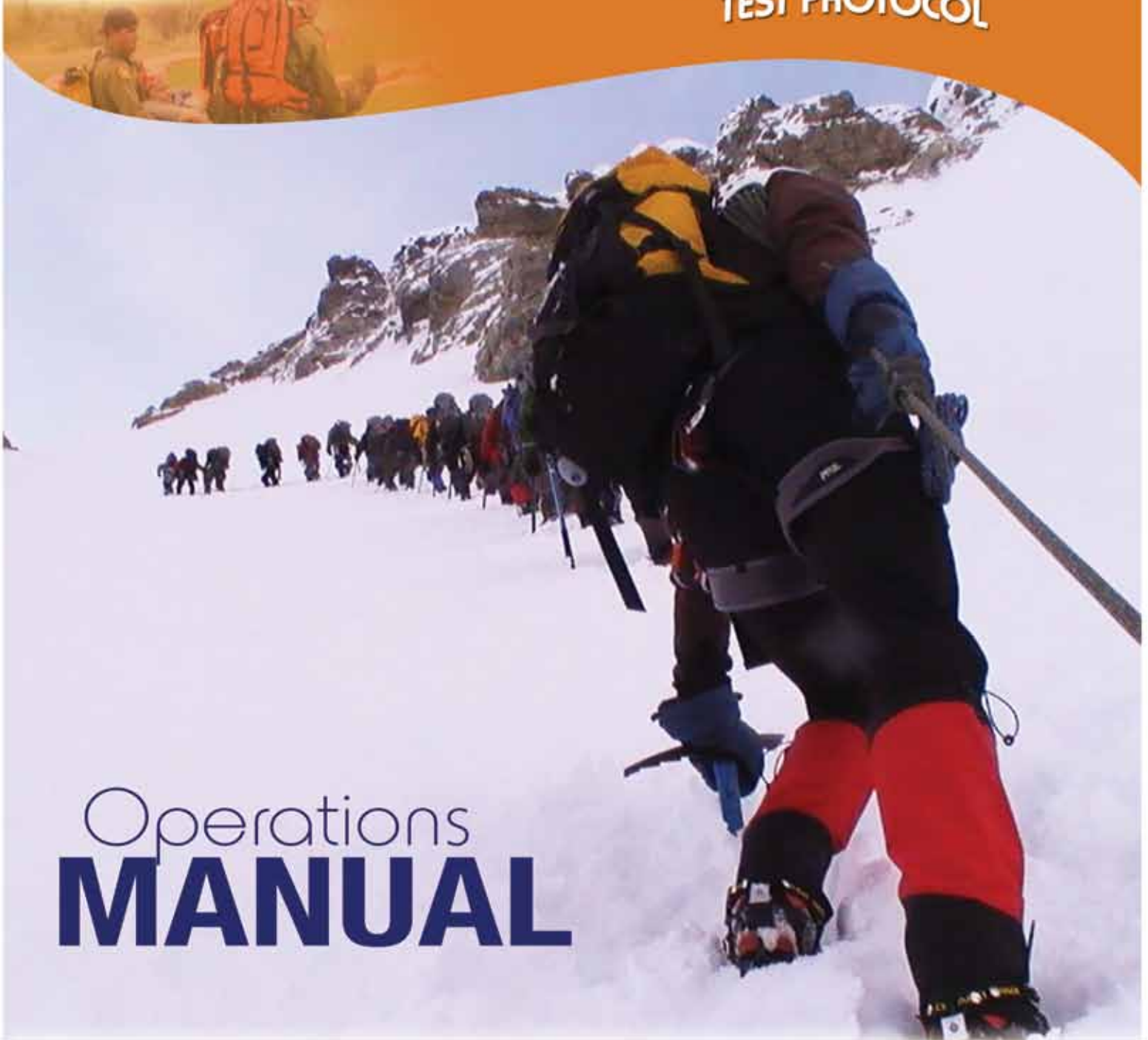




SEARCH and RESCUE TECHNICIAN
APPLICANT SELECTION
TEST PROTOCOL



Operations
MANUAL



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Test Protocol Overview

Each of the following tests represents an important aspect of the SAR Tech Training Course (QL5A). Applicants must pass all three components of the test to meet the minimum screening standard. The three components of the test include:

1. Treadmill Test
2. Equipment Carry
3. Swim

Instructions for the applicant prior to the test date

When an applicant requests a test, you should inform them of the following:

1. They must bring fitted work gloves and a pack similar to the Arc'teryx Bora 80™ (Appendix C), such as a military issued pack.
2. Be dressed in PT gear (shorts, running shoes and t-shirt), and bring swim test attire.
3. Follow the same pre-testing guidelines as per the CF EXPRES with regards to coffee, exercise, etc.
4. Recommend that they avoid strenuous exercise for 2 days prior to the evaluation to minimize fatigue.

PRE-TEST PROCEDURES

Safety and Emergency Action Plan

The test protocols involve a graded treadmill exercise and a variety of job-related tasks for which the applicants are expected to perform maximally.

The evaluation staff must be familiar with maximal exercise and be able to recognize signs and symptoms of cardiovascular and musculoskeletal distress.

While the actual incidence of adverse outcomes from testing is likely small, an emergency action plan must be in place to recognize and manage any incidences during testing.

Treadmill Calibration

The treadmill speed and grade must be accurate. Refer to Appendix B for instructions on treadmill calibration.

Testing day

1. Completion of the SAR Tech applicant physical fitness test form including pre-screening (questionnaires, HR & BP) as per the CF EXPRES testing protocols. (Refer to Appendix D).
2. Verification of pack fit and loading. (Refer to Appendix C).
3. Familiarization with the Equipment Carry test procedures (e.g., wearing gloves).
4. Selection of correct fin size for the swim test.
5. Ensure the previous setting on the treadmill have been cleared.

** The outlined equipment selection and fitting will likely have already occurred as the applicants should have been training prior to the test and would have used the same equipment.*

At the end of the pre-test stage, the applicant is ready to start the test.

