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315 WEST RING ROAD
ELIZABETHTOWN, KY 42701

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M/710 Design Acceptance Test (DAT #1)

Test Plan

Model 710, New Centerfire Rifle

Revision # 2

03/31/00

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M/710 Design Acceptance #1 Test Plan

Approvals

A meeting was held on 7 March 2000 to discuss the scheduled M/710 DAT #1 test. The purpose of this meeting was to define the test requirements for this Design Acceptance Test (DAT) scheduled to start in early March. During this meeting the test plan was reviewed step by step to determine what additional testing might be required to adequately test the product. This document lists the tests and procedures that have been agreed to by all meeting participants. Successful completion of these tests will qualify the Model 710 for Trial & Pilot evaluation.

The following people have reviewed this document and agree to this DAT #1 test protocol.

Dale Danner _____
Research & Technology

Scott Franz / Jim Snedeker _____
Test & Measurement Lab

_____

Danny Diaz / Michael Keeney _____
Firearms Development

_____

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M/710 CENTERFIRE RIFLE

DESIGN ACCEPTANCE TEST PLAN - DAT #1

Introduction:

This test is designed with the assumption that not all of the sample test guns will be available at the same start time. The initial test sample of 15 rifles will be delivered the second week in March (2000) and will be followed by an additional sample of 30-35 rifles delivered for test at a later time. Both sample sets are considered to be integral parts of the complete Design Acceptance Test Procedure.

The samples have been divided based on current estimates of sample delivery as follows. Rifles designated A1 to A15 are the first samples expected to be submitted for test on or about the 13th of March (2000) with a second group expected on about mid-May (2000) which will be designated as B1 to B30.

When successfully completing the proof test series, a 200 round per gun jack-function test is planned for the initial 15 rifle sample to quickly determine the probable malfunction rate and determine if the expenditure of further amounts of ammunition is justified by the performance of the product. Upon passing the jack-function test, the rifles will be subjected to 100 rounds per rifle test (twenty-five rounds each of four different bullet types). These rifles will be shot from the shoulder (standing position) in the long range to confirm that the rifles function as intended when shot in the same manner as expected to be used by the customer.

Various inspection points and safety reviews are scheduled into the test program.

Note that samples A1 through A15 will be shot using 3 aluminum stocks that will preclude some tests such as recoil and drop testing. The samples scheduled for delivery in mid-May will have the synthetic stocks designed for this model. Those tests requiring the use of the final design stock will be run at that time. The Intentional Abuse tests are scheduled during Phase I, (for rifles A1-A15) but will be tested without the stocks in place. Although not currently scheduled these tests may be repeated during Phase II if necessary.

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When additional samples are submitted in mid-May, the test rifles will again, with a few exceptions, be subjected to the full range of standard rifle test procedures, comprised of Measurements, Accuracy, Function & Endurance testing, Environmental and Abusive testing.

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Initial Tests, Measurements and Inspections:

HEADSPACE AND PROOF - TLW0010A THROUGH TLW0010C:

TLW0010A – Measure Headspace

All test samples will be measured for headspace before being tested in either the jack or shot from the shoulder. The chamber, bolt face & locking lugs on both the bolt and the receiver will be inspected for the presence of dirt or debris. If dirt or debris that could affect headspace measurement is present then these areas of the firearm will be cleaned before using the gauges.

Method:

- The graduated headspace gauges based on Remington chamber dimensions (Ref.: Remington Gauge Drawing # 41560 ...A, ...B, ...C, & ...D) will be used and the headspace measurements will be recorded to the nearest .001" increment as indicated by the gauge. The .30-06 Remington chamber drawing LB-153 will be used for chamber dimensions and LB-154 will be used for chamber drawings for the .270 caliber.
- The headspace measurements will be recorded to the nearest .001" increment as indicated by the gauge.
- If the measurement is taken at the start of the test then headspace should be less than Min. + .005".
- As the test progresses, headspace will be taken at each "Safety Inspection" scheduled in the plan and, in addition, at each "Clean & Inspect" activity scheduled by the plan.
- The readings for each firearm will be recorded on the "Daily Test Data Sheet" to be kept with each firearm in the accompanying data packet.
- For any firearms where the headspace is changing at each inspection point the firearm will be withdrawn from test and examined for the cause.
- In no case will any firearm in the test program be allowed to continue test if the headspace exceeds Min. + .009".

Data Required:

- Rifle serial number

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- Headspace measurements for each sample

TLW0010B – Proof Test

All test sample firearms will be subjected to a standard .30-06 (or .270) Factory Proof Load, shot in the blow-up room using a lanyard. This procedure will be completed before the firearm can be used for any additional firing tests.

Before proof testing the firearm should be inspected for:

- Barrel Obstructions
- Bore and chamber are free of grease or oil and other debris.

For fully assembled firearms, one definitive proof cartridge should be fired in each firearm. Definitive proof ammunition is to be used in accordance with the "Handling of Ammunition" procedure defined in the SAAMI Technical Committee Manual, Volume III, Section II, Page 2410 as follows.

a. "Cartridges to be tested should be placed in a vertical position with primer end down in a recessed holding block."

b. "...a cartridge should be lifted vertically from the block. It should be rotated slowly, end over end, in a vertical plane through 360° pausing momentarily when the powder is at the bullet end and again when the powder is at the primer end."

c. "The cartridge is then rotated slowly, a minimum amount to enter chamber, keeping primer end in lowest possible position until inserted gently and carefully into the chamber."

d. "The cartridge should be seated in the chamber as far as practicable with the fingers. The bolt or breech mechanism should be closed gently in order not to disturb the position of the powder in the cartridge case. The object of this method of handling cartridges is to position the propellant powder at the primer end of the cartridge case by permitting it to fall gently against the primer and while rotating the case."

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Note that these procedures for proof testing were developed to consistently position the propellant thereby providing greater consistency of proof pressures. Failure to follow this procedure during the definitive proof testing of each chamber of the firearm could result in pressure levels significantly below the minimum proof pressure specification as determined for the cartridge.

Any firearms components, such as bolts, bolt heads, receivers including chambers, etc. which were previously subjected to proof testing and, which subsequently, have any proof sensitive components changed, altered, or substituted, should be re-proofed.

Method:

- Record headspace before proof testing *(see previous procedure "TLW0010A – Measure Headspace")*
- After firing the proof round, the firearm will be carefully examined to determine if any damage to the product has occurred due to exposure to the proof pressure. This inspection includes:
- Visual inspection for damage,
  - damaged receiver or bolt, especially the locking lugs on the bolt or the receiver
  - bulged chamber or bore; split, cracked or otherwise damaged barrel,
  - broken stock,
  - any other part subjected to the proofing stress, which can be visually examined for damage.
  - Any "suspicious" areas should be submitted to magna-flux inspection before proceeding.
- Magna-Flux all bolt heads after Proof.
- The fired proof cartridge should be examined to determine that no firearm fault has introduced cartridge failure, such as:
  - Expanded cartridge head.
  - Excessive roughness, rings, or bulging, which would affect extraction.
  - Beginning separation or material stretching in front of the case head indicating excessive headspace or excessive pressure as stated above.
  - Any cartridge case failure indicating a firearm fault.
- In addition, the spent proof round should be examined for the presence of unusual deformation, split case or split head, and for any evidence of a pierced primer. Any of these conditions may be indicative that high-pressure gases may have vented into the action where other damage to components may have occurred.

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- Take note of any indication of significant gas leakage, if present, it may indicate that the firearm was not subjected to full proof pressures and the proof test would then be invalid and would require re-proofing.
- A firearm is only properly proofed when the cartridge has been fired without evidence of significant gas leakage.
- Save the spent proof case in a Zip-Lock plastic bag and label and place in the data packet for further reference. If any parts were broken or otherwise damaged, place these parts in the same bag as the proof case and label. Place a label on the firearm and withdraw the firearm from the test.
- Each sample firearms' headspace *(see following procedure "TLW0010C – Re-Measure Headspace after Proof")* must remain in range from min. to min. +.007" after proofing, with no individual firearm's headspace to grow more than .002" after firing one proof round. After successful proofing, the right lug on the bolt head will be marked in the center (i.e. center of top to bottom and center or front to rear) of the lug with a center punch to indicate that is has been proofed.
- After proof, if the firearm passes the inspection and headspace has been measured (*see next section of test plan*), stamp the firearm on the barrel with an authorized Remington proof stamp. Locate the proof mark on the right rear of the barrel in the specified location for the Remington proof stamp. **DO NOT STAMP** if the headspace exceeds Min + .009".
- Because of the higher pressures involved in shooting proof cartridges, adequate precautions, both mechanical and procedural, should be taken to protect personnel performing the firearms proof testing. To this end, the firearm should be securely mounted, completely shielded from the operator and firing accomplished by a remote control method.

Data Required:

- Rifle serial number
- Record and note any headspace growth and the corresponding round level.
- Record significant gas leakage and/or firearm damage.
- Record any case damage or other ammunition related malfunctions.
- Record any damage to the firearm resulting from the proof test. Document with Photographs is necessary.

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TLW0010C – Re-Measure Headspace after Proof

All test samples will be re-measured for headspace after proof and before being tested in either the jack or shot from the shoulder. The chamber, bolt face & locking block/locking notch will be inspected for the presence of dirt or debris. If dirt or debris that could affect headspace measurement is present then these areas of the firearm will be thoroughly cleaned before using the gauges.

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Method:

- The graduated headspace gauges based on Remington chamber dimensions (Ref.: Remington Gauge Drawing # 41560 ...A (min.), ...B (+.005), ...C (+.007), & ...D (+.009)) will again be used and the headspace measurements will be recorded to the nearest .001" increment as indicated by the gauge. The .30-06 Remington chamber drawing LB-153 will be used for chamber dimensions and LB-154 will be used for chamber drawings for the .270 caliber.
- The headspace measurement taken prior to the proof test should be less than min. + .005". If, after proof, the growth of the headspace is more than + .002" from the pre-proof condition, then stop and review the results with the test manager before continuing to the next phase of the test.
- In no case should the measurement for headspace after initial proof test be greater than min.+007" for a new firearm.
- If at any time during the test program the headspace exceeds a maximum of Min. + .009" do not continue to fire the rifle, tag the gun with a label reading "Do Not Shoot This Firearm – Exceeds Maximum Allowable Headspace" and return the firearm to the Test Manager for disposition.

Data Required:

- Rifle serial number
- Record and note any headspace growth and round level.

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FORCES – TLW0010D THROUGH TLW0010K:

TLW0010D - Measure Firing Pin Indent:

The firing pin indent will be measured for each of the sample rifles using SAAMI qualified copper crushers. The average of three trials per sample rifle will be calculated. The Average of three indents must be equal to or greater than 0.017".

Method:

- Using copper crushers, "burnish" both ends of the crusher slug by gently rubbing both ends on the granite base of the dial indicator stand (use outside edge of the plate.)
- Place the copper crusher in a .30-06 / .270-crusher holder, place the crusher holder on the base of the dial indicator and zero the dial indicator with the point of the indicator in the approximate center of the crusher.
- Carefully, with the gun held so that the muzzle is pointed down toward the floor, gently insert the crusher holder into the chamber, being sure that the extractor clearance cut on the crusher is properly oriented relative to the extractor position.
- While maintaining a firm hold on the bolt handle, gently, and slowly ease the bolt forward to the full forward position and then rotate down being sure that the action locks fully.
- Holding the firearm in a horizontal and level position, and pointing the firearm in a safe direction, pull the trigger until the firing pin releases.
- Carefully open the action and remove the crusher holder, being careful not to drop the copper crusher.
- Leave the crusher in the holder and place under the dial indicator.
- Move the crusher holder so that the point of the dial indicator finds the deepest portion of the firing pin indent.
- Record the dial indicator reading to the nearest .001".
- Repeat procedure two more times and record the dial indicator readings using a new copper crusher for each trial.
- Each firearm sample should have three readings that will be averaged.
- Record all three readings for the data file.

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Data Required:

- Rifle serial number
- Each of the three trial indents
- The calculated average indent by rifle.

TLW0010E - Measure Sear/Trigger Engagement and Sear Lift:

The Sear/Trigger Engagement will be measured. The amount of engagement must be measured between .020" and .025" measured with the bolt in the fully closed and locked position.

Method for measuring Sear/Trigger Engagement:

- The 30" Optical comparator will be used to measure the engagement at 50X magnification.
- With the barreled action held firmly in position, the barreled action will be aligned such that the action is held perpendicular to the lens in both the horizontal and vertical planes.
- With action closed and locked, the safety in the "fire" position, measure the amount of overlap between the sear and the trigger.

Method for measuring Sear Lift:

- Remove the bolt from the action.
- Place the Safety in the "Off-Safe" (i.e. "Fire") position.
- With the action held firmly in a horizontal position pre-load the sear in the downward position using a small screwdriver and with a dial indicator zeroed on the top of the sear, gently rotate the Safety to the "On-Safe" position.
- Record the amount of vertical movement of the sear.
- Minimum sear lift is 0.006" and maximum sear lift is 0.018"

Data Required:

- Rifle Serial number
- Record Sear/Trigger Engagement
- Record Sear Lift

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TLW0010F - Measure Trigger Pull Forces:

Trigger pull (force and displacement required to manually operate the trigger)

Method:

- Trigger pull is to be performed to the SAAMI standard; horizontal pull at the center of the finger radius of the trigger using the Test Lab apparatus designed for taking this measurement.
- Use the 1-10 lb. Chatillion Force digital force gauge.
- Force is measured parallel to the bore with the stock assembled to the action.
- Three pulls are to be taken on each sample rifle and the results averaged.
- The average force for the three trials must be between 3.5 lb. and 5.0 lb.

Data Required:

- Rifle Serial number
- All three data points for each trial rifle.
- The average of the three measurements for each sample rifle.

TLW0010G - Measure Safe On/Off Forces:

Using the Chatillion Digital force gauge and the wooden holding fixture used to take trigger pull readings, push the Safe to the "Safe Off" position on each test sample. Complete three trials. Record all three readings for each firearm. Repeat the test, this time pushing the Safe to the "Safe On" position on each trial. Record all three readings. Average each of the three sets of readings in each direction for each test sample. These measurements are for information only. A minimum of 1 lb. force in either direction will be assumed as the reference criteria.

Method:

- Use trigger pull apparatus to hold the rifle for this test.
- Use the Chatillion Digital Force gauge (0-10 lb. range) with the disc point or the "v" shaped point. Use the same tip on all subsequent trials.
- Make three trials in each direction for each sample.

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- Average the results of each of the three trials.
- For Phase II rifles, the ISS system will be checked.

Data Required:

- Rifle serial number
- Each of the three readings for each direction on each sample
- The average of each of the three sets of readings
- The results of the ISS system check.

TLW0010H - Measure Bolt Lift and Bolt Closing Forces:

The force required opening the bolt and closing the bolt will be measured for each sample. Both of these forces will be taken with the chamber empty and then repeated, this time with a new dummy round in the chamber. There is not a specification for these forces and the readings will be taken for information only.

Method:

- After locating the rifle in the trigger pull fixture and securely locking in place, (it may be necessary to clamp the fixture to the bench if not already securely fixed in place), locate the hook of the force gauge at the point on the bolt handle just behind the ball.
- With the chamber empty and using the Chatillion gauge, pull the gauge straight up and perpendicular to the bore, measure the force required to open the bolt.
- Lock the firearm in a horizontal position, using the trigger pull holding fixture, (i.e. shooting position) before taking the measurements.
- Take three readings for each gun in the sample.
- Record all readings.
- Repeat the procedure only this time push the bolt closed.
- Note that it may be necessary to start the bolt closed by hand so the firing pin head is depressed sufficiently out of the notch and can start up the cam surface of the bolt as the firing pin is cocked.
- Repeat the above procedure this time with a new, unused dummy round in the chamber.

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Data Required:

- Rifle serial number
- Each of the three readings taken for each of the 4 states for each test sample
- The average of each set of three measurements per state

TLW0010I - Measure Magazine Spring Force:

The force produced by the compression of the Magazine Spring in the box with the follower attached will be measured. These measurements will be taken for information only. There is no specification currently defined for this characteristic.

Method:

- Use the Chatillion TCD200 Spring Testing Machine with the Chatillion Digital Force Gauge (0-10 lb. range). Use the disc probe (½ " dia.) on the gauge.
- Place the magazine box, bottom side down, on the staging table.
- Zero force gauge with no load applied.
- Lower the gauge until it just touches the magazine follower, approximately in the middle location both side to side and front to rear.
- Zero force gauge again if necessary.
- Lower the gauge 0.200" and take the spring force measurements.
- Lower the gauge another 1.0".
- Take the force measurement at this depressed location of the spring.
- Repeat procedure two additional trials for each box.
- Average the 3 trials for each box and at each measurement location.

Data Required:

- Force Measurements taken on each trial per box at each of the measurement locations.
- The Average Force measurement per box.
- The serial number of the Chatillion Digital Force Gauge used for the procedure.

