

APPENDIX 3 TO ANNEX E

C22 MODULAR PISTOL PROJECT

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

- 1.1. The purpose of this document is to detail the testing procedures that must be followed during Phases 2 and 3 of the bid evaluation, to verify compliance of the Bid Samples to selected Requirements from Annex C.

2. PRELIMINARY NOTES

- 2.1. Serial # must be recorded for all Bid Samples at the start of Phase 2 evaluation.
- 2.2. Round count must be tracked for all Bid Samples throughout testing during Phase 2 and Phase 3.
- 2.3. Primed casings, ~~blanks or dummy cartridges~~ may be used in situations where the test facility deems it unsafe to use live cartridges.
- 2.4. The Bid Samples must be uniquely labeled for identification purposes as follows:
 - 2.4.1. FF A to H.
 - 2.5. The Contracting Authority will schedule a 4 hour video conference to review the bidders Owner/Operator Manuals and Armourers Maintenance/Repair Manuals to ensure Canada understands how to properly maintain and repair the bid samples prior to the start of the Phase 2 evaluation.
 - 2.6. Canada will use the following lubricants to maintain the Bid Samples during Phase 2 and Phase 3 testing.
 - 2.6.1. Cleaner Lubricant Preservative (CLP) or other lubricants meeting the requirements of MIL-PRF-63460;
 - 2.6.2. Low Temperature lubricants meeting the requirements of MIL-PRF-14107 or MIL-L-14107; and
 - 2.6.3. Laboratory grade acetone.

3. PHASE 2 PART II – LABORATORY AND RANGE TESTING

3.1. Test 1: Ammunition Compatibility/Safety Inspection

3.1.1. Aim

- a. Canada must complete a complete safety inspection of all Bid Samples to confirm compliance to requirements 3.1.1 to 3.1.3 of Annex C, and verify that the Bid Samples fire safely.

3.1.2. Procedure

- a. All Bid Samples must be inspected and gauged to verify that they are safe to fire using maintenance gauges (headspace and barrel gauges) provided with the Bid Samples.
- b. Following the safety inspection, a CAF shooter must fire 5 rounds of ~~Canadian Mk 1 Ball 9 x 19 mm Cartridge~~ 9mm Ball Cdn Mk 1, NSN 1305-20-000-6943 with each Bid Sample to confirm safe operation.
- c. If any Bid Sample is found to be unsafe to fire, the Bidder must be notified, and must resolve all issues within ~~72 hours~~ 7 days at no cost to Canada.
- d. The Bidder must resolve all issues on site under the supervision of Canada.

3.1.3. Sentencing Criteria

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

3.2. Test 2: Safety Mechanism Operation

3.2.1. Aim

- a. Verify compliance to requirements ~~3.7.13~~, 3.9.1 and 3.9.2 of Annex C.

3.2.2. Procedure

- a. All Bid Samples must be used to confirm compliance.
- b. Insert a fully loaded magazine into the Bid Sample.
- c. Load a cartridge into the chamber by racking the slide.
- d. Fire 2 cartridge of ~~Canadian Mk 1 Ball 9 x 19 mm Cartridge 9mm Ball Cdn Mk 1, NSN 1305-20-000-6943~~ ammunition from the weapon then cease-fire.
- e. Remove the loaded magazine from the Bid Sample.
- f. Remove the live cartridge from the chamber by racking the slide rearward and return the slide to the forward position.
- g. Fully disassemble the Bid Sample following manufacturer's procedures for cleaning without pulling the trigger to fire the Bid Sample.

3.2.3. Sentencing Criteria

- a. Confirm that the shooter can both see and feel the loaded chamber indicator ~~on the top of the slide~~ when the Bid Sample is first loaded and following each shot.
- b. Confirm that the Bid Sample can be fully disassembled without having to pull the trigger to fire the Bid Sample following procedures detailed in the Owner/Operator Manuals or Armourers Maintenance/Repair Manuals.

3.3. **Test 3: Precision And Accuracy Testing**

3.3.1. Aim

- a. Verify precision requirement to 3.16.1 of Annex C.