Test Recording Forms

Throughout the testing process, record all results on the *SAR Tech Applicant Physical Fitness Test Form* (Appendix D)

Observations should be made to indicate if there were any issues during the test.

At the completion of the test protocol, you should check all sections of the data forms to ensure that nothing has been overlooked, and that all the information is legible and verified.

Treadmill Test – Pack Loading and Fitting

1. The pack must be adjusted to properly fit so that performance during the load carriage is not compromised.
2. The pack must weigh 25 kg in total. Guidelines for correct loading are found in Appendix C.

Equipment Carry Test Familiarization

The format of the SAR Tech Applicant Testing procedure does not allow the applicant sufficient time to learn the Equipment Carry protocol between the Treadmill Test and the Equipment Carry Test.

Therefore, the purpose of the standardized familiarization process is to allow the applicant to be properly prepared to perform the Equipment Carry Test upon completion of the 5 min transition from the Treadmill Test. The familiarization process also provides the applicant with a warm-up. It is highly recommended that rubber plates and dumbbells be used for this test item.

Standardized familiarization protocol:

Using gloves, the applicant performs the following tasks in a continuous process:

1. One equipment carry with the 115lb/52kg barbell over the 40 m circuit.
2. An unloaded completion of the 40 m circuit.
3. One equipment carry with the 55lb/25kg dumbbells over the 40 m circuit.
4. A second unloaded completion of the 40 m circuit.

For the familiarization session you should:

1. Review all instructions.
2. Start the test in the normal manner.
3. Allow the applicant to practice lifting the weights with proper form.
4. Correct any errors immediately.
5. Ensure that the applicant understands the procedures.
6. Allow the applicant to ask questions.
7. Inform applicants that gloves are mandatory and that they must provide them.

Termination of the test

If, at any point in the testing process, the applicant's safety is at risk due to health issues or exhaustion, you should terminate the test and possibly refer the applicant to the Medical officer if required.

A retest may only be scheduled a minimum of 3 months later. The same protocol as per the CF EXPRES testing should be followed.

Fin Selection for Swim Test

The applicant should select the correct Rubber Aquam™ fin size for use in the Swim Test.

This equipment should be available when applicant arrives at the pool to allow the transition to the Swim test to occur in the designated 30 min.



SAR TECH TREADMILL TEST

The test has been developed to challenge the type of aerobic fitness that is most frequently encountered during the QL5A course.

SAR Tech trainees often work hard for 15 - 20 min periods carrying heavy loads while hiking or back-country skiing, followed by a recovery period. This type of work is repeated many times during a training day. It is not mandatory but recommended to have 2 evaluators to administer this test item. One main evaluator and an assistant that can be located at the rear of the treadmill for additional safety.

There are two objectives to the treadmill test:

1. To evaluate the ability to complete a representative sample of endurance work while carrying a typical load.
2. To evaluate maximal work capacity under load. During the entire test, applicants will carry a 25 kg backpack.



Figure 1: Side view of the SAR Tech Treadmill test

Equipment

1. Backpack weighing 25 kg, similar to the Arc'teryx Bora 80™ backpack (Appendix C). Military Packs or personal packs must have chest and hip straps, and be adjustable to fit properly as shown in Appendix C.
2. Treadmill.

Treadmill Familiarization

You should instruct the applicant on the principles of treadmill safety, correct starting and stopping procedures, communication during the test, and test end-points.

You should clearly explain what is expected of them during the test. You must inform the applicant that the rails are there for safety only, they are not to be used for support. Only one warning will be given then the test will be stopped if applicant keeps using the rail.

You should ensure that the previous setting used on the treadmill are cleared before the test starts.

Treadmill Test Protocol

Test Protocol is outlined below. Applicants will follow the protocol until they indicate they cannot continue.

The treadmill test has 4 distinct phases:

1. **Warm-up phase:** Walking at 5.6 km/h (3.5 mph) for 6 minutes. The grade starts at 2% and increases to 6% by the end of the warm-up.

2. **Constant work phase:** 15 minutes of walking at 5.6 km/h (3.5 mph) and 8% grade. Completion of this phase is essential in order to meet the minimum standard for this component of the test.
3. **Progressive phase:** The treadmill grade increases by 1% each minute up to a maximum of 15%. Thereafter, the grade stays constant at 15%, while the speed increases by 0.8km/h (0.5 mph) every minute. The candidate will complete as many stages as possible until they choose to quit.
4. **Cool-down phase:** 5 minutes of walking at 4 km/h (2.5 mph) on a flat treadmill (0% grade). The cool-down phase begins the moment the candidate quits the progressive phase. Completion of the cool-down phase is mandatory.

At the completion of the cool-down, start your stopwatch to initiate the 5 minute transition time from the end of the Treadmill Test to the start of the Equipment Carry Test.

Summary of the SAR Tech Treadmill Test protocol

Test Phase	Test Time (minutes)	Treadmill Speed (km/h)/(mph)	Treadmill Grade %
Warm-up	0-2	5.6/3.5	2
	2-4	5.6/3.5	4
	4-6	5.6/3.5	6
Constant work	6-21	5.6/3.5	8
Progressive	21-22	5.6/3.5	9
	22-23	5.6/3.5	10
	23-24	5.6/3.5	11
	24-25	5.6/3.5	12
	25-26	5.6/3.5	13
	26-27	5.6/3.5	14
	27-28	5.6/3.5	15
	28-29	6.4/4.0	15
	29-30	7.2/4.5	15
	30-31	8/5.0	15
	31-32	8.8/5.5	15
	32-33	9.6/6.0	15
	33-34	10.4/6.5	15
34-35	11.2/7.0	15	
Cool-down	0-5	4/2.5	0

Rating of Perceived Exertion (RPE)

During the warm-up, you should explain the RPE scale to the applicant and that you will require responses during the test.