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TLW0010J - Measure Recoil Force:

Using the Remington designed recoil force device, measure the recoil forces for both the .30-06 and .270 caliber rifles. This test will only be done during Phase II with the synthetic stocks assembled to the actions. The measurements will be taken for information only.

Method:

- Assemble device to stock.
- Shoot the test in "blow-up" range using the jack. Fire the rifle remotely. (As an alternative, the rifle may be shot from the shoulder, with prior review of the safety status of the firearms.)
- Use the round with the heaviest available factory bullet.
- Shoot ten rounds per sample rifle.
- Average the ten rounds for each sample.

Data Required:

- Rifle serial number
- The peak force and area under the curve will be calculated for each shot for which data is captured.
- A plot of each shot, 4 signals captured per shot (3 for force and 1 for acceleration.)
- The average for peak force and areas under the curve of the ten trials per rifle.

TLW0010K - Measure Lock Time:

Using the Remington method of measuring Lock Time, measure the lock time on the sample rifles provided. Do three trials on each sample rifle. Average the three trials. This data is for information only. The expectation is that lock time will be in the 3-msec. range. This test is scheduled for Phase I testing but may have to be postponed until Phase II if the metal stocks create a measurement problem.

Method:

- Standard Remington Lock Time Measurement procedure. (Sear Safety Cam release to 1st firing pin contact with the primer.)

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- Measure three lock times per sample rifle

Data Required:

- Rifle serial number
- Each lock time trial
- Average lock time per rifle
- Settings used on the equipment.

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WEIGHTS OF MAJOR COMPONENTS – TLW0010L THROUGH TLW0010O:

Note: The Weight measurements are scheduled for Phase II when the synthetic stocks are available for test.

TLW0010L - Overall Weight:

The test samples will be weighed on the Mettler Toledo digital balance (PB8000) located in the Metrology Lab. The rifles will be weighed once each with the chamber and magazine empty. The rifle will have only the open sights attached, no scope or other accessories attached.

Method:

- Clean the platen of the digital balance, if necessary.
- If the balance is not already on and has been turned on at least 30 minutes for warm-up, turn the balance on and wait 30 minutes for the balance circuitry to stabilize.
- Run the balance calibration routine if necessary.
- Make sure the units are set to "lb."
- With the chamber empty and the magazine box empty of rounds, carefully place the rifle on its left side with the rifles approximate front to rear balance point directly over the center of the balance platen.
- When the scale settles down, record the weight in lb. to the nearest 0.1 lb. (Note that the scale has three decimal points displayed.)

Data Required:

- Rifle serial number
- Weight to the nearest 0.1-lb.
- Serial number of the Mettler PB8000 balance (it should be SN 2114475246)

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TLW0010M - Weight of Stock Assembly:

The stock, disassembled from the barreled action, will be weighed. (Synthetic stock only.) The test samples will be weighed on the Mettler Toledo digital balance (PB8000) located in the Metrology Lab. The rifle's stocks will be weighed once each.

Method:

- Clean the platen of the digital balance, if necessary.
- If the balance is not already on and has been turned on at least 30 minutes for warm-up, turn the balance on and wait 30 minutes for the balance circuitry to stabilize.
- Run the balance calibration routine if necessary.
- Make sure the units are set to "lb."
- Label the stock as to which barreled action it came from
- Carefully place the stock on its left side with the stock's approximate front to rear balance point directly over the center of the balance platen.
- When the scale settles down, record the weight in lb. to the nearest 0.1 lb. (Note that the scale has three decimal points displayed.)

Data Required:

- Rifle serial number
- Weight to the nearest 0.1-lb.
- Serial number of the Mettler PB8000 balance (it should be SN 2114475246)

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TLW0010N - Weight of Barrel Assembly:

The barreled action, disassembled from the stock, will be weighed. Remove the bolt assembly from the barreled action. The test samples will be weighed on the Mettler Toledo digital balance (PB8000) located in the Metrology Lab. The rifle's barreled actions will be weighed once each.

Method:

- Tag the bolt so that it labeled with the last four digits of its rifle's serial number. This bolt assembly must be returned to its original rifle or the headspace may change.
- Clean the platen of the digital balance, if necessary.
- If the balance is not already on and has been turned on at least 30 minutes for warm-up, turn the balance on and wait 30 minutes for the balance circuitry to stabilize.
- Run the balance calibration routine if necessary.
- Make sure the units are set to "lb."
- Carefully place the barreled action on its left side with the barreled action's approximate front to rear balance point directly over the center of the balance platen.
- When the scale settles down, record the weight in lb. to the nearest 0.1 lb. (Note that the scale has three decimal points displayed.)
- Re-assemble the stock on its corresponding barreled action.

Data Required:

- Rifle serial number
- Weight to the nearest 0.1-lb.
- Serial number of the Mettler PB8000 balance (it should be SN 2114475246)

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TLW0010O - Weight of Bolt Assembly:

The bolt assembly, disassembled from the rifle, will be weighed. The test samples will be weighed on the Mettler Toledo digital balance (PB8000) located in the Metrology Lab. The rifle's bolt assembly will be weighed once each.

Method:

- Check to be sure that the bolt is correctly tagged with the last four digits of its rifle's serial number. This bolt assembly must be returned to its original rifle or the headspace may change.
- Clean the platen of the digital balance, if necessary.
- If the balance is not already on and has been turned on at least 30 minutes for warm-up, turn the balance on and wait 30 minutes for the balance circuitry to stabilize.
- Run the balance calibration routine if necessary.
- Make sure the units are set to "lb."
- Carefully place the bolt assembly with the bolt assembly's approximate front to rear balance point directly over the center of the balance platen.
- When the scale settles down, record the weight in lb. to the nearest 0.1 lb. (Note that the scale has three decimal points displayed.)
- Re-assemble the bolt on its corresponding barreled action.

Data Required:

- Rifle serial number
- Weight to the nearest 0.1-lb.
- Serial number of the Mettler PB8000 balance (it should be SN 2114475246)

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Remington Arms Company Inc.
RESEARCH & DEVELOPMENT TECHNICAL CENTER
315 WEST RING ROAD
ELIZABETHTOWN, KY 42701

LENGTHS OF MAJOR COMPONENTS – TLW0010P THROUGH TLW0010R:

TLW0010P - Overall Length:

Phase II measurement of Overall Length of the firearm. For information only.

Method:

- Set butt of gun on the floor near a wall
- Bring the top of the barrel to the wall so that the top of the barrel lies even with the wall surface
- Measure the distance from the floor to the end of the muzzle using a tape measure.

Data required:

- Rifle Serial number
- Measurements for each sample rifle.

TLW0010Q - Barrel Length:

Measure the length of the barrel. For the .30-06 and .270 caliber, the barrel length should be 22" ± .125" measured from the bolt face to the end of the muzzle.

Method:

- Check firearm for live ammunition
- Close bolt over and empty chamber
- With the butt of the rifle on the floor and the muzzle pointing up, carefully and gently, so as to not scratch the bore or nick the rifling, insert a brass rod (not steel) into the muzzle of the rifle until it stops on the bolt face. Move the brass rod around to insure that you are on the bolt face and not on the edge of the ejector or extractor.
- Carefully mark the brass rod where it is even with the edge of the muzzle
- Remove the rod and measure the length.

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Data Required:

- Rifle serial number
- Measurement of barrel lengths in inches.

TLW0010R - Length of Pull:

Length of Pull – the distance from the center of the butt plate (from center of top (i.e. heel) to center of bottom (i.e. toe)), to the inside curve of the trigger. Measurements are taken for information only. 83

Method:

- With muzzle of rifle pointed down and barrel clamped securely in holding device
- Located the center of the distance, top to bottom of the butt pad and mark pad or butt plate
- Measure to the inside curve of the trigger (at the front)

Data Required:

- Rifle serial number
- Length of Pull measurements

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GUN CHARACTERISTICS – TLW0010S THROUGH TLW0010U:

TLW0010S - Balance Point:

Balance Point – Phase II measurement. Establish the balance point for this firearm. (This measurement will also be used later for the SAAMI drop test.)

Method:

- Using a right angle block from the metrology lab, invert the block to provide a "sharp edge".
- Close the action over an empty chamber and with the magazine empty.
- Using two hands, carefully place the firearm in a horizontal orientation, over the edge of the angle block with the bottom of the firearm in the down position.
- Again, using two hands, one on each side of the block edge about one foot from the block edge front to rear, carefully place the firearm on the edge and attempt to locate the balance point.
- With the assistance of another individual, place a light pencil mark at the likely balance point. After removing the firearm from the edge, measure the distance to the breech face with the bolt in the closed position. (The position of the breach face was determined when the barrel length was measured. This location, that is, the breach face can be established by measuring the specific distance from the muzzle to outside of the receiver and marked accordingly. The distance from the balance point to this breach face mark is the location of the balance point.)
- Repeat this procedure for the following condition:
  - Using .30-06 dummy shells, place one in the chamber and four in the magazine, close the action and measure the distance to the bolt face.

Data Required:

- Record rifle serial number
- Record balance point with firearm empty
- Record balance point with firearm "loaded"

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TLW0010T - Drop and Cast:

Drop at the comb – the distance from an imaginary line drawn along the top edge of the receiver to the foremost position of the comb.

Drop at the Heel - the distance from an imaginary line drawn along the top edge of the receiver to the point on the heel of the stock.

Both of these dimensions are for information only.

Cast off (or cast on) – Not required for rifle stocks.

Method: (for drop at Comb)

- Align the top of the receiver along back edge of the Drop Board
- Measure the distance from the Drop Board to the front-most position of the Comb
- Record the distance to the nearest 1/8"

Method: (for drop at Heel)

- Using the same procedure as mentioned above, measure the distance from the closest point on the top of the heel (just ahead of the butt-pad or butt-plate backer at the edge of the stock proper) to the back of the Drop Board. Record distance to nearest 1/8"

Data Required:

- Record rifle serial number
- Record drop at comb
- Record drop at heel

TLW0010U – 50 lb. Trigger Pull Test

This test is conducted to determine if the safety mechanism will release the trigger mechanism and cause the firearm to discharge if the trigger is pulled intentionally by the shooter with the safety on the "On-Safe" position. In addition, sufficient force is applied to the trigger with the safe in the "On-Safe" position to assure

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that the trigger dimensions will not change thereby affecting trigger/sear engagement. Prior to start of test verify that trigger pull, engagement and over-travel are within recommended specifications on the sample rifles.

- Inspect and verify the rifle is not loaded and the safe is in the "On-Safe" position.
- Locate the firearm in a vertical position with the muzzle pointed up.
- Using the set of plug gauges determine the amount of minimum clearance between the rear of the trigger and the inside rear of the trigger guard. This dimension will be used as a reference to see if the trigger has been deformed by the loading in the next steps.
- Carefully load a primed case into the chamber and close the bolt.
- With the safe in the "On-Safe" position, using the NRA trigger pull rod, load the trigger with a 50 lb. weight. **BE EXTREMELY CAUTIOUS TO STAY CLEAR OF THE MUZZLE IN CASE THE FIREARM DISCHARGES THE PRIMED CASE.**
- Remove the load from the trigger.
- Move the Safety to the "Fire" position, the rifle must not discharge.
- Return the Safety to the "On-Safe" position.
- Carefully remove the rifle from the holding device and with the muzzle pointed in a safe direction, pull the trigger, the rifle must discharge. Extract the shell case.
- Using the plug gauges measure the minimum clearance between the rear of the trigger and the inside rear of the trigger guard.
- Measure the trigger pull, engagement and over-travel to insure that they have not changed from the beginning of the test.

Data required:

- Rifle serial number
- Measurements of Trigger pull, engagement, over-travel and trigger/trigger guard clearance before and after loading.
- Note that the rifle "fired" or did not fire when the safety was pushed to the "Fire" position.
- Note that the rifle did "fire" when the trigger was pulled.

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FIREARMS MEASUREMENTS – TLW0010V THROUGH TLWOO10Z:

TLW0010V - Chamber cast:

Use the .30-06-chamber drawing LB-153 for reference.

Method:

- Make chamber cast using standard procedure
- Use the 30" optical comparator
- Measure the following dimensions:
  - .4708/.4728
  - .4425/.4440
  - 34° 30" Angle
  - .3404/.3424
  - .3095/.3105

Data Required:

- Rifle serial numbers
- Record dimensions requested above.

TLW0010W - Bore Diameter:

Measure Bore Diameter using standard procedures.

Method:

- Measure .30-06 caliber
- Dimension equals .300/.301

Data Required:

- Rifle serial numbers

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- Measurements of each bore by serial number

TLW0010X - Groove Diameter:

Measure Groove Diameter using standard procedures.

Method:

- Measure .30-06 caliber
- Dimension equals .308/.309

Data Required:

- Rifle serial numbers
- Measurements of each bore by serial number

TLW0010Y - Twist Rate (.30-06)

Measure Twist Rate using standard procedures.

Method:

- Measure .30-06 caliber
- 1 turn in 10" ± .25", RH

Data Required:

- Rifle serial numbers
- Measurements of each bore by serial number

TLW0010Z - Magazine Capacity Test:

Rifles with the magazine fully loaded must be able to be inserted into firearm with the bolt closed and in the locked position. Model 710 must be able to accept 4 rounds in the magazine and load into a closed bolt.

Method:

- Check rifle for live ammunition

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- With muzzle pointed in a safe direction, close the bolt and lock over an empty chamber
- Load 4 dummy rounds into the magazine
- Insert magazine into the rifle, it must lock securely in place
- Cycle the 4 dummy rounds through the chamber and eject each round
- Remove the magazine box and repeat test two additional times per sample rifle using a different magazine box each trial.

Data Required:

- Rifle serial number
- Record any failures to load and cycle properly by box and rifle

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FUNCTION & ENDURANCE TESTING:

FUNCTION AND ENDURANCE TESTING – TLW0010AA THROUGH TLW0010AE

TLW0010AA - Basic Jack Function Test (to 200 Rounds):

To get an early picture of the product's functional capability, a 200 round per rifle jack function test will be conducted. Five bullet types will be used, 40 round of each in each rifle to evaluate the potential for feeding problems. The test will be conducted in the test jacks with the "belly-protectors" in place and fully closed for each shot. All malfunctions and any unusual behavior will be noted on the data forms. The overall average of all sample rifles should be at or below 2-% malfunction rate. Up to two rifles from the sample of 15 are permitted to be removed from the averaging process if they have excessive malfunction rates relative to the remaining group of 13 samples. These rifles will be investigated by engineering to determine the probable source of the problem and engineering will provide written documentation for possible inclusion in the DAT report. No major mechanical failures are allowed in the test sample. Major mechanical failures are defined as those failures that cannot easily be repaired with simple tools and/or readily available replacement parts. At the conclusion of this test the firearms will be carefully examined for signs of excessive wear, especially with respect to the plastic components.

Method:

- Check each rifle for the presence of the proof stamp(s) – do not shoot unless the stamp(s) are present.
- Check each rifle for headspace
- Draw ammunition from stores – See test manager for ammo types to be used for this test.
- Each tester to have five rifles for test at any given time.
- The muzzle of each rifle will be inserted into the shooting port and the rifle placed securely in the test jack before the rifle is loaded.
- Load the five rounds into the rifle, one in the chamber and four in the magazine, do not shoot single shot by hand-feeding single rounds into the chamber.

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- Push the safe to the "fire" position, be sure that the barrel is far enough within the port hole so that the muzzle will stay in the port when the rifle recoils. If there is any question, re-adjust the jack into a better position.
- With the lid on the belly protector closed, fire the first round in the chamber, listen for any off-sounds, and be alert for any other unusual behavior.
- Open the bolt; eject the spent round, note any extraction or ejection problems.
- Close the bolt to load the first round from the magazine into the chamber, note any feeding or stemming problems.
- Continue to fire the remaining rounds in the magazine until the last round is fired.
- Push the Safety to "On Safe" position, the safety will be pushed to the fire position at the start of every five round trial and will be pushed to the On Safe position at the end of every five round trial. Repetitive action of the safety lever on the trigger assembly side-plate needs to be determined.
- After firing twenty rounds (1 box of ammo) the rifle will be checked carefully for the presence of any live ammunition and if empty will be removed from the test jack and placed in the cooling rack. The safety will be in the "On Safe" position and the bolt will be unlocked and fully open at all times. Compressed air may be used, if necessary to cool the inside of the chamber area if the rifle is excessively hot from firing.
- All malfunctions will be recorded on the data sheets.

Data Required:

- Rifle serial number
- Tester's name
- Date of test firing
- The TLW#
- The ammunition used for the test with the ammo lot code number of the rounds actually used.
- Any malfunctions noted or other unusual items of note.

