

Appendix 3 to Annex D

C21

**MULTI-CALIBRE SNIPER
WEAPON SYSTEM**

**TECHNICAL EVALUATION PROCEDURES
FOR PHASES 2 AND 3**



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NOTICE

This documentation has been reviewed by the technical authority and does not contain controlled goods. Disclosure notices and handling instructions originally received with the document shall continue to apply.

1. **PURPOSE**

The purpose of this document is to detail the testing procedures that will be used during Phases 2 and 3 of the bid evaluation, to verify compliance of the MCSW Pre-Production Samples (PPSs) to selected Requirements from Annex C.

2. **PRELIMINARY NOTES**

- 2.1. Serial # must be captured for all three Pre-Production Samples (PPS) at the start of Phase 2 Part II evaluation.
- 2.2. Round count must be tracked for all three PPSs (A, B and C) throughout testing during Phase II Part II evaluation.
- 2.3. Primed casings, Blanks or Dummy Rounds may be used in situations where the test facility deems it unsafe to use live rounds.

3. **PHASE 2 PART II – LABORATORY AND RANGE TESTING**

3.1. **Test 1: Ammunition Compatibility/Safety Inspection**

3.1.1. Aim

DND will complete a complete safety inspection of the PPSs in both calibres to confirm compliance to Requirement 3.1.1.2 of Annex C, and to verify that the PPSs fire safely.

3.1.2. Procedure

- a. All three PPSs (A, B and C) will be inspected and gauged to verify that they are safe to fire in both calibres using maintenance gauges provided with the PPSs.
- b. Following the safety inspection, a CAF qualified marksman must fire 5 rounds of C181 cartridges in the 7.62 configuration, and 5 rounds of B408 cartridges in the .338 configuration with each PPS to confirm safe operation in both configurations.
- c. If any PPS is found to be unsafe to fire, the Bidder will be notified, and must resolve all issues within 72 hours at no cost to Canada.

3.1.3. Sentencing Criteria

For any PPS that is deemed unsafe to fire, and the bidder is not able to correct the deficiencies within the allotted time, the reasons will be recorded and the bid will be deemed non-compliant and given no further consideration.

3.2. **Test 2: Rifle Chamber**

3.2.1. Aim

Verify compliance to Requirement 3.1.1.12 of Annex C.

3.2.2. Procedure

- a. Using PPS (A) in the 7.62 configuration, insert an empty magazine into the Rifle slot.
- b. Insert a C181 Cartridge directly into the Rifle chamber, and cock the bolt.

3.2.3. Sentencing Criteria

A C181 round can be inserted directly into the Rifle chamber.

3.3. **Test 3: Safety Mechanism Operation**

3.3.1. Aim

Verify compliance to Requirements 3.1.5.2 and 3.1.5.4 of Annex C.

3.3.2. Procedure

- a. Using PPS (A) in the 7.62 configuration, insert a C181 Cartridge into the chamber and cock the bolt.
- b. While the Safety is in the "SAFE" position, attempt to pull the trigger.
- c. Retract the bolt, and cock the bolt to a point where it is not fully engaged.
- d. Place the Safety in the "FIRE" position, and pull the trigger.
- e. Repeat steps a. to d. in the .338 configuration, using B408 Cartridges.

3.3.3. Sentencing Criteria

The PPS does not fire while the Safety is in the "SAFE" position, in both configurations.

The bolt does not disengage upon a trigger pull, when the bolt is not fully engaged prior to pulling the trigger.

3.4. **Test 4: Calibre Change Duration**

3.4.1. Aim

Verify compliance to Requirement 3.5.7.1 of Annex C.

3.4.2. Procedure

- a. Use a timer to keep track of the duration to perform a calibre change.
- b. A CAF qualified marksman will perform this operation. The user may train on the Calibre Change procedure up to 10 times by following the instructions provided in the Operator's manual.
- c. Starting with PPS (A) in the 7.62 configuration, perform a Calibre change into the .338 configuration using tools provided with the PPS.

3.4.3. Sentencing Criteria

The duration to perform a calibre change is within the duration specified in Requirement 3.5.7.1 of Annex C.

3.5. **Test 5: Muzzle Brake and Suppressor Operation**

3.5.1. Aim

Verify compliance to Requirements 3.3.3.1, 3.3.3.10, 3.3.4.1 and 3.3.4.2 of Annex C.