You can record these responses on the worksheet in Appendix E. It is often convenient to mount the chart on the back of a clipboard, place it in front of the applicant and allow them to point to the appropriate response. Alternately, the chart can be mounted on the wall in front of the treadmill.

Recording of test performance

During the test, keep an accurate record of exercise time and workload (speed and grade) for each minute of the test.

The rating of perceived exertion (RPE) should be recorded at the appropriate times marked on the *SAR Tech Treadmill Test Worksheet*.

While the RPE is not part of the test result per se, the data provide very useful insights into the fatigue state of the subject during and after the test. Their degree of fatigue can be evaluated through direct observation and the RPE responses at peak exercise.

Treadmill Test Termination

The test end-point should be determined by the applicant when they signal that they cannot continue. In order to take the applicant to the point of maximal exertion safely, it is essential that you maintain constant and clear communication with the applicant.

At the test end-point, you should instruct the applicant to use the hand rails for support while you rapidly decrease the speed and grade to the recovery settings (2.5 mph or 4 km/h and 0% grade).

Note the total treadmill test time (min and s) on both the *SAR Tech Treadmill Test Worksheet* in Appendix E and on the *SAR Tech Applicant Physical Fitness Test Form* (Appendix D).

Recovery Phase

Upon completion of the test, applicants are required to perform a standardized cool-down. Use your discretion when adjusting the specific walking speed. For example, taller individuals may feel more comfortable at a slightly faster speed.

Applicants must complete the 5-minute cool-down phase wearing the pack.

The recovery stage is essential for a safe transition from maximal exertion to stopping exercise. Therefore, other than in exceptional circumstances where the safety of the applicant is in question, the recovery phase must be completed.

During the recovery phase, monitor the applicant for signs or distress.

Be vigilant since problems such as nausea and lightheadedness are more likely to occur during recovery than during exercise. Applicants can drink water as required during the recovery phase.

At the end of the recovery phase, you must warn the applicant to hold on to the safety rail securely and straddle the treadmill belt. Once the applicant is clear of the belt, you can stop the treadmill.

Communication

You must maintain a dialogue with the applicant. Inform the applicant in advance of every change of speed or grade and acknowledge their willingness to continue.

When the applicant wishes to stop the test, they must tap a designated spot on the safety rail of the treadmill. This should be done as a warning signal approximately 15 seconds before the applicant feels they must stop.

This stopping signal and amount of time (5-15s) before completion should be agreed upon by you and the applicant prior to the start of the test. You'll then have time to confirm that the test will stop in a few seconds and remind the applicant of the active recovery phase.

Clear communication between the applicant, yourself, and any others assisting with the test is essential. Evaluator roles should be clear prior to the start of the test.

Interpretation of Treadmill Test Results

An applicant "passes" the test by completing the first 21 min. This includes:

1. The standardized warm-up (6 minutes).
2. Constant work phase (15 minutes).

While completion of the recovery phase is essential for safety reasons, recovery time is not considered part of the total test time.

Transition to Equipment Carry Test

Once the backpack is removed after the cool-down, the applicant will have a 5 minute transition to walk to the Equipment Carry Test.

SECTION IV

EQUIPMENT CARRY TEST

Members of the QL5A course frequently have to move equipment and/or patients over relatively short distances. Often, this work involves 6-8 repetitions while carrying loads of 40-55 kg (90-120 lb). This work is generally accomplished with a sense of purpose or urgency.

The Equipment Carry Test was developed to simulate the physical challenges encountered during such work.

It is a shuttle test where the applicant lifts and carries weights back and forth over a 40 m course. After the applicant goes through the 40 m course carrying a weight ("loaded") they perform another 40 m repetition without load ("unloaded"). This simulates moving equipment from a storage area to a destination (e.g., dive boat, aircraft) and returning to pick up and carry another load.

Transition

In the time remaining of the 5 min transition, you will review the requirements of the test and answer any questions.

With approximately 30 seconds left in the transition period, you will move the applicant into position to start the test. Position the applicant just behind the easy curl barbell in a standing position. At this point, the applicant must have gloves on to perform the test.

At the end of the transition time, you will inform the applicant to begin the Equipment Carry Test. The applicant should begin the test within 5 seconds.

Start your stopwatch with the applicant's first movement toward the barbell.

The equipment is outlined in Appendix A.

Test Description

The course is 40 m long (20 m out, around a cone, and 20 m back).

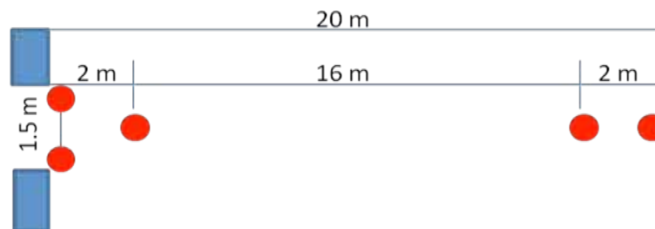


Figure 2: Schematic of Equipment Carry Test Layout. Dots represent positioning cones. Rectangles represent mats for barbell and dumbbell setups. 2 cones separated by 1.5 m distance (same as starting line) instead of only one can be used to identify the 2 m. warning zone at the starting area.



Figure 3: Layout of the Equipment Carry Test with a view from behind the starting line



Figure 4: Layout of the Equipment Carry Test with a view from the turning cones back to the starting line

1. The test begins when the applicant, starting from a standing position behind the easy-curl bar, makes a movement to begin lifting the bar. The easy-curl bar is loaded with two 20.4 kg (45 lb) plates and collars for a total weight of 52.2 kg (115 lb).



Figure 5: Applicant position for the start of the Equipment Carry Test

2. The applicant picks up the barbell and proceeds 20 m away from the start point, around a cone, and returns. When the applicant returns, they will come back THROUGH the two cones (at the start/finish line), turn left and place the barbell back down in the starting position. The barbell must be carried in front of the body using an underhand grip.