3.3.2. Setup

- a. All Bid Samples must be used to confirm precision and accuracy requirements.
- b. All precision and accuracy shooting must be conducted ~~on an indoor 25 m range at 25 m.~~
- c. All precision and accuracy shooting must be from a ransom rest where the Bid Sample has been secured using grip inserts for the medium grip size provided by the bidder. Canada replaced the Star Knobs which tighten the ABC plate on the ransom rest with nuts to ensure identical torque settings can be applied for all groupings.
- d. A laser magnetically mounted in the bore will be used to align the bore onto the target prior to firing the first grouping. Aiming of each shot must be conducted using laser aiming device(s) attached to the ransom rest to ensure consistent and repeatable point of aim.

- e. Paper or electronic targets or both must be used to allow evaluators to measure precision.

3.3.3. Procedure

- a. Fire ~~20~~ 10 cartridges (~~Canadian Mk 1 Ball 9 x 19 mm ammunition Cartridge 9mm Ball Cdn Mk 1, NSN 1305-20-000-6943~~) to confirm that the Bid Sample is properly secured in the ransom rest and, that all ransom rest hardware remains tight ~~and the laser aiming devices are functional and allow the shooter to maintain a consistent point of aim.~~
- b. Conduct a precision test by firing 5 x 5 cartridge groupings using ~~Canadian Mk 1 Ball 9 x 19 mm~~ Cartridge 9mm Ball Cdn Mk 1, NSN 1305-20-000-6943;
 - i. The tester may reshoot up to 1 of the 5 groupings, if there was an anomaly (flyer) in the groupings compared to the other groupings by that weapon.
 - ii. The tester may reshoot any grouping where the precision achieved can be attributed to the fault of the test set-up or ammunition.

3.3.4. Results

- a. Canada must calculate the precision and the MPI for each group, and record all measurements on the record sheet at Attachment 1 to Appendix 3 to Annex E. Targets used for precision shooting must be labeled and retained for record purposes.

3.3.5. Sentencing Criteria

- a. The Maximum Extreme Spread for each of the 5 round groupings must be less than or equal to 12 cm.
- b. All the rows in the table of Attachment 1 of Appendix 3 must be Compliant, where applicable.

3.4. **Test 4: Trigger Pull Force**

3.4.1. Aim

- a. Verify compliance to requirements ~~3.7.6, 3.7.7 and 3.7.9~~ 3.7.6 and 3.7.9 of Annex C.

3.4.2. Procedure

- a. All Bid Samples must be used to confirm that the trigger pull force are within specification.
- b. The trigger pull force must be measured using a system of measurement similar to a National Rifle Association (NRA) Official Universal Trigger Weight System (NRA Weights).

- c. The Bid Sample must be mounted in a fixture with the barrel vertical and the muzzle up.
- d. With the Bid Sample unloaded and an empty magazine, apply loads to trigger so that the load is parallel to the barrel to within 5°.
- e. The trigger pull force must be measured in the following manner:
 - i. Ready the Bid Sample;
 - ii. Apply a 5.5 lb load to the trigger;
 - iii. Increase the load in 1/16 lb increments until 7.0 lbs has been applied or until the Bid Sample fires on the empty chamber;
 - iv. When adding a new increment of weight, cycle the Bid Sample to reset all components and mechanisms;
 - v. Record the load that causes the striker to release; and
 - vi. To expedite the measurement, coarse measurement may be done using an electronic measurement device to determine the trigger pull force, then confirm the measurement with the NRA weights. If this approach is used, begin with a load at least 1/2 lb less than the electronically determined trigger pull weight and continue the measurement in accordance with 3.4.2.e.iii through 3.4.2.e.v.
- f. Conduct this measurement 10 times to determine compliance to requirements at Annex C paragraphs 3.7.6, ~~3.7.7~~ and 3.7.9.

3.4.3. Sentencing Criteria

- a. The trigger pull measurement for each trigger pull must meet the range specified in Requirement 3.7.6 of Annex C.
- b. The trigger pull weight for each Bid Sample must be consistent with a maximum deviation of ~~+/-~~ 0.2 kgs across the 10 trigger pull measurements.
- ~~c. The trigger must reset to its normal forward most position upon release after partial or complete trigger pull.~~

3.5. **Test 5: Low Temperature Operation**

3.5.1. Aim

- a. Verify ~~compliance to requirement 3.20.2 of Annex C~~ low temperature operation.