3.5.2. Procedure

- a. Using PPS (A) in the 7.62 configuration, attach the Muzzle Brake as per the instructions in the Operator's Manual or other documentation provided by the Bidder.
- b. Fully Load the magazine with C181 Cartridges, and fire five rounds.
- c. Verify that the Muzzle Brake has not become loose.
- d. Attach the Suppressor as per the instructions in the Operator's Manual or other documentation provided by the Bidder.
- e. Replenish the magazine with five C181 Cartridges, and fire five rounds.
- f. Verify that the Suppressor has not become loose.
- g. Repeat steps a. to f. in the .338 Configuration using B408 Cartridges.

3.5.3. Sentencing Criteria

The PPS uses the same Muzzle Brake and Suppressor for both configurations, and is able to fire in both configurations.

The Muzzle Brake and Suppressor do not become loose after firing five rounds, in both configurations.

3.6. **Test 6: Precision And Accuracy Testing**

3.6.1. Aim

Verify Compliance to Requirements 3.5.1.1, 3.5.1.2, 3.5.6.1, 3.5.6.2, 3.5.6.3 and 3.5.6.4 of Annex C.

3.6.2. Setup

- a. PPS (B) will be used for Test 6.
- b. All precision and accuracy shooting will be conducted at a range of 100m.
- c. Paper or electronic targets will be used to measure precision.
- d. No precision shooting will occur at open ranges on days with sustained cross winds of 9.25 km/h or more.
- e. The PPS must only be fired when barrel temperature is below the manufacturer's maximum barrel temperature.

3.6.3. Procedure

- a. The PPS will be hand fired using the bi-pod and optical scope provided with the PPS, by a CAF qualified marksman, in the prone position.
- b. Start the firing sequence as detailed in Attachment 1 of Appendix 3.
- c. The PPS must be zeroed with the Suppressor installed before the shooting.
- d. After zeroing, conduct a precision test by firing 5 x 5 groupings of GM308M2 cartridges with the suppressor attached;
 - i. The shooter is permitted to fire one warming round prior to firing the first grouping.
 - ii. Prior to each grouping being fired, the Suppressor must be removed and re-attached.
 - iii. The shooter must maintain the same point of aim on the target for all shots.
 - iv. The shooter may reshoot up to 2 of the 5 groupings, if there was an anomaly (flyer) in the groupings compared to the other groupings by that weapon;
- e. The shooter will then remove the 7.62 barrel and re-install it (without removing the suppressor from the barrel), and shoot a grouping of 5 rounds using GM308M2 cartridges.
- f. Repeat steps c. to e. in the .338 configuration using GM338LM cartridges as detailed in Attachment 1 of Appendix 3.

3.6.4. Results

- a. Canada will calculate the Mean Radius and the MPI for each group, and record all measurements on the record sheet at Attachment 1 of Appendix 3.

3.6.5. Sentencing Criteria

- a. The Average Mean Radius for the 5 x 5 round groupings, in each calibre, must be less than or equal to 1.2cm, as calculated in Attachment 1 of Appendix 3.
- b. The MPI shift between groupings for the 5 x 5 groupings, in each calibre, must be less than or equal to 29.1mm, as calculated in Attachment 1 of Appendix 3.
- c. The MPI shift when the barrel is removed and re-attached, in each calibre, must be less than or equal to 29.1mm, as calculated in Attachment 1 of Appendix 3.
- d. All the rows in the table of Attachment 1 of Appendix 3 must be Compliant, where applicable.

3.7. **Test 7: Trigger Pull Force**

3.7.1. Aim

Verify Compliance to Requirement 3.1.4.3 of Annex C.

3.7.2. Procedure

- a. Using PPS (C), adjust trigger to lightest trigger pull (2nd stage) and measure pull force.
- b. Adjust trigger to heaviest trigger pull (2nd stage) and measure pull force.

3.7.3. Sentencing Criteria

The measured range of the trigger pull must meet the range specified in Requirement 3.1.4.3 of Annex C.

3.8. **Test 8: Low Temperature Operation**

3.8.1. Aim

Verify Compliance to Requirement 3.7.1 of Annex C.

3.8.2. Procedure

- a. Setup PPS (C) in the 7.62 configuration to be used with GM308M2 cartridges.
- b. Condition Magazines, cartridges, and Rifle with Suppressor attached to the temperature specified in Requirement 3.7.1 of Annex C, +/- 3°C, for 12-24 hours, using Manufacturer's recommended preparation procedure for low temperature operation.
- c. Test the PPS in accordance with AECTP 300, Method 303, Procedure II and III, C2 Cold.
- d. Fully Load magazine with cartridges at cold test temperature.
- e. Operate switches and adjustments.
- f. Remove and re-install Suppressor.
- g. Load and unload Magazine into Rifle.
- h. Load Magazine into Rifle and fire all cartridges in the magazine.
- i. Repeat steps b. to h. for the .338 configuration using GM338LM cartridges.