3. After completing the 40 m circuit with the barbell, the applicant will complete a 40m unloaded repetition (not carrying the barbell) over the same course, again returning through the two cones. Applicants may step over the barbell.
4. After completing the unloaded repetition (and re-entering the starting zone THROUGH the two cones at the start/finish line), the applicant will pick up the two 25 kg (55 lb) dumbbells (or kettle bells) to start the second loaded repetition. The procedure is the same as for the barbell: one 40 m circuit loaded followed by one 40 m circuit unloaded.
5. In total, the applicant will cover the 40 m course EIGHT times under load (4 times with the barbell and 4 times with the dumbbells) and SEVEN times unloaded for a total of 15 times through the course.
6. The test ends when the applicant crosses the start/finish line with the dumbbells for the 4th time. At this point stop your stopwatch. The total time to complete the 15 repetitions of the 40 m course is the applicant's score and you should enter it in the appropriate field on the *SAR Tech Applicant Physical Fitness Test Form* (Equipment carry time: _____).
7. At the completion of the test, start your stopwatch to time the 30 minute transition to the Swim Test.

Note: There are cones placed 2 m from the start point and 2 m from the turn cone. When the applicant is between these two cones (separated by a distance of 16 m) they may move as quickly as possible. That is, they can walk, shuffle, jog, or run as long as they maintain control and move **SAFELY**. However, the area inside the 2 m cones is a “no-run zone”.



Transition to Swim Test

Applicants have 30 min to transition to the swim test. Some applicants will have to drive to the pool therefore it is critical that you schedule appropriately the facilities requirements to respect the transition time.

A significant part of the QL5A course involves work in the water during dive training and sea operations. Almost all water work is performed with various types of equipment. Trainees regularly do continuous swims of up to 1000 m. The ability to swim both with and without equipment is important, but the test is completed with fins in order to evaluate the leg strength and endurance required for continuous finning.

Transition

In the time remaining of the 30 minute transition time, ensure that the applicant is properly fitted with Rubber Aquam™ fins, review the requirements of the test, and answer any questions.

With 30 seconds left in the transition period, the applicant should be in the pool in a starting position.

At the end of the transition time, inform the applicant that the transition time is over and that they should begin the Swim Test. The applicant should begin the test within 5 seconds.

Start your stopwatch at the applicant's first swimming movement.

Pool Size

Ideally, a 25 m pool is used, which means 30 lengths must be completed for the 750m swim.

Evaluation staff should calculate the number of lengths prior to testing if the pool is not 25 m long.

Note: Pool length should be as close as possible to 25 m.

Test Description

If the applicant needs to stop during the swim, they may **not** touch the bottom of the pool or hold onto the edge.

The total time to complete 750 m is the applicant's swim test score.

The test can be completed using any stroke or simply just finning/kicking.

During the test the applicant will wear a swim suit of their choice and can use goggles. Applicants will wear Rubber Aquam™ fins. Wetsuits are not permitted.

Applicants can touch or push off each end of the pool during turns.

The test begins at the shallow end of the pool (in a 25 m pool) with the applicant touching the wall of the pool.

Start your stopwatch when the applicant makes the first movement away from the wall.

The test ends when the applicant touches the wall after the final length. At this point, stop your stopwatch and enter the time into the appropriate field on the *SAR Tech Applicant Physical Fitness Test Form* (Swim Time: _____).

The applicant has now finished the SAR Tech Applicant Test and should begin the recovery process.

Feedback during Test

You should provide the applicant with feedback on progress. For example, you can alert the swimmer at 20 and 10 laps to go, and before the last lap.

SECTION VI

RECOVERY

Encourage the applicant(s) to continue walking slowly after the test. Do not allow them to sit or lie down immediately following the test. Walking and light stretching will help facilitate recovery.

You should monitor the applicant for approximately 15-30 minutes of recovery. As the applicant will likely be very fatigued, they should recover and re-hydrate.

After the applicants have showered and changed into clothes, you should meet each person to re-assess their recovery and supervise if required.

Observations should include feedback regarding dizziness, nausea, muscle cramping, etc. If any symptoms are present, continue to monitor.

Once in a recovery area, encourage the applicants to begin re-hydrating with water or a diluted sports drink. Instruct them to take small sips of fluid as a minimum. A light snack can also be ingested if desired.

Normally, an applicant can be released after approximately 30 min of recovery.

You should "sign-out" the applicant after their heart rate has returned below 100 bts/min and their blood pressure is below 150/100 mmHg.

SECTION VII

RETESTS

If a candidate fails to meet any of the test standards but their performance time falls within the following times (standard + acceptable time over), then they can retest a minimum of 48 hrs later. Candidates must perform the entire test during the retest.

Otherwise a minimum of 3 months is required for a retest if a failure occurs outside of these times.

Treadmill test: 21 min (-77s); $\geq 19:43$ min.

Equipment Carry: 390s/6:30 min (+25s); ≤ 415 s.

Swim: 20 min (+37s); $\leq 20:37$ min.

General Equipment and Supplies

- Clipboard for evaluation forms
- RPE Chart

Treadmill Test

- Calibrated treadmill (calibrated for grade range of 0-15% and speed range of 3.5-7.0 mph) (Appendix B)
- Applicants will bring their own properly fitted, packed and weighed 25kg backpack similar to the Arc'teryx Bora 80™ (Appendix C). Evaluators will verify fit weight and packing.
- As per Appendix C, items for loading pack.
- Stopwatch
- An assistant evaluator is recommended for this test. This person is to be located at the rear of the treadmill for additional safety.

The Equipment Carry Test

- 25 lb (11.3 kg) easy-curl barbell
- 2 x 45 lb (20.4 kg) weight plates (rubber plates are recommended)
- Two collars
- 2 x 55 lb (25 kg) dumbbells or kettle bells (rubber dumbbells are recommended)
- Two rubber mats (approx 1 m x 1.2 m) to act at both the starting point of the test and to cushion the surface from the barbell and dumbbells.
- 5 cones
- 20 m measuring tape
- Gloves (applicants will bring fitted work gloves or military issue)

SAR TECH Swim Test

- (Preferably) a 25 m or 25 yd pool
- Selection of Rubber Aquam fins™ sizes.
- Bathing suit and goggles



- o Evaluators should have a selection of different sized fins to meet the applicant's needs.
- o It may also be helpful to schedule applicants with different foot sizes to be tested at the same time. This will reduce the number of fins required in a specific size.