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TLW0010AB - Basic Shoulder Function Test:

To get an early picture of the product's functional capability from the perspective of the customer, a 100 round per rifle shoulder function test will be conducted to evaluate the potential for feeding problems. These malfunctions may be different from those noted in the jack test due to shooter reactions to recoil potentially affecting round position in the magazine box. The test will be conducted in the long range shooting from a standing position. Twenty-five (25) rounds each of four (4) different bullet types will be shot in each sample rifle.

All malfunctions and any unusual behavior will be noted on the data forms. The overall average of all sample rifles should be at or below the 2% malfunction rate. All rifles must pass the 2% criteria due to the small number of rounds being fired. No major mechanical failures are allowed in the test sample. Major mechanical failures are defined as those failures that cannot easily be repaired with simple tools and/or readily available replacement parts. At the conclusion of this test the firearms will be carefully examined for signs of excessive wear, especially with respect to the plastic components.

Method:

- Check each rifle for the presence of the proof stamp(s) – do not shot unless the stamp(s) are present.
- Check each rifle for headspace
- Draw ammunition from stores – See test manager for ammo types to be used for this test.
- Perform all range preparations required for shooting in the long range. Make sure the range ventilation is turned on.
- Wear safety glasses with side shields and double hearing protection.
- When ready to fire, the tester should stand in the doorway of the long range and when firing should be careful to keep the bullets in the center of the range to prevent damage to shields, lights, etc.
- Load the five rounds into the rifle, one in the chamber and four in the magazine, do not shoot single shot by hand-feeding single rounds into the chamber.
- Push the safe to the "fire" position,
- Fire the first round in the chamber, listen for any off-sounds, and be alert for any other unusual behavior.

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- Open the bolt; eject the spent round, note any extraction or ejection problems.
- Close the bolt to load the first round from the magazine into the chamber, note any feeding or stemming problems.
- Continue to fire the remaining rounds in the magazine until the last round is fired.
- Push the Safety to "On Safe" position, the safety will be pushed to the fire position at the start of every five round trial and will be pushed to the On Safe position at the end of every five round trial. The effect of the action of the safety lever on the trigger assembly side-plate needs to be determined.
- After firing ten rounds the rifle will be checked carefully for the presence of any live ammunition and if empty will be placed in the cooling rack. The safety will be in the "On Safe" position and the bolt will be unlocked and fully open at all times. Compressed air may be used, if necessary to cool the inside of the chamber area if the rifle is excessively hot from firing.
- All malfunctions will be recorded on the data sheets.

Data Required:

- Rifle serial number
- Tester's name
- Date of test firing
- The TLW#
- The ammunition used for the test with the ammo code number of the rounds actually used.
- Any malfunctions noted or other unusual items of note.

TLW0010AC - Extended Function & Endurance:

This Endurance Test will be shot to accomplish two purposes. The first purpose is to determine an estimate of the product's expected malfunction rate over an extended period of shooting. The second is to determine both the estimated life of individual components as well as the expected life (in rounds) of the product before system failure occurs. For purposes of definition, a component failure will be one that prevents (or could prevent) the firearm from functioning as intended. These are failures that can be fixed relatively easily by the simple replacement of a part such as could be done by the gun owner using only simple household tools.

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System failures are defined as failures of a major nature, the extent of which would require specialized tooling or methods to repair not normally available to the average gun owner. Such a repair would be most likely made by a qualified gunsmith or by return to the factory.

This Endurance Test will be shot in the test jacks and the testers will use gloves for protection. The covers on the "belly-protectors" will be down and in-place for each test shot. Careful monitoring of each test gun is essential to evaluate the malfunction rate for each firearm.

The standard Remington test jacks will be used for all jack-related testing.

Each rifle will be shot, using a variety of Centerfire ammunition comprised of light, medium and heavy bullets. In addition, ammunition from the three major manufacturers (Remington, Winchester and Federal) of Centerfire ammunition shall be included in the mix.

Each rifle will be shot no more than 20 rounds before being put aside for cooling. Compressed air applied to the inside of the chamber will be an acceptable method to assist in the cool-down process.

The S.A.A.M.I. recommendation for the minimum acceptable malfunction rate for a bolt action rifle is a malfunction rate of < 2%. In this case, if the overall malfunction rate average for the test samples is > 2%, the DAT test will be stopped and the guns returned to Design for modification and improvement before being re-submitted for DAT. If the overall average malfunction rate is < 2% but one of the firearms is significantly greater than 2% malfunction rate, the test may continue with the other nine test samples while Design attempts to fix the problem with malfunctioning gun. After repair, this gun will again be required to pass the 200 round jack function test at < 2% malfunction rate. If the gun passes these criteria it will then be re-introduced into the Endurance test. It is important that total endurance rounds on the gun include any rounds that are put through the gun for re-test purposes.

The test will be performed according to Remington's standard endurance test procedures for centerfire rifle. Pyramid for this test will be ten rifles to 1,000 rounds, six rifles to 2,000 rounds, three rifles to 5,000 rounds and one rifle to 10,000 rounds.

Record all instances of malfunctions and failures, and replace parts when they become unserviceable noting the round level when they were replaced.

After every 100 rounds one live round will be extracted and ejected from the chamber to check on live round ejection. The ejected round will then be re-inserted into the chamber and fired to help keep the endurance round count accurate.

Method:

- Disassemble, thoroughly clean, lubricate per the design team's instructions, and reassemble. Record headspace for each.
- Fire each test firearm in accordance with the firing procedure (number of rounds, firing cycle) specified by engineering and the test plan.
- Ammunition will be used that comprises at least five types of bullets, change ammunition type every 100 rounds.
- Before commencing design acceptance testing, calibrate, adjust, or re-build the shooting jacks, if necessary.
- Allow the firearm to completely recover in the shooting jack between each shot and do not lean or "stiff arm" the firearm while shooting the gun.
- All ammunition is to be functioned through the magazine - no "single shot" hand feeding permitted.
- Allow the rifle to cool between cycles. One cycle is 20 rounds fired. The use of forced air to accelerate cooling of the barrels between firing trials is permitted. The air should be directed from the chamber toward the muzzle to prevent it from washing the lubricant from the firearm's action.
- Cycle the safety from fire to safe every 5 rounds, from Safe to Fire at the start of the five round cycle and from Fire to Safe at the end of the 5 round cycle.
- After every 1000 rounds, disassemble, inspect, clean and lubricate the entire mechanism and take all required measurements.
- At the initial 1000, initial 5000 and at the 10,000 round level, Magna-Flux the bolt heads.
- The Standard Remington Jacks (using the heavy configuration) are to be used for this test.

Data Required:

- Rifle serial number
- Tester's name
- The Test Jack Identification
- TLW#
- Date of actual testing
- Headspace every 1000 round interval.
- Malfunctions per ammo type, breakage, and replacement parts used.

- Any failure that requires the gun to be removed from testing completely.
- Notify management of any unusual events or malfunctions immediately.
- Any firing of the firearm without the trigger being pulled.
- Record ammunition lot code information as it is used throughout the test.
- Bullet type used for each 100 rounds of the test.
- The results and photographs, if any, of the Magna-Flux testing.

TLW0010AD - Clean Rifles and Inspect:

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After each 1000 rounds of endurance, unless other wise specified, each rifle will be disassembled, cleaned and thoroughly inspected.

A list of inspection points will be provided in the gun packet for check-off and sign-off by the inspector. The inspector will be looking for any signs of unusual wear, especially on critical components and surfaces as well as for anything such as cracks or deformed material that might present a safety concern. Photographs will be taken to document unusual wear, damage or other notable characteristics.

TLW0010AE - Dry Cycle to 5000 Cycles:

The bolt assembly will be dry cycled to determine reliability due to mechanical wear as well as verify the long term performance and reliability of the bolt and receiver assembly. The M/700 dry cycle fixture will be used to perform this test by mounting the M/710 bolt / firing pin / firecontrol assembly and cycling to a 5000 cycle level. Bolt galling and other M/710 common part failures will be noted relative to this test.

Of particular interest in this test will be the effects of wear on the plastic components in the receiver and firecontrol.

For comparison purposes a new Model 700 fire control will be run in parallel through the dry cycle machine. Headspace will be checked on both actions at each 1000 round level to determine if the lugs are wearing excessively. Photographs will be taken at the start of the dry cycle test of the bolt lugs, cam surfaces

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and other critical wear areas and repeated at each 1000 cycle level. Photographs of each critical area will be taken at each inspection level, after cleaning. Each model will be lubricated after cleaning and inspection according to the instructions that will be found in its owner's manual.

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ACCURACY TESTING:

ACCURACY AND POI TESTING – TLW0010AF THROUGH TLW0010AG

TLW0010AF - Point of Impact:

Note: This will be a Phase II test only. The barrels for Phase I will not have been angularity straightened.

The point of impact test involves the verification of the firearms sighting system adjustment and the potential to hit the point of aim. The open sights must have sufficient adjustment in either direction when the rifle is sighted in at 100 yards. Random variation and/or extreme difference in shot to shot point of impact (as well as group size) typically indicate improper barrel processing and is used as a final inspection flag in production. This test will be shot from the bench with open sights. Shoot five, 5-shot groups from each test rifle. Use the same code of ammunition for all point of impact test shots.

Method:

- Certify the ammunition selected for muzzle velocity and pressure.
- Pick the point of aim on the target
- Adjust point of aim to the bulls-eye at 100 yards.
- Slide must be adjusted to between the second line from the rear to third line from the front.
- The aperture must have the width of the screw retaining shoulder visible to either side.
- Shoot five "warmer" shots
- Shot five, 5-shot groups

Data Required:

- Measure the center of the impact groups to the point of aim in terms of "x" and "y" positions.
- Record takedown screw torque
- Record position of slide when shot
- Record ammunition lot number used during the test
- Record and label any fail-to-fire ammunition

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TLW0010AG - Group Size at 100 yards

One hundred-yard accuracy testing will be completed utilizing standard factory ammunition. The test will consist of five, 5-shot groups. Guns will be cooled after every other group. Each firearm will be cleaned and fired with five fouling shots prior to beginning the accuracy work-up. Group sizes will be measured from actual targets and recorded. The same code of ammunition and same type of ammunition will be used for all group size test shots. Average group sizes must be ≤ 3" at 100 yards.

Method:

- Certify the ammunition selected for muzzle velocity and pressure.
- Fire five, 5-shot groups at 100 yards, using a 36 power scope for each ammunition type selected. Prior to beginning of the test, clean the bore and shoot 5 "fouling" shots to seat in the rifle.
- Cycle the safety from fire to safe every 5 rounds.
- Accuracy should be shot from a recoiling rest. Shoulder shooting is acceptable but not the preferred way.

Data Required:

- Measure group sizes center to center
- Record takedown screw torque
- Record make and identifier of scope
- Record ammunition type used.
- Record ammunition lot numbers used during the test
- Record and label any fail-to-fire ammunition.
- Record any malfunctions that occur during the test.

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ENVIRONMENTAL TESTING:

TEMPERATURE & HUMIDITY – TLW0010AH THROUGH TLW0010AK

TLW0010AH - Hot Function Test:

This test evaluates the effect of extreme high temperatures on the functioning performance of firearms.

Method:

- Condition test firearm and 100 rounds of ammunition of each caliber in a climatic chamber for at least 6 hours at a temperature of 120 degrees F. (or as close to 120 degrees F. as the equipment can be maintained.)
- Test each firearm within the chamber as follows:
  - Fire 20 rounds of ammunition. Wait 2 hours and repeat until all 100 rounds have been fired.
  - Do not perform maintenance during the 100 round cycle.
  - Cycle the safety from fire to safe every 5 rounds.
  - The tester should wear gloves to protect his hands from the hot metal.
- After 100 rounds have been fired through each firearm, remove the firearms from the conditioning chamber, disassemble, thoroughly inspect, clean and lubricate.

Data Required:

- Record temperature and exposure times
- Record all malfunctions.
- Record damage noted during inspection
- Record all necessary maintenance actions performed

TLW0010AI - Cold Function Test:

This test evaluates the effect of extreme low temperatures on the functioning performance of the firearms. Shoot the firearm from inside the environmental test cabinet in the long range.

Method:

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- Condition the firearm and 100 rounds of ammunition of climatic chamber for at least 6 hours at a temperature of -20 degrees F.
- Test each firearm within the chamber as follows:
- Fire 20 rounds of ammunition. Wait 2 hours and repeat until all 100 rounds have been fired.
- Do not perform maintenance during the 100 round cycle.
- Cycle the safety from fire to safe every 5 rounds.
- After 100 rounds have been fired through the firearm, remove the firearm from the conditioning chamber, disassemble, thoroughly inspect, clean and lubricate.

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Data Required:

- Record temperature and exposure times
- Record all malfunctions.
- Record damage noted during inspection
- Record all necessary maintenance actions performed

TLW0010AJ – Thermal Cycle Test:

This test evaluates the effects of large temperature changes due to expansion and contraction differentials of metallic and non-metallic components used in the Model 710. The sample rifle will be alternately cycled between a temperature of 120°F. and -20°F. for at least 3 complete cycles, brought back to ambient temperature and test fired in the test jacks for 200 rounds to evaluate both function and safety related characteristics.

Method:

- Shoot sample rifle in test jack to determine rifles malfunction characteristics and rate.
- Do not clean rifle
- Place rifle in freezer that is pre-set to -20°F and leave undisturbed for at least 24 hours.
- At completion of 24+ hours, remove rifle and immediately place in the pre-heated test chamber at a temperature as close to the +120°F as can be attained by the equipment. Leave rifle undisturbed for at least 24 hours.

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- At completion of at least 24 hours, remove rifle and immediately place in the freezer.
- Repeat this cycle for a minimum of three complete hot and three complete cold cycles.
- At the completion of the final cycle (the heat cycle) remove the rifle from the chamber and allow cooling to ambient temperature – a minimum of six hours.
- Inspect the rifle for any indications of damage due to the thermal cycling.
- Return the rifle to the test jack used at the start of the test and fire another 100 rounds recording malfunction types and rates.
- Remove the action from the stock and examine the rifle for any obvious signs that the thermal cycling has affected the parts with special attention directed at the metallic and non-metallic interfaces. Look for cracked parts and for signs of material creep.

Data Required:

- Rifle serial number
- Cycle time for each test condition
- Temperature records throughout each cycle. Use the chart feature on the freezer and a temperature-recording device for the chamber.
- Malfunctions type and rates both pre- and post thermal cycles.
- Observations made on cracks, creep or other noteworthy items.

TLW0010AK - Heat & Humidity Function Test:

Method:

- Shoot the firearm from inside the environmental test cabinet in the long range.
- Store the gun and ammunition for a minimum of six hours at a temperature of +100°F and 80-90% Relative Humidity.
- Shoot 100 rounds and record all malfunctions or other unusual events.

Data Required:

- Record temperature and exposure times
- Record all malfunctions.

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- Record damage noted during inspection
- Record all necessary maintenance actions performed

DEBRIS TESTING – TLW0010AL THROUGH TLW0010AN

TLW0010AL - Dynamic Sand & Dust Test:

This test evaluates the effects of blowing sand and dust on firearm performance. The test firing is conducted after the firearm is removed from the sand and dust environment. Use the same sand and dust mixture that is used in the Sand and Dust Test,

(See Table No. 1.)

Method:

- Clean and lubricate one test firearm and close the muzzle with tape.
- Close the bolt. Set the safety in the SAFE position. Load the firearm using one primed case.
- Expose the firearm as follows:
- Place the firearm in the center of the box, and fasten the box lid.
- After 1 minute, stop the blowing air, remove the lid, and turn the firearm upside down in the box. Replace the lid and repeat the sand and dust blast for another minute.
- Remove the gun from the box after first attempting to wipe clean the firearm with gloved hands. Clean parts as much as possible by blowing the rifle with compressed air or by shaking the firearm. Carefully remove the tape from the muzzle. REMEMBER THAT THE RIFLE HAS A PRIMED CASE IN THE CHAMBER.
- Take the rifle to a test jack in the short range.
- Place the Safe in the fire position and attempt to fire the primed case. Make one attempt only. If the primed case does not fire, carefully open the action and remove the primed case, dispose of properly.
- Load the magazine with live rounds and fire a full magazine from the firearm while in the test jack.
- If firing is unsatisfactory, attempt to fire with a clean magazine loaded with clean ammunition. If repeated malfunctions make it impossible to fire all of the ammunition, field strip and clean the firearm in accordance

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with the applicable operator's manual. Then attempt to fire the remaining ammunition, (from a box of 20 cartridges.) If repeated malfunctions make it impractical to fire the remaining ammunition, stop the test. Cycle the safety from fire to safe every 5 rounds.

- At every 5 round interval verify the firearm is not loaded.
- Close the firearm as if to fire it and put the safety to the SAFE position
- Pull the trigger firmly (10 lb. maximum) - firearm must not fire.
- With the finger off the trigger, move the safety to the FIRE position - firearm must not fire.
- Disassemble the firearm over a large white paper and weigh the amount of debris present in the main mechanism

Data Required:

- Record malfunctions.
- Record number of rounds fired.
- Record weight of debris found in the gun.
- Record any firing of the firearm without the trigger being pulled.
- Record any misfires.