3.8.3. Sentencing Criteria

The PPS must remain serviceable, safe to operate, and complete the test with no more than 1 weapon related stoppage per calibre configuration.

3.9. **Test 9: High Temperature Operation**

3.9.1. Aim

Verify Compliance to Requirement 3.7.2 of Annex C.

3.9.2. Procedure

- a. Setup PPS (C) in the 7.62 configuration to be used with GM308M2 cartridges.
- b. Condition Magazines, cartridges, and Rifle with Suppressor attached to the temperature specified in Requirement 3.7.2 of Annex C, +/- 3°C, for 12-24 hours, using Manufacturer's recommended preparation procedure for high temperature operation.
- c. Test the PPS in accordance with AECTP 300, Method 302, High Temperature Operation (constant temperature), Procedure II.
- d. Fully Load magazine with cartridges at high test temperature.

- e. Operate switches and adjustments.
- f. Remove and re-install Suppressor.
- g. Load and unload Magazine into Rifle.
- h. Load Magazine into Rifle and fire all cartridges in the magazine.
- i. Repeat steps b. to h. for the .338 configuration using GM338LM cartridges.

3.9.3. Sentencing Criteria

The PPS must remain serviceable, safe to operate, and complete the test with no more than 1 weapon related stoppage per calibre configuration.

3.10. **Test 10: Interchangeability Test**

3.10.1. Aim

Verify Compliance to Requirement 3.6.1 of Annex C.

3.10.2. Procedure

- a. All three PPSs (A, B and C) will be tested, starting in the 7.62 configuration.
- b. The PPSs must be disassembled into the major subassemblies indicated below:

Subassembly Groups:

Group 1: Chassis (Stock);

Group 2: Bolt Assembly (w/Bolt Head);

Group 3: Trigger Mechanism;

Group 4: Suppressor/Muzzle Brake;

Group 5: Magazine;

Group 6: Barrel; and

Group 7: Firing Pin Assembly.

- c. The PPSs must be reassembled according to the weapon interchangeability schedule below:

Interchanged PPSs:

Interchanged PPS I: A1, A4, A7, B3, B6, C2, C5

Interchanged PPS II: A2, A5, B1, B4, B7, C3, C6

Interchanged PPS III: A3, A6, B2, B5, C1, C4, C7

Interchanged PPS I consists of Group 1 of PPS A, Group 4 of PPS A, Group 7 of PPS A, Group 3 of PPS B, Group 6 of PPS B, Group 2 of PPS C and Group 5 of PPS C.

- d. Load a full magazine and fire 5x GM308M2 cartridges in each interchanged PPS to confirm operation.
- e. Change the PPSs into the .338LM configuration.
- f. Load a full magazine and fire 5x GM338LM cartridges in each interchanged PPS to confirm operation.
- g. The Interchanged PPSs must be returned to the original state (PPSs A, B and C).

3.10.3. Sentencing Criteria

- a. Parts must be found to be interchangeable between the PPSs within the same calibre group.
- b. The interchanged PPSs must be serviceable and fire safely, in both calibre configurations.

3.11. **Test 11: Suppressor Sound Attenuation**

3.11.1. Aim

Verify Compliance to Requirement 3.3.3.2 of Annex C.

3.11.2. Procedure

- a. PPS (A) will be tested using C181 cartridges.
- b. PPS (B) will be tested using B408 cartridges.
- c. Fire each PPS without the Suppressor or muzzle brake installed, and measure the noise level at one meter horizontally perpendicular to the left of the muzzle, for a total of 5 rounds.
- d. Calculate the average noise level.
- e. Repeat steps c. and d. with the Suppressor installed.
- f. Calculate the sound attenuation (difference between the average noise levels with and without the Suppressor installed).

3.11.3. Sentencing Criteria

- a. For each PPS, the sound attenuation of the suppressor must be as specified in Requirement 3.3.3.2 of Annex C.

3.12. **Test 12: Safety Drop**

3.12.1. Aim

Verify Compliance to Requirement 3.5.2.1.

3.12.2. Setup

- a. PPS (C) will be used for this test.
- b. The Rifle is to be dropped with the magazine attached. Bi-pod, Scope, Sling, Muzzle Brake and Suppressor can be omitted for this test.
- c. The impact surface will consist of concrete covered with 2mm thick layer of rubber surfacing.