Treadmill Calibration

You should check the treadmill each testing day to ensure that the speed and grade are accurate. This is essential since the criteria for passing the test requires that the applicant complete 21 minutes of exercise consisting of specific speed and grade settings.

If the speed and/or grade are incorrect, then it is possible individuals who should fail will pass, or alternately, individuals who should pass will fail.

This section provides simple guidelines for verifying the calibration of the treadmill. Actual adjustment of the settings to ensure proper calibration may require service by a qualified treadmill technician. Check the manual for the treadmill to see if adjustment is possible. Alternately, the steps described below allow you to check for calibration errors and to compensate for them.

Treadmill Speed

The speed of the treadmill is typically reported on the display in miles per hour (mph). If a treadmill display is in kilometers per hour (km/h) then a simple calculation can be made to convert from metric to English units. Helpful conversions are:

- Speed in kilometers per hour $\times 0.62$ = speed in miles per hour
- Speed in miles per hour $\times 26.82$ = speed in meters per minute

The majority of the test is completed at 3.5 mph and therefore, this is the most important speed to calibrate. In most cases, calibration should be robust for a range of speeds, and it should not be necessary to calibrate for all possible speeds. For example, if the treadmill is correct at 3.5 mph, then it will also be correct throughout the range between about 3.0 and 5.0 mph. This can be verified on an individual basis if necessary.

Equipment required to verify calibration of the treadmill:

- Measuring tape (long enough to measure the length of the belt)
- Marking tape (athletic tape or duct tape)
- Stopwatch
- Calculator

1. Determine the length of the treadmill belt. This may be available from a technical manual, but it is also easily measured.
2. Calculate the number of belt revolutions expected at 3.5 mph (93.9 m/min). For example, if the belt length is 4.3 m, then at 3.5 mph your calculations will reveal:
 - a. 21.8 revolutions per minute
 - b. 2.75 seconds per revolution
 - c. 55.1 seconds for 20 revolutions
3. Once these calculations are complete, verify the calibration by following the steps below:
 - a. Place a piece of marking tape on the treadmill belt and a second piece of tape on the deck beside the belt.
 - b. Set the treadmill to 3.5 mph and have one evaluator walk on the belt (this is important as the belt speed is often different when the treadmill is loaded or unloaded).
 - c. The second evaluator should measure the elapsed time for a given number of revolutions, noting each complete revolution the marking tape passes the tape on the treadmill deck (see Figure G-2).

- d. In theory, you could measure the elapsed time for one revolution, however the “experimental time” is short (2.75 s) and the influence of reaction time and movement time could result in a significant error. Timing a reasonably large number of revolutions (e.g., 20) diminishes this error significantly. Reaction and movement time are now very small compared to a relatively large “experimental time”. Your accuracy may be improved by practice, by doing several repetitions, or by having more than one timer.
- e. If the actual elapsed time is the same as the predicted elapsed time, then the treadmill speed display is accurate and nothing further is required.
- f. If the actual elapsed time differs from the predicted time, then adjust the speed control up or down slightly to compensate for the difference, and repeat the timing procedure. This may have to be done several times.
- g. For example, you may find that when the speed control displays 3.6 mph that the belt speed is actually 3.5 mph.
- h. Bear in mind that by following the above steps, you have not calibrated the treadmill speed. However, you have checked the speed and taken steps to compensate for any difference between the display on the speed controller and the actual speed of the belt.



Figure B-1: Set controller to the desired speed



Figure B-2: Verifying the speed of the treadmill belt requires accurate timing of belt revolutions. Note that the tape mark on the belt is approaching the mark on the treadmill deck. Each pass of the tape on the belt counts as one revolution. See text for details. It is essential that an assistant walks on the treadmill while the belt speed is being verified.

Treadmill Grade

The slope of the treadmill is expressed as percent grade, which is calculated by the vertical rise for a given amount of horizontal distance. Typically, we are interested in the amount of vertical “rise” for 1 meter of horizontal distance (or “run”). Therefore, for a 10% grade, the rise will be 10 cm over a run of 100 cm (or 1 m).

To check the calibration of the grade, the following equipment is required:

- An accurate measuring tape (a steel anthropometric tape is best)
- Marking tape (athletic tape or duct tape)
- Carpenter’s level

Follow the steps below:

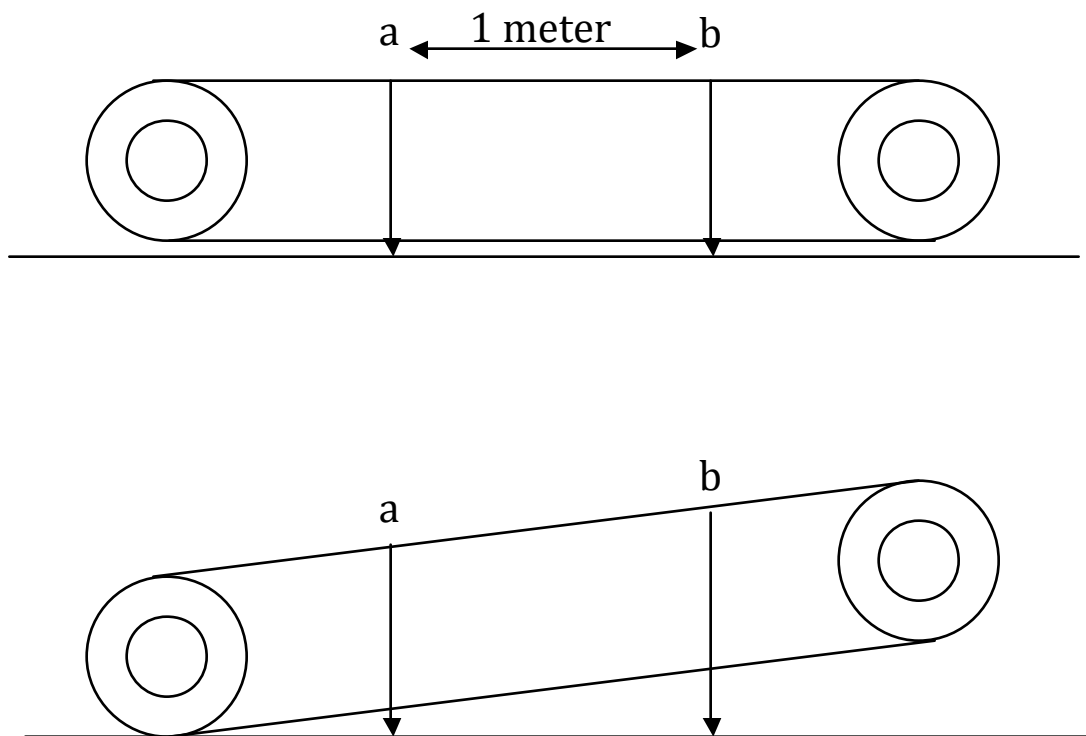
- a. Turn on the treadmill and set the grade display to “0”.
- b. Use a carpenter’s level to ensure that the treadmill is level fore-to-aft and side-to-side. Floors are not always level, so don’t be surprised to find that the treadmill is not level. Minor adjustments can be made by repositioning the treadmill, adjusting the leveling feet (if applicable) or by using shims (small pieces of linoleum flooring work well).
- c. Carefully measure a one meter distance along the side of the treadmill and mark with marking tape (see Figure G-3).
- d. Adjust the grade display to read 10%.
- e. Measure the distance between the floor and the treadmill deck at each end of the one meter distance marked out earlier (see Figure G-3).
- f. If the treadmill grade display is correct, the distance at the front mark (closer to the front of the treadmill) should be exactly 10 cm greater than the distance at the back mark. If so, the grade is correct and no further adjustments are required.
- g. If the distance is not correct, adjust the treadmill grade controller up or down as required until the difference is 10 cm. Whatever the display reads is actually equivalent to 10%. For example, you may find that when the display reads 11%, the actual grade is 10%. You can then make up a “correction table” with displayed and actual values to be used during testing.
- h. Bear in mind that by following the above steps, you have not calibrated the treadmill grade. However, you have checked the grade and taken steps to compensate for any difference between the display on the grade controller and the actual slope of the belt.

The diagram below illustrates the method of verifying the grade on the treadmill.

Figure B-3

Top panel: Turn the treadmill power on and set the grade controller to 0%. Use a carpenter's level to make sure that the treadmill is level both front-to-back and side-to-side. Measure off a distance of 1 m (distance between points "a" and "b" on the diagram). The distance from points "a" and "b" to the floor will be exactly the same if the treadmill is level (grade = 0%).


Bottom panel: The treadmill grade controller should be set to 10%. The distance between point "b" to the floor should be 10 cm greater than the distance between point "a" and the floor. Remember that percent slope is simply "rise" over "run", so a rise of 10 cm over a run of 100 cm equals 10%.




Appendix C

INSTRUCTIONS FOR LOAD CARRIAGE PACKING AND FITTING

Pack Frame Sizing

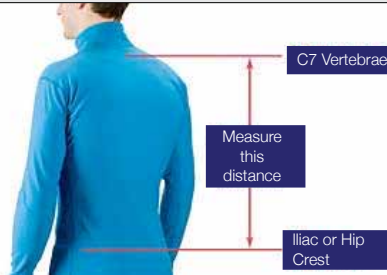
BORA 80 Male	Sizing Chart		
	Small	Medium	Tall
	40-48 cm	46-53 cm	51-58+ cm

BRIZA 75 Female	Sizing Chart		
	Small	Medium	Tall
	36-43 cm	41-48 cm	46-53+ cm



Measuring Back Length

- Back length if measured from the C7 vertebrae to the top of the iliac crest as shown in the diagram to the right.
- If a measurement falls between 2 sizes it is usually better to go with the smaller of the two sizes.
- It is possible to interchange different size shoulder strap and hipbelt components on many Arc'teryx Packs.



Hipbelt Sizing

- Locate the Iliac Crest, (the top of the most prominent point of the hipbone) and measure around the hips on this point.
- When the hipbelt is properly centered on the hip crest and tightened, the ends of the pads should extend at least 3 inches past the hip crest.



Shoulder Strap Adjustments

- The shoulder straps should contour smoothly and be in contact throughout the entire length of the shoulder strap padding.
- The adjustment buckle at the lower end of the shoulder strap should be positioned roughly even with the centre of the armpit.



Fine tuning: Hipbelt Angle Flare

- Adjust the angle at which the 2-inch webbing exits the front of the padding. Most women require slightly more flare than men (angle at which the belt sits on the hips).



Fine tuning: Load lifters



Range of acceptable load lifter strap angle

- The purpose of the load lifters is to slightly lift the shoulder straps from the shoulders, not to bring the pack in against the back.
- The ideal angle for the load lifter straps is 45 degrees; however, an angle of 30 to 60 degrees is quite acceptable.
- Minimum tension is required for each strap to do its job if the pack is correctly adjusted.

Fine tuning: Load stabilizer



Hipbelt stabilizer strap.

- Reduce movement of the load weight by maximally tightening the strap depicted above.

