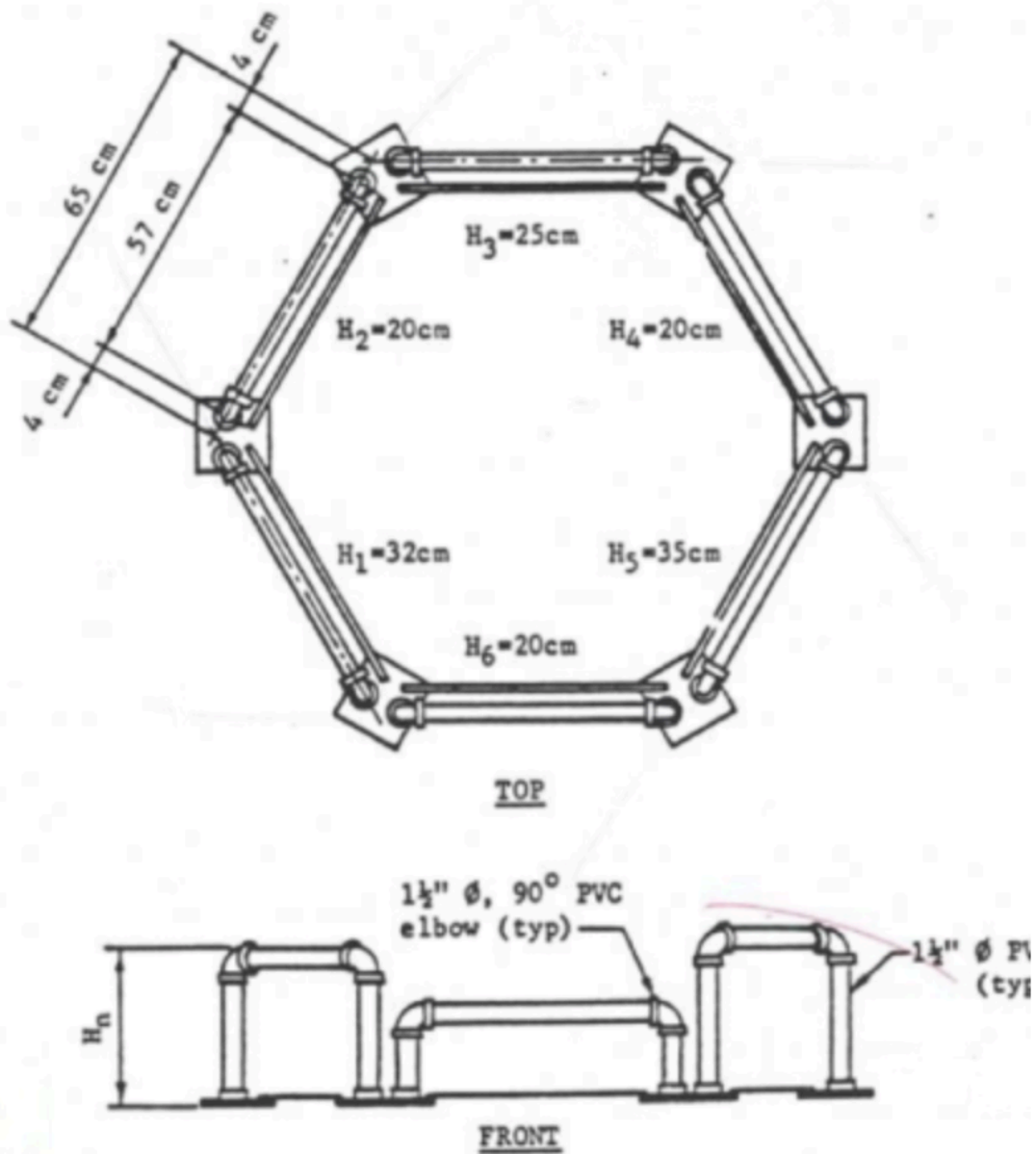
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DATE OF BIRTH: \_\_\_\_\_ FIS/ACA LICENSE NUMBER: \_\_\_\_\_