3.12.3. Procedure

- a. PPS (C) will be tested, starting in the 7.62 configuration.
- b. Adjust 2nd stage trigger pull weight to the lowest setting stated in requirement 3.1.4.3.
- c. Load a primed only cartridge into the Rifle chamber and cock the Rifle.
- d. Load magazine full with dummy rounds and insert into the Rifle.
- e. Place the safety mechanism in the "SAFE" position.
- f. The Rifle must be suspended 1.5 m above the impact surface, with the following orientations of the Rifle:
 - i. Rifle vertical, with Muzzle facing impact surface;
 - ii. Rifle vertical, with Butt stock facing impact surface;
 - iii. Rifle angled forward at 45° to impact surface;
 - iv. Rifle angled backwards at 45° to impact surface; and
 - v. Rifle in shooting position and parallel to impact surface.
- g. The Rifle must be dropped once for each orientation using a quick release mechanism onto the specified impact surface.
- h. The Rifle must be cocked after each drop with a new primed cartridge used for each drop.
- i. The Rifle can be caught after the drop to avoid damage.
- j. Repeat steps b. to i. with the safety mechanism in the "FIRE" position;
- k. Change the PPS calibre into the .338 configuration, and repeat steps b. to j.

3.12.4. Sentencing Criteria

The Rifle must not discharge the primed casing after each drop, in both configurations.

4. **PHASE 3 – ENDURANCE AND PRECISION TESTING**

4.1. **Test 13: Endurance And Precision Test**

4.1.1. Aim

Verify compliance to Requirements 3.5.4.2 and 3.5.5.2 of Annex C.

4.1.2. Setup

- a. PPS (B) will be used to undergo Test 12 in the .338LM Configuration.
- b. B408 cartridges will be used during endurance testing.
- c. GM338LM cartridges will be used during precision testing.
- d. All precision shooting will be conducted at a range of 100m.
- e. Paper or electronic targets will be used to measure precision.
- f. No precision shooting will occur at open ranges on days with sustained cross winds of 9.25 km/h or more.
- g. For the Precision test, the PPS will be hand fired using the bi-pod and optical scope provided with the PPS, by one or more CAF qualified marksman, in the prone position.
- h. Spare parts and consumables provided with the PPSs will be used in support of this test when necessary.
- i. Canada will perform all operator, preventative and corrective maintenance actions on the PPS for the duration of the test, in accordance with OEM Operator and Maintenance Manuals.
- j. The PPS must only be fired when barrel temperature is below the manufacturer's maximum barrel temperature.
- k. The endurance and precision testing must be completed using one Barrel, one Suppressor and one bolt Body/handle for the PPS.
- l. The Suppressor must be attached to the barrel while conducting endurance and precision testing.
- m. All weapon-related stoppages must be recorded in the "COMMENTS" column in Attachment 2 to Appendix 3 during the endurance and precision tests.

4.1.3. Procedure

- a. PPS (B) will be subjected to an Endurance test of 4,000 rounds in the .338LM configuration, including Precision tests, as per the sequence detailed in Attachment 2 to Appendix 3.
- b. Total rounds fired with PPS (B) during Phase 2 Part II will count towards the first Endurance sequence (Seq# 1a) in Attachment 2 to Appendix 3.

- c. Prior to a Precision test, the PPS must be zeroed using GM338LM cartridges.
- d. After zeroing, conduct a precision test by firing 5 x 5 groupings of GM338LM cartridges;
 - i. The shooter is permitted to fire one warming round prior to firing the first grouping; any warming rounds will count towards the endurance rounds in the next Endurance firing sequence.
 - ii. Prior to each grouping being fired, the Suppressor must be removed and re-attached.
 - iii. The shooter must maintain the same point of aim on the target for all shots.
 - iv. The shooter may reshoot up to 2 of the 5 groupings, if there was an anomaly (flyer) in the groupings compared to the other groupings by that weapon.
- e. Continue the firing sequence for the PPS as detailed in Attachment 2 to Appendix 3, until a total of 4,000 rounds have been reached.

4.1.4. Results

- a. Canada will calculate the Mean Radius for each group, and record all measurements on the record sheet at Attachment 2 to Appendix 3.

4.1.5. Sentencing Criteria

- a. The PPS must complete the endurance and precision tests with no more than five (5) weapon-related stoppages.
- b. For each row where the Precision test is conducted in Attachment 2 to Appendix 3, the Average Mean Radius for the 5 x 5 groupings must be less than or equal to 1.2cm.
- c. The Barrel, Suppressor, Bolt body/handle must not require replacement for the duration of the endurance and precision test for the PPS.