TLW0010AM - Static Sand & Dust Test:

This test is the second of two that evaluates the effect of sand and dust on firearm performance, where the test firing is conducted after the firearm has sand and dust directly placed in the action. Thus, an exposure box is not required. For Sand & Dust composition see Table No. 1.

Method:

- Clean and lubricate one test gun to the procedure supplied by the design team.
- Remove the bolt. Set the safety in the SAFE position and verify that the firearm is unloaded.
- Record the weight of one level tablespoon of debris mixture.
- Expose the firearm as follows:

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- Place the firearm in a shooting jack, bottom of rifle up, and apply a tablespoon of sand in the firecontrol mechanism from the bottom. Tap the firearm three times, in the middle of the receiver, to jar the rifle and to assist getting sand into the mechanism.
- Turn the firearm to its normal upright horizontal position and apply a tablespoon of sand and dust to the top of the firecontrol mechanism from the top. Tap the firearm three times, in the middle of the receiver, to jar the rifle and aid sand getting into the mechanism.
- Replace the bolt. Wipe away any sand that prevents the bolt from closing.
- Load the magazine. Fire a full magazine from the firearm. If there are repeated malfunctions, attempt to fire with another magazine. If firing is still unsatisfactory, attempt to fire with a clean magazine, container, etc., loaded with clean ammunition. If repeated malfunctions make it impractical to fire the remaining ammunition (from a box of 20 cartridges), stop the test.
- At every 5 round interval verify the firearm is not loaded.
- Close the firearm as if to fire it and put the safety to the SAFE position.
- Pull the trigger firmly (10 lb. maximum) - firearm must not fire.
- With the finger off the trigger, move the safety to the FIRE position - firearm must not fire.
- Carefully disassemble the firearm over large sheet of white paper and weigh the amount of debris that finds its way into the main mechanism area.

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TABLE No. 1. COMPOSITION OF SAND AND DUST MIXTURE
(by percent particles, by weight, retained in sieves)

Sieve Size (US gage sieve no.)	Percent of weight retained	Particle Size (microns)
20	3	842 to 1000
30	5	595 to 841
45	17	355 to 595
60	14	251 to 354
100	10	150 to 250
pass 100	less than 1	-----
140-mesh silica flour		
140	1	105 to 149
200	4	74 to 105
325	7.5	44 to 74
pass 325	37.5	less than 44

Data Required:

- Record malfunctions.
- Record number of rounds fired.
- Record weight of debris found in the gun.
- Record any firing of the firearm without the trigger being pulled.
- Record any hang fires.

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TLW0010AN - Field Debris Test:

This test determines the effect of "field debris" on firearm performance, where the firing is conducted after the firearm has field debris directly placed in the action. *See Table No. 2 for field debris composition.*

Method:

- Clean and lubricate one test gun to the procedure supplied by the design team.
- Remove the bolt. Set the safety in the SAFE position and verify that the firearm is unloaded.
- Record the weight of one level tablespoon of field debris mixture per following table.
- Expose the firearm as follows:
- Place the firearm in a shooting jack, turn bottom side up, and apply a tablespoon of debris in the firecontrol mechanism from the bottom. Tap the firearm three times, in the middle of the receiver, to jar the rifle and aid field debris getting into the mechanism.
- Turn the firearm to its normal upright horizontal position and apply a tablespoon of field debris to the top of the firecontrol mechanism from the top. Tap the firearm three times, in the middle of the receiver, to jar the rifle and aid the debris getting into the mechanism.
- Wipe away any debris that prevents the bolt from closing. Clean parts as much as possible by blowing sharply or wiping.
- Fire a full magazine from the firearm. If repeated malfunctions make this impossible, attempt to fire with another magazine. If firing is still unsatisfactory, attempt to fire with a clean magazine, container, etc., loaded with clean ammunition. If repeated malfunctions make it impractical to fire the remaining ammunition (from a box of 20 cartridges), stop the test.
- Cycle the safety from fire to safe every 5 rounds.
- At every 5 round interval verify the firearm is not loaded.
- Close the firearm as if to fire it and put the safety to the SAFE position
- Pull the trigger firmly (10 lb. maximum) - firearm must not fire.
- With the finger off the trigger, move the safety to the FIRE position - firearm must not fire.

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- Disassemble the firearm over white paper and weigh or measure the amount of debris present in the main mechanism area. Debris should be removed from the parts for weighing.

Data Required:

- Record malfunctions.
- Record number of rounds fired.
- Record weight of debris in the gun at the conclusion of the test.
- Record any firing of the firearm without the trigger being pulled.
- Record any hang fires.

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Table No. 2 - Field Debris Mixture (By Volume)	
Dried Grass Clippings	2 parts
Toothpicks (round, .25" long max.) to represent twigs	1 part
Bird Seed	1 part
Table Salt	1 part
Small Stones (.015" dia. to .125" dia.)	1 part
Crushed Dry Leaves	2 parts
Pine Needles	1 part
Hair Samples (no longer than 2 inch)	1 part

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MISC. TESTS – TLW0010AO THROUGH TLWOO10AP

TLW0010AO - Rain Test:

Use Standard Remington Rain test procedure using the Salt Fog Chamber. Rifle must function without any safety related malfunctions.

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TLW0010AP - Solvent Testing:

For any non-metallic components in the M/710 that have not previously been tested for the effect of solvents, use Remington standard procedure to solvent test these new components. For some components where there is not enough material in one gun to properly test the sample, secure additional components from Design to complete the testing. If there are components that require testing then use the following procedure:

Tests will be conducted in accordance with ASTM D543-87, which calls for 24-hour immersion in solvents followed by a property evaluation. Hardness or stiffness is the property measured for this test, either quantitatively or qualitatively (where quantitative measurements were impractical). Solvent effects in polymers range from no effect to complete decomposition. Parts that absorb solvents may permanently discolor, crack, craze, or otherwise display failures. The parts also may simply take up solvent when immersed and yield the solvent back when exposed to air with no other property change other than temporary modulus (stiffness) reduction. To support this observation, it is often helpful to separate parts by their amount of solvent uptake, so that the large solvent uptake parts can be more carefully examined.

The receiver insert will be specifically tested for this DAT.

Method:

- Obtain untested chemicals.
- Weigh and obtain hardness readings on the test specimen(s).
- Place the specimen(s) in a container so that they are completely covered by the solvent. Leave at rest in the container for 24 hours.
- Remove and wipe the specimen(s) until they are dry. Weigh and obtain hardness readings on the test specimen(s).
- Leave the specimen(s) to air dry an additional 24 hours. Weigh and obtain hardness readings on the test specimens.
- The list of solvents, lubricants and production chemicals commonly used with and around firearms is found in below:

  Remington Oil
  Remington Bore Cleaner

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Break Free Bore Cleaner
Birchwood-Casey Gunscrubber
Remington Action Cleaner
Hoppe's Oil
Hoppe's #9 Solvent
TPC Solvent
LP-1 Lubricant
Thin Film Lubricant
Steel Guard
Molycoat Paste
Molycoat Powder
Cobratec

Data Required:

- Record part weights before and after test.
- Record part hardness before and after test.

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ABUSIVE TESTING

IMPACT TESTING – TLW0010AQ THROUGH TLW0010AV

TLW0010AQ - SAAMI Drop Test:

This test will simulate abusive dropping of the firearm from a distance of 48 inches onto a 1" thick 85 durometer (Shore A) rubber mat backed by concrete. Trigger Pull weight will be adjusted to minimum specification (3-½ lb.) The Trigger/Sear engagement will be set to the minimum specification (0.020"). Test will be performed according to SAAMI Technical Committee procedures. Magazine capacity will as well be according to SAAMI procedures. After each series of test, the primed case will be discharged to insure validity of test. This test will be performed on a sample of four firearms (for Phase I) and six firearms (Phase II) of .30-06 calibers only and six rifles of .270 caliber when available.

Method:

- With the firearm safety in the SAFE state, the firearm shall be capable of passing the below test criteria for drop testing from a height of four feet onto an 85±5 Durometer, Shore A, rubber mat, one-inch thick backed by concrete. The mat and concrete shall be large enough so that when the gun is dropped it will fall and

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come to rest without interference within the perimeter of the mat. The four feet shall be measured from the surface of the rubber mat to the center of gravity of the firearm. The center of gravity shall be determined to an accuracy of ± one inch by any recognized method for finding the center of gravity of an irregular shaped object. The primed case shall be discharged following the drop and a fresh primed cartridge re-chambered prior to the next drop. A "fresh" firearm may be substituted into the test at any point.

- The firearm or firearms shall be dropped in such a way as to strike the rubber mat surface once in each of the following attitudes:
    - Barrel vertical, muzzle down.
    - Barrel vertical, muzzle up.
    - Barrel horizontal, bottom up.
    - Barrel horizontal, bottom down.
    - Barrel horizontal, left side up.
    - Barrel horizontal, right side up.
- Tests shall be conducted with the trigger pull force set at the minimum force specified, with engagement set to the minimum specified, and with the firecontrol lubricated as in the owner's manual.
- The test shall be conducted with the magazine or clip fully loaded with dummy cartridges and inserted in the firearm.
- Parts breakage or other damage as a result of drop testing does not constitute failure as long as the empty primed case does not fire and the firearm can be unloaded safely after each drop. More stocks are required than the amount of test guns to allow for breakage due to the drop testing. If a stock cracks - replace before continuing test.

Data required:

- Record whether or not the firearm fires an empty primed case of its designated cartridge when tested in accordance with this procedure.
- Record round level

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TLW0010AR - SAAMI Jar-Off Test:

The objective of the jar-off test is to simulate the abusive impacting (bumping) of the firearm against a hard surface with the firearm in a condition of maximum readiness. With the firearm in the ready to fire condition, the firearm shall be capable of withstanding a jar-off shock equivalent to being dropped from a height of 12" inches onto a 1" thick 85 Durometer (Shore A) rubber mat backed by concrete. Trigger Pull weight will be adjusted to minimum specification. The test will be performed according to SAAMI Technical Committee procedures. Magazine will be loaded to maximum capacity with dummy rounds according to SAAMI procedures. A fresh primed case will be chambered prior to each drop. After each drop the primed case will be discharged to verify its validity. This test will be performed on a sample of firearms made up of .30-06 caliber.

Method:

- With the firearm cocked and the safety in the FIRE position the firearm shall be capable of withstanding jar-off shock equivalent to being dropped from a height of twelve inches onto a 85±5 Durometer, Shore A, rubber mat, one-inch thick backed by concrete. The mat and concrete shall be large enough so that when the gun is dropped it will fall within the perimeter of the mat striking the mat once. The twelve inches will be measured from the test surface to the lowest point on the firearm. As an alternate to free dropping, other methods may be substituted if they provide equivalent impact characteristics. The primed case shall be discharged following the drop and a fresh primed cartridge re-chambered prior to the next drop. A "fresh" firearm may be substituted into the test at any point.
- The firearm or firearms shall be dropped in such a way as to strike the rubber mat surface once in each of the following attitudes:
    - Barrel vertical, muzzle down.
    - Barrel vertical, muzzle up.
    - Barrel horizontal, bottom up
    - Barrel horizontal, bottom down.
    - Barrel horizontal, left side up.
    - Barrel horizontal, right side up.

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- Tests shall be conducted with the trigger pull force set at the minimum force specified, with engagement set to the minimum specified, and with the firecontrol lubricated per the owner's manual.
- The test shall be conducted with the magazine or clip fully loaded with dummy cartridges and inserted in the firearm.
- Parts breakage or other damage as a result of drop testing does not constitute failure as long as the empty primed case does not fire and the firearm can be unloaded safely after each drop. More stocks are required than the amount of test guns to allow for breakage due to the drop testing. If a stock cracks - replace before continuing test.

Data required:

- Record engagement and trigger pull.
- Record whether or not the firearm fires an empty primed case of its designated cartridge when tested in accordance with this procedure.
- Record the round level on the firearm.

TLW0010AS - SAAMI Rotation Test:

The test will be conducted according to SAAMI Technical Committee procedures. The firearm will be placed in the "Safe Carrying" condition and dropped from an upright position with its butt resting on the surface of a 1" thick 85 durometer (Shore A) rubber mat backed by concrete. Trigger Pull weight will be adjusted to minimum specification. Magazine capacity will as well be according to SAAMI procedures. The firearm shall be tested (dropped) on both the right and left sides. After each rotation, the primed case will be discharged to insure validity of test.

Method:

- With the firearm safety in the SAFE state, the firearm shall be capable of passing the below test criteria when allowed to fall freely from an upright position with its butt resting on the surface of a 85±5 Durometer, Shore A, rubber mat, one-inch thick backed by concrete. The mat and concrete shall be large enough so that when the gun falls it will come to a rest without interference within the perimeter of the mat. The firearm shall be tested so as to fall once on its right-hand side and once on its left-hand side. The primed

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case shall be discharged following the drop and a fresh primed cartridge re-chambered prior to the next drop. A "fresh" firearm may be substituted into the test at any point.

- Tests shall be conducted with the trigger pull force set at the minimum force specified, with engagement set to the minimum specified, and with the firecontrol lubricated per the owner's manual.
- The test shall be conducted with the magazine or clip fully loaded with dummy cartridges, inserted in the firearm.
- Parts breakage or other damage as a result of drop testing does not constitute failure as long as the empty primed case does not fire and the firearm can be unloaded safely after each drop. More stocks are required than the amount of test guns to allow for breakage due to the drop testing. If a stock cracks, replace before continuing test.

Data required:

- Record whether or not the firearm fires an empty primed case of its designated cartridge when tested in accordance with this procedure.
- Record round level on the firearm

TLW0010AT– Extended SAAMI Jar-Off Test: (for Information only.)

With the intent to establish design margin this test simulates the abusive impacting (bumping) of the firearm against a hard surface with the firearm in a state of maximum readiness under conditions more severe than the SAAMI recommendations. This test will be performed on a sample of six (Phase II) (or the number available after performing the std. SAAMI tests) firearms.

Method:

- With the firearm cocked and in the safety in the FIRE position the firearm shall be dropped from a height of 18 inches, 24 inches, and 48 inches onto a 85±5 Durometer, Shore A, rubber mat, one-inch thick backed by concrete. The mat and concrete shall be large enough so that when the gun is dropped it will fall within the perimeter of the mat striking the mat once. The distance of drop will be measured from the test surface to the lowest point on the firearm. The primed case shall be discharged following

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the drop and a fresh primed cartridge re-chambered prior to the next drop. A "fresh" firearm may be substituted into the test at any point.

- The firearm or firearms shall be dropped in such a way as to cause it to strike the rubber mat surface in each of the following attitudes:
    - Barrel vertical, muzzle down.
    - Barrel vertical, muzzle up.
    - Barrel horizontal, bottom up
    - Barrel horizontal, bottom down.
    - Barrel horizontal, left side up.
    - Barrel horizontal, right side up.
- Tests shall be conducted with the trigger pull force set at the minimum force specified, with engagement set to the minimum specified, and with the firecontrol well lubricated with Rem-Oil.
- The test shall be conducted with the magazine or clip fully loaded with dummy cartridges and inserted in the firearm.
- Conduct this test at 18 inches, 24 inches, and 48 inches.
- Parts breakage or other damage as a result of drop testing does not constitute failure as long as the empty primed case does not fire and the firearm can be unloaded safely after each drop. More stocks are required than the amount of test guns to allow for breakage due to the drop testing. If a stock cracks - replace before continuing test.

Data required:

- Record engagement and trigger pull
- Record whether or not the firearm fires an empty primed case of its designated cartridge when tested in accordance with this procedure.
- Record the round level on the firearm

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TLW0010AU – Extended SAAMI Rotation Test: (for Information only.)

With the intent to establish design margin this test simulates the abusive fall of a firearm when left leaning against a vertical surface under conditions more severe than the SAAMI recommendations. This test will be performed on a sample of six (Phase II) (or of those still available) firearms.

Method:

- With the firearm safety in the SAFE state, the firearm shall be capable of passing the following test criteria when allowed to fall freely from an upright position with its butt resting on the surface of a tiled floor backed by concrete. The firearm shall be tested so as to fall once on its right-hand side and once on its left-hand side. The primed case shall be discharged following the drop and a fresh primed cartridge re-chambered prior to the next drop. A "fresh" firearm may be substituted into the test at any point.
- Tests shall be conducted with the trigger pull force set at the minimum force specified, with engagement set to the minimum specified, and with the firecontrol well lubricated with Rem-Oil.
- The test shall be conducted with the magazine or clip fully loaded with dummy cartridges, inserted in the firearm.
- Parts breakage or other damage as a result of drop testing does not constitute failure as long as the empty primed case does not fire and the firearm can be unloaded safely after each drop. More stocks are required than the amount of test guns to allow for breakage due to the drop testing. If a stock cracks - replace before continuing test.