CLUB: \_\_\_\_\_ PROVINCE: \_\_\_\_\_

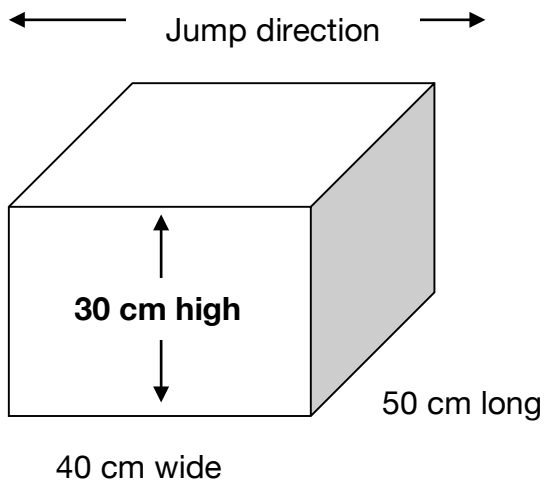
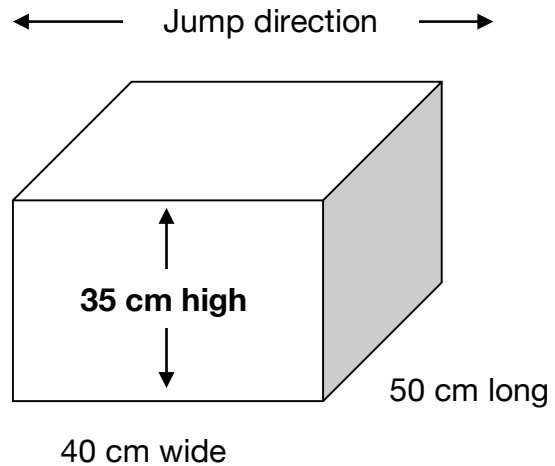
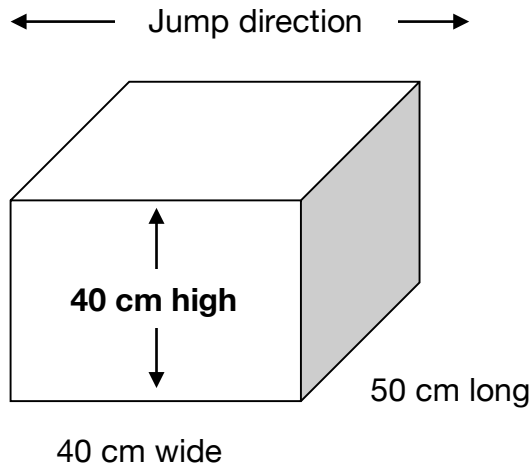
|  |                             |                           |                     |  |
|--|-----------------------------|---------------------------|---------------------|--|
| <b>COMMENTS:</b>                           |                             |                           |                     | <b>Athlete<br/>executed the<br/>test with proper<br/>technique</b> |
| <b>Overhead<br/>Squat with<br/>Dowel</b>   | <b>Score</b>                |                           |                     | <b>Yes<br/>No</b>  |
| <b>Single Leg<br/>Full Squat</b>           | <b>Score</b>                |                           |                     | <b>Yes<br/>No</b>  |
| <b>Standing<br/>Long Jump<br/>(meters)</b> | <b>Trial 1</b>              | <b>Trial 2</b>            | <b>Trial 3</b>      | <b>Yes<br/>No</b>  |
| <b>Penta Jump<br/>(meters)</b>             | <b>Trial 1</b>              | <b>Trial 2</b>            | <b>Trial 3</b>      | <b>Yes<br/>No</b>  |
| <b>Pull Up<br/>Test</b>                    | <b>Number<br/>Completed</b> |                           |                     | <b>Yes<br/>No</b>  |
| <b>Hex Jump<br/>Test<br/>(seconds)</b>     | <b>Clockwise 1</b>          | <b>Counterclockwise 1</b> | <b>Total Time 1</b> | <b>Yes<br/>No</b>  |
|  | <b>Clockwise 2</b>          | <b>Counterclockwise 2</b> | <b>Total Time 2</b> |  |
|  | <b>Clockwise 3</b>          | <b>Counterclockwise 3</b> | <b>Total Time 3</b> |  |
| <b>90 Second<br/>Box Jump<br/>Test</b>     | <b>Number<br/>Completed</b> |                           |                     | <b>Yes<br/>No</b>  |
| <b>20M Shuttle<br/>Run</b>                 | <b>Level Completed</b>      | <b>Shuttle Completed</b>  |                     | <b>Yes<br/>No</b>  |

## HEX SPECIFICATIONS





## 90 SECOND BOX JUMP BOX SPECIFICATIONS



### Building Tips:

We recommend making the boxes out of wood if you do not have access to pre-built boxes.

The top is  $\frac{3}{4}$  inch plywood and the interior frame and cross braces are constructed from 2 x 4's.

Reinforce the inside of the boxes with metal brackets in the corners.