3.5.2. Procedure

- a. Perform this test on FF A and FF B.

- b. FF A and FF B must be cleaned and lubricated using lubricants at paragraph 2.6 following manufacturer's recommended preparation procedure for low temperature operation as detailed in the Owner/Operator Manuals or Armourers Maintenance/Repair Manuals. Condition Magazines, cartridges, and Bid Samples to the temperature specified in Requirement 3.20.2 of Annex C, +/- 3°C, for 12-24 hours, using Manufacturer's recommended preparation procedure for low temperature operation.
- c. FF A and FF B must be loaded with a round chambered and a magazine loaded with 14 rounds of Cartridge 9mm Ball Cdn Mk 1, NSN 1305-20-000-6943 before initiation of testing. Test the Bid Sample in accordance with AECTP 300, Method 303, Low Temperature, Procedure IIa, Operation Test (Constant Temperature) and Procedure III, Manipulation Test
- d. Condition magazines, cartridges, and Bid Samples to -30 deg C, +/- 3°C, for 8 hours in an environmental chamber. Load 2 magazines for each Bid Sample with 10 cartridges conditioned at 3.5.2.b
- e. FF A and FF B must fire 15 rounds of ammunition upon conclusion of low temperature conditioning. Operate switches and adjustments.
- f. Firing must begin within one minute of removal from the environmental chamber. Load the Bid Sample with the first magazine and fire 10 cartridges of Canadian Mk 1 Ball 9 x 19 mm ammunition.
- g. Firing must be completed within three minutes of removal from the environmental chamber. Remove the first magazine and load the Bid Sample with the second magazine and fire 10 cartridges of Canadian Mk 1 Ball 9 x 19 mm ammunition.

3.5.3. Sentencing Criteria

- a. The Bid Samples must remain serviceable, safe to operate, and complete the test with no more than one Class 1 Stoppage as described in Annex C.

3.6. **Test 6: High Temperature Operation**

3.6.1. Aim

- a. Verify ~~compliance to requirement 3.20.3 of Annex C~~ high temperature operation.

3.6.2. Procedure

- a. Perform this test on FF C and FF D.

- b. FF C and FF D must be cleaned and lubricated using lubricants at paragraph 2.6 following manufacturer's recommended preparation procedure for high temperature operation in the Owner/Operator Manuals or Armourers Maintenance/Repair Manuals. Condition Magazines, cartridges, and Bid Samples to the temperature specified in Requirement 3.20.3 of Annex C, +/- 3°C, for 12-24 hours, using Manufacturer's recommended preparation procedure for high temperature operation.
- c. FF C and FF D must be loaded with a round chambered and a magazine loaded with 14 rounds of Cartridge 9mm Ball Cdn Mk 1, NSN 1305-20-000-6943 before initiation of testing. Test the Bid Sample in accordance with AECTP 300, Method 302, Procedure II High Temperature Operation (Constant Temperature).
- d. Condition magazines, cartridges, and Bid Samples to +40 deg C, +/- 3°C, for 8 hours in an environmental chamber. Load 2 magazines for each Bid Sample with 10 cartridges conditioned at 3.6.2.b.
- e. FF C and FF D must fire 15 rounds of ammunition upon conclusion of high temperature conditioning. Operate switches and adjustments.
- f. Firing must begin within one minute of removal from the environmental chamber. Load the Bid Sample with the first magazine and fire 10 cartridges of Canadian Mk 1 Ball 9 x 19 mm ammunition.
- g. Firing must be completed within three minutes of removal from the environmental chamber. Remove the first magazine and load the Bid Sample with the second magazine and fire 10 cartridges of Canadian Mk 1 Ball 9 x 19 mm ammunition.

3.6.3. Sentencing Criteria

- a. The Bid Sample must remain serviceable, safe to operate, and complete the test with no more than one Class 1 Stoppage as described in Annex C.