Data required:

- Record whether or not the firearm fires an empty primed case of its designated cartridge when tested in accordance with this procedure.
- Record round level of the firearm.

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TLW0010AV – Extended SAAMI Drop Test: (for Information only)

With the intent to establish design margin this test simulates abusive dropping of the firearm in conditions more severe than the SAAMI recommendations. This test will be performed on a sample of six (or of those still available) firearms.

Method:

- With the firearm safety in the SAFE state, the firearm shall be dropped from a height of 6 feet and 8 feet onto a 85± 5 Durometer, Shore A, rubber mat, one-inch thick backed by concrete. The mat and concrete shall be large enough so that when the gun is dropped it will fall and come to rest without interference within the perimeter of the mat. The drop height shall be measured from the surface of the rubber mat to the center of gravity of the firearm. The center of gravity shall be determined to an accuracy of ± one inch by any recognized method for finding the center of gravity of an irregular shaped object.
- The primed case shall be discharged following the drop and a fresh primed cartridge re-chambered prior to the next drop. A "fresh" firearm may be substituted into the test at any point.
- Test Procedure - The firearm or firearms shall be dropped in such a way as to strike the rubber mat surface once in each of the following attitudes:
    - Barrel vertical, muzzle down.
    - Barrel vertical, muzzle up.
    - Barrel horizontal, bottom up.
    - Barrel horizontal, bottom down.
    - Barrel horizontal, left side up.
    - Barrel horizontal, right side up.
- Tests shall be conducted with the trigger pull force set at the minimum force specified, with engagement set to the minimum specified, and with the firecontrol well lubricated with Rem-Oil.
- The test shall be conducted with the magazine or clip fully loaded with dummy cartridges and inserted in the firearm.

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- Parts breakage or other damage as a result of drop testing does not constitute failure as long as the empty primed case does not fire and the firearm can be unloaded safely after each drop. More stocks are required than the amount of test guns to allow for breakage due to the drop testing. If a stock cracks - replace before continuing test.

Data required:

- Record whether or not the firearm fires an empty primed case of its designated cartridge when tested in accordance with this procedure.
- Record round level on the firearm.

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INTENTIONAL ABUSE- TLW0010AW THROUGH TLW0010AY

Note that for all of the following tests, the rounds are to be loaded remotely and the test setup shall have the capability of unloading live rounds remotely if required.

TLW0010AW - Pierced Primer Test:

For this test, a firing pin will be altered to have a "wedge-shaped" point. This type of firing pin point should produce a pierced primer when fired. The purpose of piercing the primer is to allow high-pressure gases to escape into the action and thereby determine the effect of high-pressure gases when dumped into the bolt, magazine box and receiver areas. All standard Remington high-pressure ammunition safety procedures will be used for this test. A standard round of .30-06 ammunition will be used.

After firing the rifle will be examined for damage. Photographs of damaged components will be taken and kept for record. The rifle will be tagged and saved for possible future review.

Method:

- Position firearm in test jack located in the "Blow-up" room with the muzzle through the port.
- Set witness paper at the rear of the action perpendicular to the bore.
- Locate witness paper at the approximate location expected for the shooter's face.
- Set up the High Speed Video to tape the firing test.
- Fasten a lanyard around the stock and run through the trigger guard in front of the trigger.

- Load a standard factory .30-06 round into the chamber, and carefully close the bolt.
- All personnel are to leave the room.
- When ready to conduct the test start the high speed video and pull the lanyard.
- Carefully examine the scene looking for any broken or missing parts, holes in the witness paper etc.

Data Required:

- Rifle serial number.
- The condition of the witness paper.
- Notes of any broken or missing parts.
- Photographs of broken or missing parts.

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TLW0010AX - High Pressure Test:

The rifle will be tested to 120,000 psi. The purpose of this test is to determine the extent of damage if an individual does purposely or accidentally handload an extremely high pressure load. Use standard Remington high-pressure ammunition safety procedures for these tests. The pressures for the test round will be worked up using various grain size loads giving pressures below 95,000 psi, (approaching the limits of the transducer gauges.) The grain size load will be plotted and a curve extrapolated to determine the load expected to produce a load of approximately 120,000-psi.

All testing will be done in the blow-up room using the high-speed video camera and witness paper. Before removing or otherwise disturbing the test samples after blow-up, photographs will be taken for the record. After collection and removal of the parts additional photographs of the various individual components will be taken for the record. All parts will be put in sample bags, boxed and temporarily stored for review if required.

TLW0010AY - Obstructed Bore Test:

One of the sample rifles will have a rifle bullet driven into the bore to a position immediately ahead of the chamber. A standard round (.30-06, 220 gr. factory load) will be loaded and fired remotely. All testing will

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be done in the blow-up room using the high-speed video camera and witness paper. Before removing or otherwise disturbing the test samples after blow-up photographs will be taken for the record. After collection and removal of the parts additional photographs of the various individual components will be taken for the record. All parts and will put in sample bags, boxed and temporarily stored for review if required.

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M/710 DAT #1
TEST PLAN

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M/710 Trial & Pilot

Test Plan

Model 710, New Centerfire Rifle

(Caliber - .270)

Revision # 4

02/05/01

TLW 0407

10:52 AM 05/24/01

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M/710 CENTERFIRE RIFLE
TRIAL & PILOT TEST PLAN

Introduction:

This test is designed with the assumption that a production run of at least 150 rifles will be produced by the Mayfield plant using all available production processes intended for use in manufacturing this model. Thirty (30) rifles will be selected at random from the sample lot of 150 for use as Trial & Pilot evaluation samples.

The sample of 30 rifles will be divided into 3 groups of 10 rifles each; A1-A10, A11-A20 and A21 to A30. All rifles, A1-A30, will be used initially for visual and packaging evaluation, which will be done on site. Rifles A11-A20 will be used for measurements and A21-A30 will be used for initial accuracy using a high quality 36X scope to establish the baseline accuracy of the rifle.

All 30 rifles will be shot, 10 rounds each, as a safety precaution with a lanyard prior to the continuation of any live fire testing if Mayfield does the initial headspace and proof testing. After completion of the 10 round lanyard test, each rifle will be shot using 100 rounds of Remington ammunition, (5 types of 20 rounds each type), using the Remington jack (heavy configuration) to establish the basic product malfunction rate.

Rifles A1-A10 will then be shot, in the jack, an additional 400 rounds each using a variety of Remington and major competitor's ammunition to evaluate malfunction rates, magazine box endurance and reliability and other wear and breakage characteristics.

Rifles A11-A20 will be used as samples for Environmental Testing and Abuse Testing.

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Initial Tests, Measurements and Inspections:

VISUAL EXAMINATION, PACKAGING AUDIT AND PACKAGING TEST - TLW0407A THROUGH TLW0407C:

TLW0407A / TLW0407B – Visual Examination & Packing Material Audit

A visual examination will be made of all 30 sample rifles prior to the start of any additional testing, measurement or inspection. After the visual examination permanent labels will be affixed to each test sample using the designations A1-A30.

The following will be specifically noted:

ISS Key – present
Serial Numbers
Cosmetic Mars
Bolt Stop Release freedom
Trigger Position will be noted
Presence of Bent Triggers
Proof and Magnaflux Stamps present

Packaging will be audited, as the firearms are unpacked. Each shipping box will be examined for:

-Match of Serial Number on Rifle to that on the box end label and owner's manual package.
-Check the inventory of all required paperwork, owner's manuals, etc.
-Box examination for presence of tears in the cardboard, crushing, stains, box inserts, etc.

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TLW0407C – Packaging Test

This section of the test will be an intentional abuse of the product while in the shipping carton. The sample firearm will be packaged according to ship level criteria and dropped from a height of four feet onto a tile floor. The external packaging material will be examined for damage and then the packaging will be opened. Interior packing material integrity will be examined and assessed for damage. The firearm will be removed from the packaging and examined for damage, nicks, or other cosmetic degradation. This sequence will be repeated six times using new packaging material for each sequence and each time the product is dropped it will be on a different side so during the course of the test each of the six sides will be tested. The firearm product itself may be repaired or replaced as necessary to permit the test to continue. This portion of the test will be considered informational only as the test attempts to simulate the effects of the product being pushed from the back of a tractor-trailer and allowed to fall to the ground. This would be considered a worst-case packaging drop abuse.

HEADSPACE AND PROOF - TLW0407E THROUGH TLW0407G:

TLW0407E – Measure Headspace

All test samples will be measured for headspace before being tested in either the jack or shot from the shoulder. The chamber, bolt face & locking lugs will be inspected for the presence of dirt or debris. If dirt or debris that could affect headspace measurement is present then these areas of the firearm will be cleaned before using the gauges.

Method:

The graduated headspace gauges based on Remington chamber dimensions (Ref.: Remington Gauge Drawing # 41560 …A, ...B, …C, & …D) will be used and the headspace measurements will be recorded to the

nearest .001" increment as indicated by the gauge. The .270 Remington chamber drawing LB-154 will be used for chamber dimensions.

The headspace measurements will be recorded to the nearest .001" increment as indicated by the gauge.

If the measurement is taken at the start of the test then headspace should be less than Min. + .005".

As the test progresses, headspace will be taken at each "Safety Inspection" scheduled in the plan and, in addition, at each "Clean & Inspect" activity scheduled by the plan.

The readings for each firearm will be recorded on the "Daily Test Data Sheet" to be kept with each firearm in the accompanying data packet.

For any firearms where the headspace is changing at each inspection point the firearm will be withdrawn from test and examined for the cause.

In no case will any firearm in the test program be allowed to continue test if the headspace exceeds Min. + .009".

Data Required:

Rifle serial number

Headspace measurements for each sample

TLW0407F - Proof Test

All firearms in the 150-rifle sample as supplied by Mayfield should be proof tested prior to delivery to R&D for T&P testing. Each rifle in the selected 30-rifle sample will be examined for the presence of the Remington proof stamp. **If the rifles are not proof tested and properly stamped by Mayfield the following procedure will be used by R&D to proof test and stamp the rifles prior to any other live fire testing.**

All test sample firearms will be subjected to a standard .270 Factory Proof Load, shot in the blow-up room using a lanyard. This procedure will be completed before the firearm can be used for any additional firing tests.

Before proof testing the firearm should be inspected for:

- Barrel Obstructions

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- Bore and chamber are free of grease or oil and other debris.

For fully assembled firearms, one definitive proof cartridge should be fired in each firearm. Definitive proof ammunition is to be used in accordance with the "Handling of Ammunition" procedure defined in the SAAMI Technical Committee Manual, Volume III, Section II, Page 2410 as follows.

a. "Cartridges to be tested should be placed in a vertical position with primer end down in a recessed holding block."
b. ".... a cartridge should be lifted vertically from the block. It should be rotated slowly, end over end, in a vertical plane through 360° pausing momentarily when the powder is at the bullet end and again when the powder is at the primer end."
c. "The cartridge is then rotated slowly, a minimum amount to enter chamber, keeping primer end in lowest possible position until inserted gently and carefully into the chamber."
d. "The cartridge should be seated in the chamber as far as practicable with the fingers. The bolt or breech mechanism should be closed gently in order not to disturb the position of the powder in the cartridge case. The object of this method of handling cartridges is to position the propellant powder at the primer end of the cartridge case by permitting it to fall gently against the primer and while rotating the case."

Note that these procedures for proof testing were developed to consistently position the propellant thereby providing greater consistency of proof pressures. Failure to follow this procedure during the definitive proof testing of each chamber of the firearm could result in pressure levels significantly below the minimum proof pressure specification as determined for the cartridge.

Any firearms components, such as bolts, bolt heads, receivers including chambers, etc. which were previously subjected to proof testing and, which subsequently, have any proof sensitive components changed, altered, or substituted, should be re-proofed.

Method:

- Record headspace before proof testing *(see previous procedure "TLW0407D – Measure Headspace.")*
- After firing the proof round, the firearm will be carefully examined to determine if any damage to the product has occurred due to exposure to the proof pressure. This inspection includes:
- Visual inspection for damage,
  - damaged receiver or bolt, especially the locking lugs on the bolt or the receiver
  - bulged chamber or bore; split, cracked or otherwise damaged barrel,
  - broken stock,
  - any other part subjected to the proofing stress, which can be visually examined for damage.
  - Any "suspicious" areas should be submitted to magna-flux inspection before proceeding.
- The fired proof cartridge should be examined to determine that no firearm fault has introduced cartridge failure, such as:
  - Expanded cartridge head.
  - Excessive roughness, rings, or bulging, which would affect extraction.
  - Beginning separation or material stretching in front of the case head indicating excessive headspace or excessive pressure as stated above.
  - Any cartridge case failure indicating a firearm fault.
- In addition, the spent proof round should be examined for the presence of unusual deformation, split case or split head, and for any evidence of a pierced primer. Any of these conditions may be indicative that high-pressure gases may have vented into the action where other damage to components may have occurred.
- Take note of any indication of significant gas leakage, if present, it may indicate that the firearm was not subjected to full proof pressures and the proof test would then be invalid and would require re-proofing.
- A firearm is only properly proofed when the cartridge has been fired without evidence of significant gas leakage.

- Save the spent proof case in a Zip-Lock plastic bag and label and place in the data packet for further reference. If any parts were broken or otherwise damaged, place these parts in the same bag as the proof case and label. Place a label on the firearm and withdraw the firearm from the test.
- Each sample firearms' headspace *(see following procedure "TLW0407G – Re-Measure Headspace after Proof")* must remain in range from min. to min. +. 007" after proofing, with no individual firearm's headspace to grow more than .002" after firing one proof round. After successful proofing, the right lug on the bolt head will be marked in the center (i.e. center of top to bottom and center or front to rear) of the lug with a center punch to indicate that is has been proofed.
- After proof, if the firearm passes the inspection and headspace has been measured *(see next section of test plan)*, stamp the firearm on the barrel with an authorized Remington proof stamp. Locate the proof mark on the right rear of the barrel in the specified location for the Remington proof stamp. **DO NOT STAMP** if the headspace exceeds Min + .009".
- Because of the higher pressures involved in shooting proof cartridges, adequate precautions, both mechanical and procedural, should be taken to protect personnel performing the firearms proof testing. To this end, the firearm should be securely mounted, completely shielded from the operator and firing accomplished by a remote control method.

Data Required:

- Rifle serial number
- Record and note any headspace growth and the corresponding round level.
- Record significant gas leakage and/or firearm damage.
- Record any case damage or other ammunition related malfunctions.
- Record any damage to the firearm resulting from the proof test. Document with Photographs as necessary.

TLW0407G – Re-Measure Headspace after Proof

All test samples will be re-measured for headspace after proof and before being tested in either the jack or shot from the shoulder. The chamber, bolt face & locking block/locking notch will be inspected for the

presence of dirt or debris. If dirt or debris that could affect headspace measurement is present then these areas of the firearm will be thoroughly cleaned before using the gauges.

Method:

- The graduated headspace gauges based on Remington chamber dimensions (Ref.: Remington Gauge Drawing # 41560 ...A (min.), ...B (+. 005), ...C (+. 007), & ...D (+. 009)) will again be used and the headspace measurements will be recorded to the nearest .001" increment as indicated by the gauge. The .270 Remington chamber drawing LB-154 will be used for chamber.
- The headspace measurement taken prior to the proof test should be less than min. + .005". If, after proof, the growth of the headspace is more than + .002" from the pre-proof condition, then stop and review the results with the test manager before continuing to the next phase of the test.
- In no case should the measurement for headspace after initial proof test be greater than min.+007" for a new firearm.
- If at any time during the test program the headspace exceeds a maximum of Min. + .009" do not continue to fire the rifle, tag the gun with a label reading "Do Not Shoot This Firearm – Exceeds Maximum Allowable Headspace" and return the firearm to the Test Manager for disposition.

Data Required:

- Rifle serial number
- Record and note any headspace growth and round level.

FORCES – TLW0407H THROUGH TLW0407Q AND TLW0407T:

TLW0407H - Measure Firing Pin Indent:

The firing pin indent will be measured for each of the sample rifles using SAAMI qualified copper crushers. The average of three trials per sample rifle will be calculated. The Average of three indents must be equal to or greater than 0.017".

Method:

- Using copper crushers, "burnish" both ends of the crusher slug by gently rubbing both ends on the granite base of the dial indicator stand (use outside edge of the plate.)
- Place the copper crusher in a .270 / .270-crusher holder, place the crusher holder on the base of the dial indicator and zero the dial indicator with the point of the indicator in the approximate center of the crusher.
- Carefully, with the gun held so that the muzzle is pointed down toward the floor, gently insert the crusher holder into the chamber, being sure that the extractor clearance cut on the crusher is properly oriented relative to the extractor position.
- While maintaining a firm hold on the bolt handle, gently, and slowly ease the bolt forward to the full forward position and then rotate down being sure that the action locks fully.
- Holding the firearm in a horizontal and level position, and pointing the firearm in a safe direction, pull the trigger until the firing pin releases.
- Carefully open the action and remove the crusher holder, being careful not to drop the copper crusher.
- Leave the crusher in the holder and place under the dial indicator.
- Move the crusher holder so that the point of the dial indicator finds the deepest portion of the firing pin indent.
- Record the dial indicator reading to the nearest .001".
- Repeat procedure two more times and record the dial indicator readings using a new copper crusher for each trial.
- Each firearm sample should have three readings that will be averaged.
- Record all three readings for the data file.