Organization of load weight

Materials:

1. ArcTeryx™ expedition pack; Bora 80 for men in small, regular or tall or Briza 75 for women in small, regular or tall
2. Six 3 kg concrete or clay bricks
3. Two wool blankets
4. Towels (approximately 10 small)
5. Small sealable bags of sand

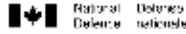
Technique:

1. Place a heavy rolled blanket in the sleeping bag compartment of the backpack leaving the separating zipper open. Stuff this compartment as full as possible.
2. Roll each brick in a towel and stack them in the main section of the backpack (two layers of three bricks)
3. Pack extra towels around the bricks for padding and stability.
4. Place another heavy rolled blanket at the top of the pack to fill the volume of the pack
5. Check the weight of the pack to ensure that the load is 25 kg.
 - a. If the pack is too light, fill a small sealable bag with some sand, etc. and pack it into the main section of the back pack. This method will allow small adjustments to bring the weight of the pack to exactly 25 kg.
 - b. If the pack is too heavy, remove a towel and then use the small sealable bag to adjust the weight to 25 kg.



Appendix D

SAR TECH APPLICANT PHYSICAL FITNESS TEST FORM



PROTECTED B (When completed)
PROTÉGÉ B (Une fois rempli)

SAR Tech Applicant Physical Fitness Test Évaluation de la condition physique des aspirants Tech SAR

Service particulars - Détails du service

A. Surname - Nom		Init.	SN - NM	Unit - Unité	UIC - CIU	Tel. - Tél.
Rank - Grade	Military occupation - Groupe professionnel militaire		MOS ID - ID SGPM	DOB - DDN (yyaa/mm/dj)	Age - Âge	Sex Sexe <input type="checkbox"/> M <input type="checkbox"/> F

Health appraisal - Évaluation de la santé

B. Questionnaire

This questionnaire is a screening device to identify personnel for whom fitness evaluation and physical activity might be inappropriate at this time. Yes
Oui No
Non

Le présent questionnaire est un outil visant à identifier les personnes pour lesquelles une évaluation de la condition physique et l'exercice sont actuellement contre-indiqués.

1. To the best of your knowledge do you have a medical condition or Medical Employment Limitation (MEL) which restricts you from participating in a maximal fitness evaluation or a progressive training program? Yes No

1. Au meilleur de votre connaissance souffrez-vous d'un trouble médical ou avez-vous des restrictions médicales d'emploi qui vous empêchent de participer à une évaluation maximale de la condition physique ou à un programme de conditionnement physique progressif? Oui Non

2. Is there any other reason you would need to talk to a physician prior to your fitness evaluation or training program? Yes No

2. Y a-t-il d'autres raisons pour lesquelles vous devriez consulter un médecin avant de participer à l'évaluation de la condition physique ou d'entreprendre un programme de conditionnement physique? Oui Non

C. Vital signs - Signes vitaux

Pre-evaluation heart rate: Pre-evaluation blood pressure: Greater than 150/100 mm Hg Less and equal than 150/100 mm Hg
Fréquence cardiaque avant l'évaluation: Tension artérielle avant l'évaluation: Au-delà de 150/100 mm Hg Moins et égal à 150/100 mm Hg

Your pre-evaluation blood pressure lies between 141/91 mm Hg and 150/100 mm Hg and is considered to be slightly above the normal range. It is recommended that you consult your M.O. Your pre-evaluation blood pressure lies between 141/91 mm Hg and 150/100 mm Hg. Cette valeur étant légèrement supérieure à la normale, il est recommandé de consulter votre médecin.

Date (yyaa/mm/dj) Signature of CF member (Signature du membre des FC)

Physical fitness evaluation - Évaluation de la condition physique

D. Cardio respiratory evaluation - Évaluation de la condition physique (Graded exercise test (GXT) - d'effort progressif complétée)

25 kg pack verified - Vérification du sac à dos de 25 kg: for fit - Ajustement for weight - Poids

1. Warm-up - Échauffement:

Grade - Inclinaison	2%	2%	4%	4%	6%	6%
Speed - Vitesse (km/h)	5.6	5.6	5.6	5.6	5.6	5.6
Speed - Vitesse (mph)	3.5	3.5	3.5	3.5	3.5	3.5
min	1	2	3	4	5	6

2. Steady-work rate phase complete - Phase d'effort continu complétée (15 min @ 5.6 km/h - 3.5 mph & 8%): Yes - Oui No - Non

3. Graded exercise test (GXT) Level completed - Phase d'effort progressif complétée:

Grade - Inclinaison	9%	10%	11%	12%	13%	14%	15%	15%	15%	15%	15%	15%	15%	15%
Speed - Vitesse (km/h)	5.6	5.6	5.6	5.6	5.6	5.6	6.4	7.2	8.0	8.8	9.6	10.4	11.2	11.2
Speed - Vitesse (mph)	3.5	3.5	3.5	3.5	3.5	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.0
min	22	23	24	25	26	27	28	29	30	31	32	33	34	35

4. Total time (Durée Totale) _____ (min:s) (Excluding cool down) - (Sans la récupération)

5. Cool - down - Récupération: 5 min (Backpack on - en portant le sac à dos)

6. Minimum standard - Norme minimale: 21 min (6 min warm-up & 15 min steady work phase @ 5.6 km/h-3.5 mph and 8% (échauffement de 6 min et 15 min d'effort continu à 5.6 km/h-3.5 mph, 8% d'inclinaison))

Pass - Réussite Fail - Échec

Retest allowed after 48 hrs if performance score is ≥ 19:43 min. Une reprise est permise après 48 heures si les résultats sont ≥ 19:43 min.

E. Transition (5min)

F. Equipment carry - Test de transport de matériel

BB - B : Barbell / Barre / DB - H : Dumbbell / Haltère / UL - SC : Unloaded / Sans charge

BB - B	UL - SC	DB - H	UL - SC	BB - B	UL - SC	DB - H	UL - SC	BB - B	DB - H	UL - SC	DB - H
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Equipment carry time - Temps écoulé pour le test de transport de matériel: _____ (min:sec)

Minimum standard - Norme minimale 6:30/390s: Pass - Réussite Fail - Échec

Retest allowed after 48 hrs if performance score is ≤ 6:55 min or 415s - Une reprise est permise après 48 heures si les résultats sont ≤ 6:55 min ou 415 s.