3.7. **Test 7: Interchangeability Test**

3.7.1. Aim

- a. Verify compliance to requirement 3.19.1 of Annex C for (1) New Weapon only.

3.7.2. Procedure

- a. Perform this test using all Bid Samples.
- b. The Bid Samples must be disassembled into the major subassembly groups and labeled or bagged and labeled in the case of smaller components that cannot be labeled for identification purposes (eg FF A G1, FF A G2...FF B G1, FF B G2...ending with FF H G8):

Subassembly Groups:

- Group 1: Magazine;
- Group 2: Trigger Group;
- Group 3: Barrel;
- Group 4: Slide;
- Group 5: Recoil Assembly (incl Guide and Spring);
- Group 6: Grip Frame/Module;
- Group 7: Striker Assembly; and
- Group 8: Magazine Catch (inc Spring, catch and stop) Assembly and Takedown Lever.

- c. The Bid Samples must be reassembled according to the weapon interchangeability chart at Table 1:

Component/Assembly	Interchanged Weapon Letter							
	A	B	C	D	E	F	G	H
Group 1	1	8	7	6	5	4	3	2
Group 2	2	1	8	7	6	5	4	3
Group 3	3	2	1	8	7	6	5	4
Group 4	4	3	2	1	8	7	6	5
Group 5	5	4	3	2	1	8	7	6
Group 6	6	5	4	3	2	1	8	7
Group 7	7	6	5	4	3	2	1	8
Group 8	8	7	6	5	4	3	2	1

Table 1: Interchangeability Chart

- d. Load a full magazine and fire 5 x cartridges (~~Canadian Mk 1 Ball 9 x 19 mm ammunition~~ Cartridge 9mm Ball Cdn Mk 1, NSN 1305-20-000-6943) from each interchanged Bid Sample to confirm operation.
- e. The Interchanged Bid Samples must be returned to the original state (ie FF A to FF H).

3.7.3. Sentencing Criteria

- a. All major subassembly groups must be found to be interchangeable between the Bid Samples.
- b. The interchanged Bid Samples must be serviceable and fire safely.

3.8. **Test 8: 1.5 Meter Safety Drop**

3.8.1. Aim

- a. Verify compliance to all requirements detailed in section 3.21 1.5 Meter Safety Drop.

3.8.2. Setup

- a. Perform this test on FF-~~AE~~.

- b. Each drop test must be performed with a fully loaded magazine.

3.8.3. Procedure

- a. Test the Bid Sample in accordance with TOP 3-2-045A, Method 4.8.2, 1.5 Meter (5 Feet) Drop.
- b. Prior to each drop insert a fully loaded magazine with primed cartridges into the Bid Sample and cycle the action to load the Bid Sample with the primed cartridge.
- c. The Bid Sample must be suspended 1.5 m above the impact surface, with the following orientations of the Bid Sample:
 - i. Muzzle Down: Muzzle must be the closest part of the pistol to the concrete floor;
 - ii. Muzzle Up: Muzzle must be the farthest part of the pistol to the concrete floor;
 - iii. Slide Up (Horizontal): Top of the side must be the farthest part of the pistol to the concrete floor;
 - iv. Slide Down (Horizontal): Top of the side must be the closest part of the pistol to the concrete floor;
 - v. Right Side (Horizontal): Right side of the pistol must be oriented as the closest part of the pistol to the concrete floor; and
 - vi. Left Side (Horizontal): Left side of the pistol must be oriented as the closest part of the pistol to the concrete
- d. The Bid Sample must be dropped from orientation i. using a quick release mechanism onto the specified impact surface.
- e. The loaded primed cartridge is to be removed post drop for inspection.
- f. The Bid Sample is to be loaded with a primed cartridge which is to be fired to confirm that the Bid Sample remains functional.
- g. The Bid Sample must be reloaded IAW 3.98.3 b and the remaining drop orientation in step c are to be completed in order following steps d to ef.
- h. The Bid Sample can be caught after the drop to avoid secondary damage.

3.8.4. Sentencing Criteria

- a. Inspect each primed cartridge following each drop to confirm that it was not discharged and that there are no visible indication of impact to the primer.
- b. The Bid Sample must remain serviceable, safe to operate, and fire a primed cartridge following each drop orientation.