Data Required:

- Rifle serial number
- Each of the three trial indents

- The calculated average indent by rifle.

TLW0407I - Measure Sear/Trigger Engagement and Sear Lift:

The Sear/Trigger Engagement will be measured. The amount of engagement must be measured between .020" and .025" measured with the bolt in the fully closed and locked position.

Method for measuring Sear/Trigger Engagement:

- The 30" Optical comparator will be used to measure the engagement at 50X magnification.
- With the barreled action held firmly in position, the barreled action will be aligned such that the action is held perpendicular to the lens in both the horizontal and vertical planes.
- With action closed and locked, the safety in the "fire" position, measure the amount of overlap between the sear and the trigger.

Method for measuring Sear Lift:

- Remove the bolt from the action.
- Place the Safety in the "Off-Safe" (i.e. "Fire") position.
- With the action held firmly in a horizontal position pre-load the sear in the downward position using a small screwdriver and with a dial indicator zeroed on the top of the sear, gently rotate the Safety to the "On-Safe" position.
- Record the amount of vertical movement of the sear.
- Minimum sear lift is 0.006"

Data Required:

- Rifle Serial number
- Record Sear/Trigger Engagement
- Record Sear Lift

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TLW0407J - Measure Trigger Pull Forces:

Trigger pull force.

Method:

- Trigger pull is to be performed to the SAAMI standard; horizontal pull at the center of the finger radius of the trigger using the Test Lab apparatus designed for taking this measurement.
- Use the 1-10 lb. Chatillion Force digital force gauge or the Spring Scale – either type is acceptable. 83
- Force is measured parallel to the bore with the stock assembled to the action.
- Three pulls are to be taken on each sample rifle and the results averaged.
- The average force for the three trials must be between 4.0 lb. and 5.5 lb.

Data Required:

- Rifle Serial number
- All three data points for each trial rifle
- The average of the three measurements for each sample rifle.

TLW0407K - Measure Safe On/Off Forces:

Using the Chatillion Digital force gauge and the wooden holding fixture used to take trigger pull readings, push the Safe from the "Safe On" to the "Safe Off" position on each test sample. Complete three trials. Record all three readings for each firearm. A minimum of 1 lb. force in "Safe On" to "Safe Off" direction will be assumed as the reference criteria.

Method:

- Use trigger pull apparatus to hold the rifle for this test.
- Use the Chatillion Digital Force gauge (0-10 lb. range) with the disc point or the "v" shaped point. Use the same tip on all subsequent trials.

- Make three trials in specified direction for each sample.
- Average the results of each of the three trials.

Data Required:

- Rifle serial number
- Each of the three readings on each sample
- The average of each of the three sets of readings

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TLW0407M - Measure Magazine Spring Force:

The force produced by the compression of the Magazine Spring in the box with the follower attached will be measured. These measurements will be taken for information only. There is no specification currently defined for this characteristic.

Method:

- Use the Chatillion TCD200 Spring Testing Machine with the Chatillion Digital Force Gauge (0-10 lb. range). Use the disc probe (½" dia.) with the gauge.
- Place the magazine box, bottom side down, on the staging table.
- Zero the force gauge with no load applied.
- Lower the gauge until it just touches the magazine follower, approximately in the middle location both side to side and front to rear.
- Zero force gauge again if necessary.
- Lower the gauge 0.200" and take the spring force measurements.
- Lower the gauge another 1.0".
- Take the force measurement at this depressed location of the spring.
- Repeat procedure two additional trials for each box.

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- Average the 3 trials for each box and at each measurement location.

Data Required:

- Force Measurements taken on each trial per box at each of the measurement locations.
- The Average Force measurement per box.
- The serial number of the Chatillion Digital Force Gauge used for the procedure.

TLW0407N – Measure Firing Pin Head / Sear Engagement:

The vertical engagement of the contact between the firing pin head and sear will be measured. The minimum vertical engagement to be .049".

Method:

- Use digital height gauge and one-tenth dial indicator attachment.
- Visually check to ensure the firearm is unloaded.
- Clamp firearm in portable vise and set on top of granite table.
- Remove the bolt assembly.
- Place the safety in the "Fire" position.
- Use a small bubble level to level the top of the receiver relative to the granite table.
- Zero indicator on the receiver insert just rearward of the sear.
- Lightly depress the sear until contact with the trigger is felt and hold in place.
- Indicate to the top of the rear portion of the sear and record the measurement.
- Reinstall the bolt assembly and close over an empty chamber.
- Use pin gauges to measure the gap between the receiver insert and the bottom of the firing pin head, record the gap width.
- Subtract the gap width from the indicated measurement and record as the firing pin to sear engagement.

Data Required:

- Firearm Serial Number
- Indicated measurement
- Pin gauge gap width measurement
- Firing pin head to sear engagement.

TLW0407O – Bolt Stop Function Check

The bolt stop will be checked for proper function. The bolt stop must prevent the bolt from being unintentionally withdrawn from the receiver when in the "locked" position and must permit the bolt to be withdrawn when in the "un-locked" position. Measure the amount of force required to move the bolt stop from the locked position to the un-locked position and record. Determine if the bolt stop can be operated by a bare hand and then a gloved hand without the aid of a tool. The bolt stop must properly "detent" in the "locked" position.

Data required:

- Rifle serial number
- Measurements of force required to move bolt stop from the locked position to the unlocked position.
- Record check of bolt stop function relative to bolt retention.
- Record whether bolt stop can be operated with bare hands and gloved hands.

TLW0407P – Function Check of ISS System:

To check the ISS systems for proper function follow the four-step procedure that follows. If the system fails during any of these procedures stop the test for that gun and continue with the next sample. To be considered a proper functioning ISS system each sample must pass all four of the procedures as outlined below.

1. Make sure the chamber and magazine box are completely empty of live ammunition. This test will involve the use of a primed case, use appropriate safety procedures. This test should be performed

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with the muzzle of the gun inserted into a shooting port or other approved device. With the bolt in the open and un-locked position and safety "On", using the ISS tool, lock the ISS System in the secure mode (no red dot visible) and remove tool. Attempt to close and lockup the bolt after placing a primed case into the chamber. You should not be able to close and lock the bolt easily, without applying excessive force. If the bolt cannot be closed the test sample passes the test. (Note: If the bolt can be closed, place the safety in the "Fire" position and then pull the trigger. The firing pin must not fall and set off the primed case. If the primed case fires then the test sample fails the test. If the primed case does not fire, attempt to unlock the ISS with the tool. Be careful, only apply enough force to see if you can unlock the ISS, without bending the tool. If the primed case is fired at any time during this procedure the test sample fails the test. If the primed case does not fire the test sample passes the test.) Record outcome of all steps taken and Pass/Fail results.

2. If the test sample passes the above test in either of the two possible ways (bolt cannot be closed or primed case does not fire) then perform the following test. Open the bolt and move partially to the rearward position (do not open bolt far enough to eject the primed case), unlock the ISS System (red dot visible) using the ISS tool. Move the safety to the "On Safe" position if it is not already there. **Remember that there is still a primed case in the chamber**. Push the bolt forward slowly, re-chambering the primed case, and fully lock the bolt. Make sure the muzzle of the rifle is in the port of the shooting station (or other approved device). Place the Safety in the "Off Safe" position and pull the trigger, the firing pin must fall and set off the primed case. If the primed case is not fired then the test sample fails. Record results.

3. If the system passes both tests above then perform this procedure. Make sure the gun is completely unloaded of live ammo or primed cases. Open the bolt to the rearward position and put the safety in the "On Safe" position. Rotate the ISS to the locked position (no red dot visible) using the ISS tool and then attempt to unlock the ISS first using your fingers and then using a small screwdriver. You must not be able to unlock the ISS System. (Be careful, do not use excessive force when using the

screwdriver, you just want to determine that the system will not unlock without the use of the proper tool.) Record results.

4. For the final check unlock the ISS system using the ISS tool and make sure the safety is in the "On Safe" position. Close and lockup the bolt on an empty chamber. Using the ISS tool attempt to lock the ISS system. Be careful, do not use excessive force or the ISS tool will be damaged. You should not be able to lock the ISS system with the bolt closed on a M/710. Record results.

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Data required:

- Rifle serial number
- Record results for all four phases of the ISS System function check.

TLW0407AT – Perform Bore Sighting Using Bushnell Scope:

Prior to the start of any live fire or accuracy testing a sample of the rifles will be inspected to determine if Mayfield has performed a bore sight check/adjustment after mounting the Bushnell Scopes. Use rifles A21-A30. Use standard Bore sighting procedures in the Long Range sighted in at 100 yards. One 5 shot group will be fired through each rifle to establish POI relative to POA. Note: Do not make any adjustment to the scope. They should be fired as received unless alignment of the scope to the bore is off considerably.

Data Required:

- Rifle serial number.
- POI relative to POA for each rifle.
- Review Results prior to further live fire testing of the test lot.

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FIREARMS MEASUREMENTS – TLW0407T THROUGH TLWOO10X:

TLW0407T - Chamber cast:

Use the .270-chamber drawing LB-154 for reference.

Method:

- Make chamber cast using standard procedure
- Use the 30" optical comparator
- Measure the following dimensions:
  - .4708/.4728
  - .4425/.4440
  - 34° 30" Angle
  - .3088/.3108
  - .2775/.2785

Data Required:

- Rifle serial numbers
- Record dimensions requested above.

TLW0407U - Bore Diameter:

Measure Bore Diameter using standard procedures.

Method:

- Measure .270 caliber
- Dimension equals .270/.271

Data Required:

- Rifle serial numbers
- Measurements of each bore by serial number

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Method:

- Check rifle for live ammunition
- With muzzle pointed in a safe direction, close the bolt and lock over an empty chamber
- Remove the magazine from the gun and load 4 dummy rounds into the magazine
- Insert magazine into the rifle, it must lock securely in place
- Cycle the 4 dummy rounds through the chamber and eject each round
- Remove the magazine box and repeat test two additional times per sample rifle.

Data Required:

- Rifle serial number
- Record any failures to load and cycle properly by box and rifle

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FUNCTION & ENDURANCE TESTING:

FUNCTION AND ENDURANCE TESTING – TLW0407Y THROUGH TLW0407AB

TLW0407Y – Ten (10) Round Safety Function Test with Lanyard:

As an additional safety precaution, each of the 30 sample rifles will be placed in the standard Remington test jack located in the Blow-Up Room and shot with ten rounds of standard load ammunition. Each shot will be fired with a lanyard with the shooter located outside of the room when the rifle is fired. At the completion of the ten rounds the rifle and spent cases will be examined for any signs of damage or abnormal conditions.

TLW0407Z - Basic Jack Function Test (100 Rounds w/Rem. Ammo):

To get a picture of the product's functional capability, a 100 round per rifle jack function test will be conducted. Five bullet types will be used, 20 rounds (all Remington) of each in each rifle to evaluate the potential for feeding problems. The test will be conducted in the Remington test jacks (heavy configuration) with the "belly-protectors" in place and fully closed for each shot. All malfunctions and any unusual behavior will be noted on the data forms. The overall average of all sample rifles should be at or below 2-% malfunction rate. Up to two rifles from the sample of 30 are permitted to be removed from the averaging process if they have excessive malfunction rates relative to the remaining group of 28 samples. No major mechanical failures are allowed in the test sample. Major mechanical failures are defined as those failures that cannot easily be repaired with simple tools and/or readily available replacement parts. At the conclusion of this test the firearms will be carefully examined for signs of excessive wear, especially with respect to the plastic components.

Method:

- Check each rifle for the presence of the proof stamp(s) – do not shoot unless the stamp(s) are present.
- Check each rifle for headspace
- Draw ammunition from stores – See test lab manager for ammo types to be used for this test.

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- Each tester to have five rifles for test at any given time.
- The muzzle of each rifle will be inserted into the shooting port and the rifle placed securely in the test jack before the rifle is loaded.
- Load four rounds into the rifle by loading four in the magazine and inserting the magazine into the gun. Do not shoot single shot by hand-feeding single rounds into the chamber.
- Push the safe to the "fire" position, be sure that the barrel is far enough within the port hole so that the muzzle will stay in the port when the rifle recoils. If there is any question, re-adjust the jack into a better position.
- With the lid on the belly protector closed, fire the first round in the chamber, listen for any off-sounds, and be alert for any other unusual behavior.
- Open the bolt; eject the spent round, note any extraction or ejection problems.
- Close the bolt to load the next round from the magazine into the chamber, note any feeding or stemming problems.
- Continue to fire the remaining rounds in the magazine until the last round is fired and the spent case is ejected.
- Push the Safety to "On Safe" position, the safety will be pushed to the fire position at the start of every five round trial and will be pushed to the On Safe position at the end of every five round trial. Repetitive action of the safety lever on the trigger assembly side-plate needs to be determined.
- After firing twenty rounds (1 box of ammo) the rifle will be checked carefully for the presence of any live ammunition and if empty will be removed from the test jack and placed in the cooling rack. The safety will be in the "On Safe" position and the bolt will be unlocked and fully open at all times. Compressed air may be used, if necessary to cool the inside of the chamber area if the rifle is excessively hot from firing.
- All malfunctions will be recorded on the data sheets.

Data Required:

- Rifle serial number
- Tester's name

- Date of test firing
- The TLW#
- The ammunition used for the test with the ammo lot code number of the rounds actually used.
- Any malfunctions noted or other unusual items of note.

TLW0407AA - Extended Function & Endurance (400 Rounds w/Rem. & Competitive Ammo):

This Extended Function & Endurance Test will be shot to determine an estimate of the product's expected malfunction rate over an extended period of shooting. For purposes of definition, a component failure will be one that prevents (or could prevent) the firearm from functioning as intended. These are failures that can be fixed relatively easily by the simple replacement of a part such as could be done by the gun owner using only simple household tools. System failures are defined as failures of a major nature, the extent of which would require specialized tooling or methods to repair not normally available to the average gun owner. Such a repair would be most likely made by a qualified gunsmith or by return to the factory.

This Extended Function & Endurance Test will be shot in the Remington test jacks (heavy configuration). The covers on the "belly-protectors" will be down and in-place for each test shot. Careful monitoring of each test gun is essential to evaluate the malfunction rate for each firearm.

Each of ten rifles will be shot, using a variety of Centerfire ammunition comprised of light, medium and heavy bullets. In addition, ammunition from the three major manufacturers (Remington, Winchester and Federal) of Centerfire ammunition shall be included in the mix.

Each rifle will be shot no more than 20 rounds before being put aside for cooling. Compressed air applied to the inside of the chamber will be an acceptable method to assist in the cool-down process.

The test will be performed according to Remington's standard endurance test procedures for centerfire rifle. Rounds for this test will be ten rifles to 400 rounds each.

Records all instances of malfunctions and failures, and replace parts when they become unserviceable noting the round level when they were replaced.

After every 100 rounds one live round will be extracted and ejected from the chamber to check on live round ejection. The ejected round will then be re-inserted into the chamber and fired to help keep the endurance round count accurate.

Method:

- Disassemble, thoroughly clean, lubricate per the design team's instructions, and re-assemble. Record headspace for each.
- Fire each test firearm in accordance with the firing procedure (number of rounds, firing cycle) specified by engineering and the test plan.
- Ammunition will be used that comprises at least five types of bullets, change ammunition type every 100 rounds. 83
- Before commencing design acceptance testing, calibrate, adjust, or re-build the shooting jacks, if necessary.
- Allow the firearm to completely recover in the shooting jack between each shot and do not lean or "stiff arm" the firearm while shooting the gun.
- All ammunition is to be functioned through the magazine - no "single shot" hand feeding permitted.
- Allow the rifle to cool between cycles. One cycle is 20 rounds fired. The use of forced air to accelerate cooling of the barrels between firing trials is permitted. The air should be directed from the chamber toward the muzzle to prevent it from washing the lubricant from the firearm's action.
- Cycle the safety from fire to safe every 5 rounds, from Safe to Fire at the start of the five round cycle and from Fire to Safe at the end of the 5 round cycle.
- After 400 rounds, disassemble, inspect, clean and lubricate the entire mechanism and take all required measurements.
- The Standard Remington Jacks (using the heavy configuration) are to be used for this test.

Data Required:

- Rifle serial number
- Tester's name
- The Test Jack Identification

- TLW#
- Date of actual testing
- Headspace after the 400 round interval.
- Malfunctions per ammo type, breakage, and replacement parts used.
- Any failure that requires the gun to be removed from testing completely.
- Notify management of any unusual events or malfunctions immediately.
- Any firing of the firearm without the trigger being pulled.
- Record ammunition lot code information as it is used throughout the test.
- Bullet type used for each 20 rounds of the test.