G. Transition (30min)

H. Swim test - Test de natation

Rubber AquamTM fin fit verified - Vérification de l'ajustement des palmes Rubber AquamTM: Swim time - Temps de natation: _____ (min:sec)

Minimum Standard - Norme minimale: 750 m in / en 20 min Pass - Réussite Fail - Échec

Retest allowed after 48 hrs if performance score is ≤ 20:37 min. - Une reprise est permise après 48 heures si les résultats sont ≤ 20:37 min.

I. Post vital signs - Signes vitaux

Heart rate - Fréquence cardiaque: _____ (must be ≤ 100 bts/min) - (doit être ≤ 100 b/min)

Blood pressure - Pression artérielle: _____ (must be ≤ 150/100 mmHg) - (doit être ≤ 150/100 mmHg)

K. Certification of evaluation - Certificat d'évaluation

Evaluator Signature of L'évaluateur

L. Certification of understanding - Attestation

I acknowledge the above fitness evaluation.
 J'atteste comprendre l'évaluation.

Date (yyaa/mm/dj) Signature of CF member (Signature du membre des FC)

DND 2756 (11-2011)

Design: Forms Management 613-957-6899
Conception: Gestion des formulaires 613-957-6906

PROTECTED B (When completed)
PROTÉGÉ B (Une fois rempli)

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COPIE 1 MÉD C

Canada
Page 1/5

Appendix E

SARTECH TREADMILL TEST WORKSHEET

SAR TechTreadmill Test Worksheet

Applicant Name: _____

Date: _____

Pack fit verified: Y N

Pack weight verified: Y N

Time (min)	Speed (mph/km/h)	Grade %	RPE	Comments
0-1	3.5/5.6	2		
1-2	3.5/5.6	2		
2-3	3.5/5.6	4		
3-4	3.5/5.6	4		
4-5	3.5/5.6	6		
5-6	3.5/5.6	6		End of warm-up
6-7	3.5/5.6	8		
7-8	3.5/5.6	8		
8-9	3.5/5.6	8		
9-10	3.5/5.6	8		
10-11	3.5/5.6	8		
11-12	3.5/5.6	8		
12-13	3.5/5.6	8		
13-14	3.5/5.6	8		
14-15	3.5/5.6	8		
15-16	3.5/5.6	8		
16-17	3.5/5.6	8		
17-18	3.5/5.6	8		
18-19	3.5/5.6	8		
19-20	3.5/5.6	8		

20-21	3.5/5.6	8		END OF STEADY-WORK-RATE
21-22	3.5/5.6	9		INCREASE INCLINE
22-23	3.5/5.6	10		
23-24	3.5/5.6	11		
24-25	3.5/5.6	12		
25-26	3.5/5.6	13		
26-27	3.5/5.6	14		
27-28	3.5/5.6	15		
28-29	4.0/6.4	15		INCREASE SPEED
29-30	4.5/7.2	15		
30-31	5.0/8	15		
31-32	5.5/8.8	15		
32-33	6.0/9.6	15		
33-34	6.5/10.4	15		
34-35	7.0/11.2	15		
COOL-DOWN				
0-1	2.5/4	0		
1-2	2.5/4	0		
2-3	2.5/4	0		
3-4	2.5/4	0		
4-5	2.5/4	0		

Total exercise time (not including cool-down): _____min:s

Evaluator signature: _____

Schematic of Equipment Carry Test Layout

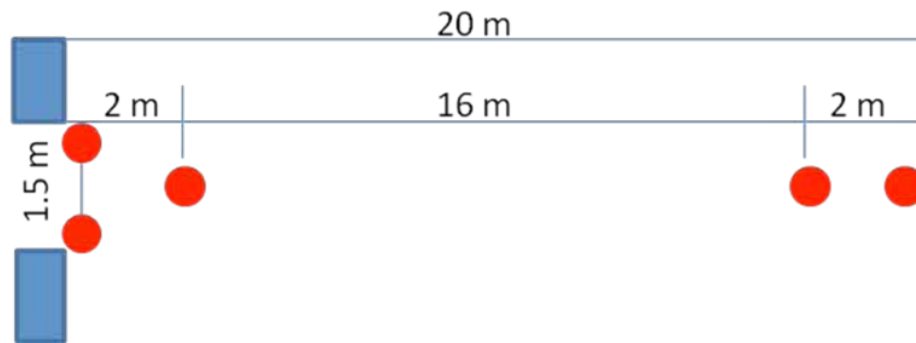


Figure F-1: Equipment schematic for Equipment Carry Test. Dots represent positioning cones. Rectangles represent mats for barbell and dumbbell setups.

Sample Timeline for Completion of Applicant Protocol

The following Testing Times (variable depending on applicant performance) and Transition Times (standardized time between tests) are an accurate reflection of the time requirement (approximately 2 hrs total) for one applicant to proceed through the test. Sample Timeline for Completion of Applicant Protocol

The following Testing Times (variable depending on applicant performance) and Transition Times (standardized time between tests) are an accurate reflection of the time requirement (approximately 2 hrs total) for one applicant to proceed through the test.

Testing Time (variable)	Transition Time (standardized)	Stage of Protocol	Event or Activity
Approx. 30 min		Check-in	Start SAR Tech testing form (Appendix D) Pre-test screening (e.g., HR, BP) Check backpack fit (Appendix C) Select fins Equipment Carry Test familiarization
Approx. 35 min		Treadmill Test	Complete treadmill test
	5 min	Transition to Equipment Carry Test	Evaluator walks with applicant to Equipment Carry Test area
Approx. 4-6 min		Equipment Carry Test	Complete the Equipment Carry Test
	30 min	Transition to Swim Test	Evaluator walks with applicant to Swim Test area
Approx. 10-20 min		Swim Test	Complete the Swim Test
5 min			Test review
		Test Completed	