4. PHASE 3 – ENDURANCE AND PRECISION TESTING

4.1. Test 9: Endurance and Precision Test

4.1.1. Aim

- a. Verify compliance to all requirements detailed in section 3.15 Performance and requirement 3.16.1 of Annex C.

4.1.2. Setup

- a. Perform this test on FF-~~EF~~.
- b. All precision and accuracy shooting must be conducted ~~on a 25 m~~ range at 25 m.
- c. All precision shooting must be from a ransom rest where the Bid Sample has been secured using grip inserts provided by the bidder. Canada replaced the Star Knobs which tighten the ABC plate on the ransom rest with nuts to ensure identical torque settings can be applied for all groupings.
- d. A laser magnetically mounted in the bore will be used to align the bore onto the target prior to firing the first grouping. Aiming of each shot must be conducted using laser aiming device attached to the ransom rest to ensure consistent and repeatable point of aim.
- e. Paper or electronic targets or both must be used to allow evaluators to measure precision.
- f. All endurance shooting must be performed by a shooter or from a ransom rest in the case of settling rounds fired prior to grouping serials.
- g. Spare parts and consumables provided with the Bid Samples must be used in support of this test when necessary.
- h. Canada must perform all operator, preventative and corrective maintenance actions on the Bid Sample for the duration of the test, in accordance with ~~OEM Operator and Maintenance Manuals~~ the Owner/Operator Manuals and Armourers Maintenance/Repair Manuals.
- i. The Bid Sample must only be fired when barrel temperature is below the manufacturer's maximum barrel temperature if a maximum barrel temperature is stated in the Owner/Operator Manuals or Armourers Maintenance/Repair Manuals.

- j. The endurance and precision testing must be completed without the replacement of the trigger group or slide assembly (less springs that are subject to defined maintenance/replacement schedules) or barrel
~~The endurance and precision testing must be completed without the replacement of the trigger group assembly, the slide assembly or the barrel.~~
- k. All weapon-related stoppages must be recorded in the "Comments (Failures)" column in Attachment 2 to Appendix 3 during the endurance and precision tests.

4.1.3. Procedure

- a. Bid Sample must be subjected to an Endurance test of 10,000 rounds as per the sequence detailed in Attachment 2 to Appendix 3 to Annex E.
- b. Total rounds fired during Phase 2 Part II must count towards the first Endurance sequence (Seq # 1a) in Attachment 2 to Appendix 3 to Annex E.
- c. Precision testing must be performed following procedures in Test 3 ~~para 3.3.3.b.~~
- d. Canada will clear all Class 1 and 2 stoppages and complete all Class 3 repairs following procedures in the Owner/Operator Manuals or Armourers Maintenance/Repair Manuals using consumable and repair parts and maintenance tooling provided by the bidder IAW Annex F. Canada may consult the bidder for advice and assistance that may be requires at Canada's sole discretion.
- e. FF F must be cleaned and lubricated using lubricants at paragraph 2.6 following manufacturer's recommended procedure in the Owner/Operator Manuals or Armourers Maintenance/Repair Manuals.

4.1.4. Results

- a. Canada must calculate the precision and the MPI for each group, and record all measurements on the record sheet at Attachment 2 to Appendix 3 to Annex E. Targets used for precision shooting must be labeled and retained for record purposes.

4.1.5. Sentencing Criteria

- a. The Maximum Extreme Spread for each of the 5 round groupings must be less than or equal to 12 cm.
- b. All the rows in the table of Attachment 2 of Appendix 3 must be Compliant, where applicable.

c. ~~The Bid Sample must not experience more than 4 Class 1 stoppages and no more than 1 Class 2 stoppages as defined in Annex C. Ammunition related stoppages are not attributed to the Bid Sample. The Bid Sample must experience no more than 8 x Class 1 stoppages, no more than 8 x Class 2 stoppages and no more than 4 x Class 3 stoppages as defined in Annex C. Ammunition related stoppages and ransom rest stoppages are not attributed to the Bid Sample.~~