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TLW0407AB - Clean Rifles and Inspect:

After 400 rounds of Extended Function & Endurance, unless other wise specified, each rifle will be disassembled, cleaned and thoroughly inspected.

A list of inspection points will be provided in the gun packet for check-off and sign-off by the inspector. The inspector will be looking for any signs of unusual wear, especially on critical components and surfaces as well as for anything such as cracks or deformed material that might present a safety concern. Photographs will be taken to document unusual wear, damage or other notable characteristics. Use the following checklist for inspection:

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Clean & Inspect Checklist

Model: _____ 710 _____ **Project:** _____ 241095 _____

Rifle: _____ **TLW #:** ____ TLW0407 ___

Date: _____/_____/_____ **Inspector:** _____

Round Level: _____

- ☐ **Measure Headspace** _____.
- ☐ **Firing Pin Indent** 1st._____ 2nd._____ 3rd._____ **Ave.**_____ 83
- ☐ **Sear Engagement:** _____.
- ☐ **Trigger Pull:** 1st._____ 2nd._____ 3rd._____ **Ave.**_____
- ☐ **Measure Feed Lip on Mag. Box at front:** _____ **& rear:** _____.

Check the following areas for signs of unusual wear or breakage:

- ☐ **Receiver insert**
- ☐ **Rear surface of Bolt Lugs**
- ☐ **Check for "galling" on rear of Bolt Lugs**
- ☐ **Bolt Plug**
- ☐ **Bolt Plug Insert "ears" on firing pin assembly**
- ☐ **Check for loose or missing pins – make note and re-stake if necessary**
- ☐ **Check plastic inserts for cracks or other damage.**

Take digital photographs, if appropriate, to record unusual wear, damage or other note-worthy observations. List the digital file name for reference along with any comments below.

_____

_____

_____

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ACCURACY TESTING:

ACCURACY AND POI TESTING – TLW0407AC THROUGH TLW0407AF

TLW0407AC – POI & Group Size – Initial Test with High Quality 36X Scope @ "zero" rounds

The point of impact test involves the verification of the firearms sighting system adjustment and the potential to hit the point of aim. Random variation and/or extreme difference in shot to shot point of impact (as well as group size) typically indicate improper barrel processing and is used as a final inspection flag in production. Shoot three, 5-shot groups from each test rifle. Use the same code of ammunition for all point of impact test shots. Sample rifles A-21 to A-30 (ten rifles) will used for this accuracy test.

Method:

- Pick the point of aim on the target
- Adjust point of aim to the bulls-eye at 100 yards
- Shoot five "warmer" shots
- Shoot three, 5-shot groups
- Cycle the safety from fire to safe every 5 rounds

Data Required:

- Measure POI vs. POA for each shot in terms of "x" and "y" position
- Measure group sizes center to center
- Record takedown screw torque
- Record make and identifier of scope
- Record ammunition type used
- Record ammunition lot numbers used during the test
- Record and label any fail-to-fire ammunition.
- Record any malfunctions that occur during the test.

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ENVIRONMENTAL TESTING:

TEMPERATURE & HUMIDITY – TLW0407AG THROUGH TLW0407AI

TLW0407AG - Hot Function Test:

This test evaluates the effect of extreme high temperatures on the functioning performance of firearms.

Method:

- Condition test firearm and 100 rounds of ammunition in a climatic chamber for at least 6 hours at a temperature of 120 degrees F. (or as close to 120 degrees F. as the equipment can be maintained.)
- Test each firearm after removing from the chamber as follows:
  - Fire 20 rounds of ammunition. Replace the rifle in the chamber. Wait 2 hours and repeat procedure until all 100 rounds have been fired.
  - Do not perform maintenance during the 100 round cycle.
  - Cycle the safety from fire to safe every 5 rounds.
  - The tester should wear gloves to protect his hands from the hot metal.
- After 100 rounds have been fired through each firearm, disassemble, thoroughly inspect, clean and lubricate.

Data Required:

- Record temperature and exposure times
- Record all malfunctions.
- Record damage noted during inspection

TLW0407AH - Cold Function Test:

This test evaluates the effect of extreme low temperatures on the functioning performance of the firearms. Shoot the firearm after removing from the environmental test cabinet.

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Method:

- Condition the firearm and 100 rounds of ammunition of climatic chamber for at least 6 hours at a temperature of -20 degrees F.
- Test each firearm after removing from the chamber as follows:
- Fire 20 rounds of ammunition. Return the firearm to the chamber. Wait 2 hours and repeat procedure until all 100 rounds have been fired.
- Do not perform maintenance during the 100 round cycle.
- Cycle the safety from fire to safe every 5 rounds.
- After 100 rounds have been fired through the firearm, disassemble, thoroughly inspect, clean and lubricate.

Data Required:

- Record temperature and exposure times
- Record all malfunctions.
- Record damage noted during inspection

TLW0407AI - Heat & Humidity Function Test:

Method:

- Shoot the firearm after removing from the environmental test cabinet in the long range.
- Store the gun and ammunition for a minimum of six hours at a temperature of +100°F and 80-90% Relative Humidity.
- Test each firearm after removing from the chamber as follows:
- Fire 20 rounds of ammunition. Return the firearm to the chamber. Wait 2 hours and repeat procedure until all 100 rounds have been fired.
- Do not perform maintenance during the 100 round cycle.
- Cycle the safety from fire to safe every 5 rounds.
- After 100 rounds have been fired through the firearm, disassemble, thoroughly inspect, clean and lubricate.

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Data Required:

- Record temperature and exposure times
- Record all malfunctions.
- Record damage noted during inspection

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M/710 TRIAL & PILOT, .270
TEST PLAN

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M/710 Trial & Pilot

Test Plan

Model 710, New Centerfire Rifle

Revision # 2

10/2/00

TLW0300
10:25 AM 05/24/01

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M/710 CENTERFIRE RIFLE
TRIAL & PILOT TEST PLAN

Introduction:

This test is designed with the assumption that a production run of at least 300 rifles will be produced by the Mayfield plant using all available production processes intended for use in manufacturing this model. Thirty (30) rifles will be selected at random from the sample lot of 300 for use as Trial & Pilot evaluation samples.

The sample of 30 rifles will be divided into 3 groups of 10 rifles each; A1-A10, A11-A20 and A21 to A28 (two rifles of the 30 will be selected and sent to marketing for review.) Rifles A1-A30 will be used initially for visual and packaging evaluation. Rifles A11-A20 will be used for measurements and A21 to A28 will be used for initial accuracy using a high quality 36X scope to establish the baseline accuracy of the rifle without the included Bushnell scope, as well as bore-sight verification using the production Bushnell scope.

All 28 rifles will be shot, 10 rounds each, as a safety precaution with a lanyard prior to the continuation of the testing. After completion of the 10 round lanyard test, each rifle will be shot with 100 rounds of Remington ammunition, (5 types of 20 rounds each type), using the jack to establish the basic product malfunction rate.

Rifles A1-A10 will then be shot, in the jack, an additional 400 rounds each using a variety of Remington and major competitor's ammunition to evaluate malfunction rates, magazine box endurance and reliability and other wear and breakage characteristics.

Rifles A11-A20 will be used as samples for Environmental Testing and Abuse Testing.

Rifles A21 to A30 will be for a 200 round test of the Scope System for stability and reliability at 0, 100 and 200 round intervals.

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Initial Tests, Measurements and Inspections:

VISUAL EXAMINATION, PACKAGING AUDIT, PACKAGING TEST AND SELECTION OF "BEST" AND "WORST" EXAMPLES - TLW0300A THROUGH TLW0300D:

TLW0300A – Visual Examination

A visual examination will be made of all 30 sample rifles prior to the start of any additional testing, measurement or inspection. A temporary hang-tag will be attached to the trigger bow of each rifle with the numbers V-1 to V-30 ("V" for "visual") along with the serial number of each rifle. These temporary tags will be used to identify each sample rifle for the purpose of recording observations. After selection of the "Best" and "Worst" examples permanent labels will be affixed to each test sample using the designations A-1 to A-28.

Clearly defined visual standards are not established for this model at this time. For purposes of this examination the attached "Warehouse Customer Focus Quality Audit Visual Demerit Identification" paper supplied by the Ilion site can be used as a guideline. Demerits, using the attached guidelines, will be assigned to each discrepancy and an average "demerits per gun" measure of visual quality will be calculated.

(As supplied by Ilion)

WAREHOUSE
CUSTOMER FOCUS QUALITY AUDIT
VISUAL DEMERIT IDENTIFICATION
DRAFT

Note: The firearms selected for Visual Demerit Classification are the result of failure to meet the personal visual criteria of the auditors.

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Demerit Classifications have been established as follows:

ONE DEMERIT: Next step above " comment " stage. A one-demerit classification would allow the firearm to continue to the warehouse. This level of demerit would not prevent the customer from buying the firearm but would require review with both front line and supervisor for corrective action.

Examples of one demerit classification:

* Fingerprints on pack box (minimal amount)
* Stock fit to receiver
* Dark mar on firearm
* Grease on Styrofoam insert
* Slight variances in checkering
* Minor imperfections in stock finish
* Minor bright mars

FIVE DEMERITS: A five-demerit classification would, under normal conditions, allow the firearm to continue to the warehouse. This level of demerit signifies that there has been a deviation from standard or the observation borders on customer rejection. More than one five-demerit classification on the same firearm could constitute the firearm returning to production for repairs. Supervision would need to assign someone to review demerit and report on follow up.

Examples of Five Demerit classification:

* Irregular steel / wood margins
* Wood match between stock & fore end
* Dents in stock or fore end
* Mis-packed accessories
* Some bright mars on firearm

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* Dimples or dents in metal surfaces
* Irregular checkering
* Grease/Oil fingerprints on firearm
* Use of excessive oil

TEN DEMERIT: A ten-demerit classification indicates the observation would greatly influence the customer's decision to not purchase that firearm. This classification also indicates the possibility a standard or procedure was not followed. This level of demerit would require the firearm to be repaired or a part replaced before being returned to the warehouse. 83
If the demerit was called due to a procedure or process not being followed, this is to be reviewed by the foreman or supervisor to the appropriate personnel within a twenty four-hour period and corrective action taken.

Examples of Ten Demerit Classifications:

* Bright mars in metal
* Improper repairs
* Wood dents & scratches (beyond template)
* Dirty appearance of firearm
* Firearm packaged incorrectly
* Accessories missing
* Poor wood match
* Firearm mis-packed
* Excessive margins

The severity of dark and bright mars would determine the degree of Demerit. This procedure would be followed with dents and scratches to wood and synthetic stock & fore end assemblies also.

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In addition to the descriptions of demerits listed above, there will be special occurrences or unique items that will require the placement of demerits. These will be handled as they occur. The Audit Team and Staff Supervision will establish the demerit level for these occurrences.

In some instances, in place of Demerits, the item being reviewed could be listed as an ACTION ITEM and assigned to a specific department or engineer to review and report on. Based upon the report of the findings, a Demerit Level would be established if needed.

FIFTY DEMERITS: A Fifty-Demerit Classification indicates the firearm being reviewed does not meet the criteria established for the proper manual function of that firearm. If a Fifty-Demerit Classification is placed upon a reviewed firearm, this would mean immediate action is taken to identify the problem and correct it.

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In addition the following will be checked on each sample:

-Check the muzzle for the presence and condition of the Crown.
-Make sure that the Metal to Stock fit is uniform.
-Check the fit of the Recoil Pad to the Stock.
-Check each sample for the presence of Dirt, Lint and Excess Oil.

Examine the samples for any other unusual appearance discrepancies that may not be listed above.

Make a list of the discrepancies and their assigned demerit values that are found on each test sample and photograph if necessary to document the finding. Calculate the average demerits per gun.

TLW0300B – Packaging Audit

The Packaging will be audited, as the firearms are unpacked. Each shipping box will be examined for:

-Match of Serial Number on Rifle to that on the box end label and owner's manual package.

-Check the inventory of all required paperwork, owner's manuals, videotapes, etc.

-Box examination for presence of tears in the cardboard, crushing, stains, box inserts, etc.

Note that the final configuration of the shipping carton is not yet completely determined and may be changed prior to commencement of shipping to the customer. Note all apparent discrepancies and photograph for documentation if necessary.

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TLW0300C – Packaging Test

Two rifles and packaging materials will be selected for inclusion in a test of the packaging to include both the rifle and scope as a system. Also included in the test will be the appropriate customer included materials such as owner's manual, warranty materials, etc.

Test procedure is still to be defined but will closely follow standard package drop testing procedures used to certify packaging for shipping.

TLW0300D – Selection of "Best" and "Worst" Examples for Marketing Review

At the completion of the Visual examination two samples will be selected as representing the "Best" and the "Worst" of the submitted lot. These two rifles will be repackaged – in their original boxes and sent to A. Russo in Madison for review. The remaining 28 rifles will now be labeled permanently with designations of A-1 to A-28 for use with the remainder of the testing. Be sure to record on a sheet of paper the matching "V" number from the visual examination so that the records can be matched at a later time.

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HEADSPACE AND PROOF - TLW0300E THROUGH TLW0300G:

TLW0300E – Measure Headspace

All test samples will be measured for headspace before being tested in either the jack or shot from the shoulder. The chamber, bolt face & locking lugs will be inspected for the presence of dirt or debris. If dirt or debris that could affect headspace measurement is present then these areas of the firearm will be cleaned before using the gauges.

Method:

The graduated headspace gauges based on Remington chamber dimensions (Ref.: Remington Gauge Drawing # 41560 …A, ...B, …C, & …D) will be used and the headspace measurements will be recorded to the nearest .001" increment as indicated by the gauge. The .30-06 Remington chamber drawing LB-153 will be used for chamber dimensions.

The headspace measurements will be recorded to the nearest .001" increment as indicated by the gauge.

If the measurement is taken at the start of the test then headspace should be less than Min. + .005".

As the test progresses, headspace will be taken at each "Safety Inspection" scheduled in the plan and, in addition, at each "Clean & Inspect" activity scheduled by the plan.

The readings for each firearm will be recorded on the "Daily Test Data Sheet" to be kept with each firearm in the accompanying data packet.

For any firearms where the headspace is changing at each inspection point the firearm will be withdrawn from test and examined for the cause.

In no case will any firearm in the test program be allowed to continue test if the headspace exceeds Min. + .009".

Data Required:

Rifle serial number

Headspace measurements for each sample

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TLW0300F – Proof Test

All firearms in the 300-rifle sample as supplied by Mayfield should be proof tested prior to delivery to R&D for T&P testing. Each rifle in the selected 30-rifle sample will be examined for the presence of the Remington proof stamp. **If the rifles are not proof tested and properly stamped by Mayfield the following procedure will be used by R&D to proof test and stamp the rifles prior to any other live fire testing proceeds.**

All test sample firearms will be subjected to a standard .30-06 Factory Proof Load, shot in the blow-up room using a lanyard. This procedure will be completed before the firearm can be used for any additional firing tests.

Before proof testing the firearm should be inspected for:

- Barrel Obstructions
- Bore and chamber are free of grease or oil and other debris.

For fully assembled firearms, one definitive proof cartridge should be fired in each firearm. Definitive proof ammunition is to be used in accordance with the "Handling of Ammunition" procedure defined in the SAAMI Technical Committee Manual, Volume III, Section II, Page 2410 as follows.

a. "Cartridges to be tested should be placed in a vertical position with primer end down in a recessed holding block."
b. ".... a cartridge should be lifted vertically from the block. It should be rotated slowly, end over end, in a vertical plane through 360° pausing momentarily when the powder is at the bullet end and again when the powder is at the primer end."
c. "The cartridge is then rotated slowly, a minimum amount to enter chamber, keeping primer end in lowest possible position until inserted gently and carefully into the chamber."

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d. "The cartridge should be seated in the chamber as far as practicable with the fingers. The bolt or breech mechanism should be closed gently in order not to disturb the position of the powder in the cartridge case. The object of this method of handling cartridges is to position the propellant powder at the primer end of the cartridge case by permitting it to fall gently against the primer and while rotating the case."

Note that these procedures for proof testing were developed to consistently position the propellant thereby providing greater consistency of proof pressures. Failure to follow this procedure during the definitive proof testing of each chamber of the firearm could result in pressure levels significantly below the minimum proof pressure specification as determined for the cartridge.

Any firearms components, such as bolts, bolt heads, receivers including chambers, etc. which were previously subjected to proof testing and, which subsequently, have any proof sensitive components changed, altered, or substituted, should be re-proofed.

Method:

- Record headspace before proof testing *(see previous procedure "TLW0300D – Measure Headspace.")*
- After firing the proof round, the firearm will be carefully examined to determine if any damage to the product has occurred due to exposure to the proof pressure. This inspection includes:
- Visual inspection for damage,
  - damaged receiver or bolt, especially the locking lugs on the bolt or the receiver
  - bulged chamber or bore; split, cracked or otherwise damaged barrel,
  - broken stock,
  - any other part subjected to the proofing stress, which can be visually examined for damage.
  - Any "suspicious" areas should be submitted to magna-flux inspection before proceeding.
- The fired proof cartridge should be examined to determine that no firearm fault has introduced cartridge failure, such as:
  - Expanded cartridge head.
  - Excessive roughness, rings, or bulging, which would affect extraction.

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- Beginning separation or material stretching in front of the case head indicating excessive headspace or excessive pressure as stated above.
- Any cartridge case failure indicating a firearm fault.

- In addition, the spent proof round should be examined for the presence of unusual deformation, split case or split head, and for any evidence of a pierced primer. Any of these conditions may be indicative that high-pressure gases may have vented into the action where other damage to components may have occurred.
- Take note of any indication of significant gas leakage, if present, it may indicate that the firearm was not subjected to full proof pressures and the proof test would then be invalid and would require re-proofing.
- A firearm is only properly proofed when the cartridge has been fired without evidence of significant gas leakage.
- Save the spent proof case in a Zip-Lock plastic bag and label and place in the data packet for further reference. If any parts were broken or otherwise damaged, place these parts in the same bag as the proof case and label. Place a label on the firearm and withdraw the firearm from the test.
- Each sample firearms' headspace *(see following procedure "TLW0300G – Re-Measure Headspace after Proof")* must remain in range from min. to min. +.007" after proofing, with no individual firearm's headspace to grow more than .002" after firing one proof round. After successful proofing, the right lug on the bolt head will be marked in the center (i.e. center of top to bottom <u>and</u> center or front to rear) of the lug with a center punch to indicate that is has been proofed.
- After proof, if the firearm passes the inspection <u>and</u> headspace has been measured (*see next section of test plan*), stamp the firearm on the barrel with an authorized Remington proof stamp. Locate the proof mark on the right rear of the barrel in the specified location for the Remington proof stamp. **<u>DO NOT STAMP</u>** if the headspace exceeds Min + .009".
- Because of the higher pressures involved in shooting proof cartridges, adequate precautions, both mechanical and procedural, should be taken to protect personnel performing the firearms proof testing. To this end, the firearm should be securely mounted, completely shielded from the operator and firing accomplished by a remote control method.

<u>Data Required:</u>

- Rifle serial number

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- Record and note any headspace growth and the corresponding round level.
- Record significant gas leakage and/or firearm damage.
- Record any case damage or other ammunition related malfunctions.
- Record any damage to the firearm resulting from the proof test. Document with Photographs as necessary.

TLW0300G – Re-Measure Headspace after Proof

All test samples will be re-measured for headspace after proof and before being tested in either the jack or shot from the shoulder. The chamber, bolt face & locking block/locking notch will be inspected for the presence of dirt or debris. If dirt or debris that could affect headspace measurement is present then these areas of the firearm will be thoroughly cleaned before using the gauges.

Method:

- The graduated headspace gauges based on Remington chamber dimensions (Ref.: Remington Gauge Drawing # 41560 …A (min.), ...B (+. 005), …C (+. 007), & …D (+. 009)) will again be used and the headspace measurements will be recorded to the nearest .001" increment as indicated by the gauge. The .30-06 Remington chamber drawing LB-153 will be used for chamber.
- The headspace measurement taken prior to the proof test should be less than min. + .005". If, after proof, the growth of the headspace is more than + .002" from the pre-proof condition, then stop and review the results with the test manager before continuing to the next phase of the test.
- In no case should the measurement for headspace after initial proof test be greater than min.+007" for a new firearm.
- If at any time during the test program the headspace exceeds a maximum of Min. + .009" do not continue to fire the rifle, tag the gun with a label reading "Do Not Shoot This Firearm – Exceeds Maximum Allowable Headspace" and return the firearm to the Test Manager for disposition.

Data Required:

- Rifle serial number
- Record and note any headspace growth and round level.

FORCES – TLW0300H THROUGH TLW0300Q AND TLW0300T:

TLW0300H - Measure Firing Pin Indent:

The firing pin indent will be measured for each of the sample rifles using SAAMI qualified copper crushers. The average of three trials per sample rifle will be calculated. The Average of three indents must be equal to or greater than 0.017".

Method:

- Using copper crushers, "burnish" both ends of the crusher slug by gently rubbing both ends on the granite base of the dial indicator stand (use outside edge of the plate.).
- Place the copper crusher in a .30-06 / .270-crusher holder, place the crusher holder on the base of the dial indicator and zero the dial indicator with the point of the indicator in the approximate center of the crusher.
- Carefully, with the gun held so that the muzzle is pointed down toward the floor, gently insert the crusher holder into the chamber, being sure that the extractor clearance cut on the crusher is properly oriented relative to the extractor position.
- While maintaining a firm hold on the bolt handle, gently, and slowly ease the bolt forward to the full forward position and then rotate down being sure that the action locks fully.
- Holding the firearm in a horizontal and level position, and pointing the firearm in a safe direction, pull the trigger until the firing pin releases.
- Carefully open the action and remove the crusher holder, being careful not to drop the copper crusher.
- Leave the crusher in the holder and place under the dial indicator.
- Move the crusher holder so that the point of the dial indicator finds the deepest portion of the firing pin indent.
- Record the dial indicator reading to the nearest .001".

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- Repeat procedure two more times and record the dial indicator readings using a new copper crusher for each trial.
- Each firearm sample should have three readings that will be averaged.
- Record all three readings for the data file.

Data Required:

- Rifle serial number
- Each of the three trial indents
- The calculated average indent by rifle.

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TLW0300I - Measure Sear/Trigger Engagement and Sear Lift:

The Sear/Trigger Engagement will be measured. The amount of engagement must be measured between .020" and .025" measured with the bolt in the fully closed and locked position.

Method for measuring Sear/Trigger Engagement:

- The 30" Optical comparator will be used to measure the engagement at 50X magnification.
- With the barreled action held firmly in position, the barreled action will be aligned such that the action is held perpendicular to the lens in both the horizontal and vertical planes.
- With action closed and locked, the safety in the "fire" position, measure the amount of overlap between the sear and the trigger.

Method for measuring Sear Lift:

- Remove the bolt from the action.
- Place the Safety in the "Off-Safe" (i.e. "Fire") position.
- With the action held firmly in a horizontal position pre-load the sear in the downward position using a small screwdriver and with a dial indicator zeroed on the top of the sear, gently rotate the Safety to the "On-Safe" position.
- Record the amount of vertical movement of the sear.

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- Minimum sear lift is 0.006" and maximum sear lift is 0.018"

Data Required:

- Rifle Serial number
- Record Sear/Trigger Engagement
- Record Sear Lift

TLW0300J - Measure Trigger Pull Forces:

Trigger pull force.

Method:

- Trigger pull is to be performed to the SAAMI standard; horizontal pull at the center of the finger radius of the trigger using the Test Lab apparatus designed for taking this measurement.
- Use the 1-10 lb. Chatillion Force digital force gauge.
- Force is measured parallel to the bore with the stock assembled to the action.
- Three pulls are to be taken on each sample rifle and the results averaged.
- The average force for the three trials must be between 4.0 lb. and 5.0 lb.

Data Required:

- Rifle Serial number
- All three data points for each trial rifle
- The average of the three measurements for each sample rifle.

TLW0300K - Measure Safe On/Off Forces:

Using the Chatillion Digital force gauge and the wooden holding fixture used to take trigger pull readings, push the Safe from the "Safe On" to the "Safe Off" position on each test sample. Complete three

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trials. Record all three readings for each firearm. A minimum of 1 lb. force in "Safe On" to "Safe Off" direction will be assumed as the reference criteria.

Method:

- Use trigger pull apparatus to hold the rifle for this test.
- Use the Chatillion Digital Force gauge (0-10 lb. range) with the disc point or the "v" shaped point. Use the same tip on all subsequent trials.
- Make three trials in specified direction for each sample.
- Average the results of each of the three trials.

Data Required:

- Rifle serial number
- Each of the three readings on each sample
- The average of each of the three sets of readings.

TLW0300L - Measure Bolt Lift and Bolt Closing Forces:

The force required opening the bolt and closing the bolt will be measured for each sample. Both of these forces will be taken with the chamber empty and then repeated, this time with a new dummy round in the chamber. There is not a specification for these forces and the readings will be taken for information only.

Method:

- After locating the rifle in the trigger pull fixture and securely locking in place, (it may be necessary to clamp the fixture to the bench if not already securely fixed in place), locate the hook of the force gauge at the point on the bolt handle just behind the ball.
- With the chamber empty and using the Chatillion gauge, pull the gauge straight up and perpendicular to the bore, measure the force required to open the bolt.
- Lock the firearm in a horizontal position, using the trigger pull holding fixture, (i.e. shooting position) before taking the measurements.

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- Take three readings for each gun in the sample.
- Record all readings.
- Repeat the procedure only this time push the bolt closed.
- Note that it may be necessary to start the bolt closed by hand so the firing pin head is depressed sufficiently out of the notch and can start up the cam surface of the bolt as the firing pin is cocked.
- Repeat the above procedure this time with a new, unused dummy round in the chamber.

Data Required:

- Rifle serial number
- Each of the three readings taken for each of the 4 states for each test sample
- The average of each set of three measurements per state

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TLW0300M - Measure Magazine Spring Force:

The force produced by the compression of the Magazine Spring in the box with the follower attached will be measured. These measurements will be taken for information only. There is no specification currently defined for this characteristic.

Method:

- Use the Chatillion TCD200 Spring Testing Machine with the Chatillion Digital Force Gauge (0-10 lb. range). Use the disc probe (½ " dia.) on the gauge.
- Place the magazine box, bottom side down, on the staging table.
- Zero force gauge with no load applied.
- Lower the gauge until it just touches the magazine follower, approximately in the middle location both side to side and front to rear.
- Zero force gauge again if necessary.
- Lower the gauge 0.200" and take the spring force measurements.
- Lower the gauge another 1.0".
- Take the force measurement at this depressed location of the spring.

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- Repeat procedure two additional trials for each box.
- Average the 3 trials for each box and at each measurement location.

Data Required:

- Force Measurements taken on each trial per box at each of the measurement locations.
- The Average Force measurement per box.
- The serial number of the Chatillion Digital Force Gauge used for the procedure.

TLW0300N – Firing Pin Head / Sear Engagement:

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The vertical engagement of the contact between the firing pin head and sear will be measured. The minimum vertical engagement to be .049".

Method:

- Use digital height gauge and one-tenth dial indicator attachment.
- Visually check to ensure the firearm is unloaded.
- Clamp firearm in portable vise and set on top of granite table.
- Remove the bolt assembly.
- Place the safety in the "Fire" position.
- Use a small bubble level to level the top of the receiver relative to the granite table.
- Zero indicator on the receiver insert just rearward of the sear.
- Lightly depress the sear until contact with the trigger is felt and hold in place.
- Indicate to the top of the rear portion of the seat and record the measurement.
- Reinstall the bolt assembly and close over an empty chamber.
- Use pin gauges to measure the gap between the receiver insert and the bottom of the firing pin head, record the gap width.
- Subtract the gap width from the indicated measurement and record as the firing pin to sear engagement.

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Data Required:

- Firearm Serial Number
- Indicated measurement
- Pin gauge gap width measurement
- Firing pin head to sear engagement.

TLW0300O – Bolt Stop Function Check

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The Bolt Stop will be checked for proper function. The bolt stop must prevent the bolt from being unintentionally withdrawn from the receiver when in the "locked" position and must permit the bolt to be withdrawn when in the "un-locked" position. Measure the amount of force required to move the bolt stop from the locked position to the un-locked position and record.

Data required:

- Rifle serial number
- Measurements of force required to move bolt stop from the locked position to the unlocked position.
- Record check of bolt stop function relative to bolt retention.

TLW0300P – Function Check of ISS System:

Check the ISS System for proper function. Make sure the chamber and magazine box are completely empty of live ammunition. This test will involve the use of a primed case, use appropriate safety procedures. With the bolt in the open and un-locked position, using the ISS tool, lock the ISS System in the secure mode and remove tool. Close the bolt, you should not be able to close and lock the bolt. (Note: If the bolt closes, attempt to place the safety in the "Fire" position and pull the trigger, the firing pin must not fall and set off the primed case. If the primed case fires then the test sample fails the test.)

If the bolt does not close and lock then make an attempt to rotate the ISS to the unsecured position using fingers and then try a small screwdriver, you must not be able to unlock the ISS System. (Be careful, do not use

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excessive force when using the screwdriver you just want to determine that the system will not unlock without the use of the proper tool.) Return the safety to the "On Safe" position.

Open the bolt and move to the rearward position, unlock the ISS System and continue to point the muzzle in a safe direction. **Remember that there is still a primed case in the chamber**. Put the muzzle of the rifle in the port of the shooting station (or other approved device). Place the Safety in the "Off Safe" position and pull the trigger, the firing pin must fall and set off the primed case. If the primed case is not fired then the test sample fails.

Data required:

- Rifle serial number
- Record check of ISS System function in both modes.
- Record whether the bolt could be closed and if closed did the primed case fire when the trigger was pulled.

TLW0300Q - Magazine Box Weld Strength Test:

Provide selected magazine box sample to M. Jiranek, Metallurgist for evaluation.

TLW0300AT – Perform Bore Sighting Using Bushnell Scope.

Prior to the start of live fire testing and accuracy testing a sample of the rifles will be bore sighted using the Bushnell Scopes. Use rifles A21 - A28. Use standard Bore sighting procedures in the Long Range sighted in at 100 yards.

Data required:

- Rifle serial number
- POI relative to Point of Aim for each rifle.
- Review results prior to further live fire testing of the test lot.

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GUN CHARACTERISTICS – TLW0300R THROUGH TLW0300S:

TLW0300R - Balance Point – "System (includes the Scope and mount rails)":

Establish the balance point for this firearm system. (This measurement will also be used later for the SAAMI drop test.)

Method:

- Using a right angle block from the metrology lab, invert the block to provide a "sharp edge".
- Close the action over an empty chamber and with the magazine empty.
- Using two hands, carefully place the firearm in a horizontal orientation, over the edge of the angle block with the bottom of the firearm in the down position.
- Again, using two hands, one on each side of the block edge about one foot from the block edge front to rear, carefully place the firearm on the edge and attempt to locate the balance point.
- With the assistance of another individual, place a light pencil mark at the likely balance point. After removing the firearm from the edge, measure the distance to the breech face with the bolt in the closed position. (The position of the breach face was determined when the barrel length was measured. This location, that is, the breach face can be established by measuring the specific distance from the muzzle to outside of the receiver and marked accordingly. The distance from the balance point to this breach face mark is the location of the balance point.)
- Repeat this procedure for the following condition:
  - Using .30-06 dummy shells, place one in the chamber and four in the magazine, close the action and measure the distance to the bolt face.

Data Required:

- Record rifle serial number
- Record balance point with firearm empty
- Record balance point with firearm "loaded"

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TLW0300S – Balance Point – Rifle Only (Without Scope, rails and Iron Sights):

Establish the balance point for this firearm. (This measurement will also be used later for the SAAMI drop test.)

Method:

- Using a right angle block from the metrology lab, invert the block to provide a "sharp edge".
- Close the action over an empty chamber and with the magazine empty
- Using two hands, carefully place the firearm in a horizontal orientation, over the edge of the angle block with the bottom of the firearm in the down position.
- Again, using two hands, one on each side of the block edge about one foot from the block edge front to rear, carefully place the firearm on the edge and attempt to locate the balance point.
- With the assistance of another individual, place a light pencil mark at the likely balance point. After removing the firearm from the edge, measure the distance to the breech face with the bolt in the closed position. (The position of the breach face was determined when the barrel length was measured. This location, that is, the breach face can be established by measuring the specific distance from the muzzle to outside of the receiver and marked accordingly. The distance from the balance point to this breach face mark is the location of the balance point.)
- Repeat this procedure for the following condition:
  - Using .30-06 dummy shells, place one in the chamber and four in the magazine, close the action and measure the distance to the bolt face.

Data Required:

- Record rifle serial number
- Record balance point with firearm empty
- Record balance point with firearm "loaded"

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FIREARMS MEASUREMENTS – TLW0300T THROUGH TLWOO10X:

TLW0300T - Chamber cast:

Use the .30-06-chamber drawing LB-153 for reference.

Method:

- Make chamber cast using standard procedure
- Use the 30" optical comparator
- Measure the following dimensions:
  - .4708/.4728
  - .4425/.4440
  - 34° 30" Angle
  - .3404/.3424
  - .3095/.3105

Data Required:

- Rifle serial numbers
- Record dimensions requested above.

TLW0300U - Bore Diameter:

Measure Bore Diameter using standard procedures.

Method:

- Measure .30-06 caliber
- Dimension equals .300/.301

Data Required:

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- Rifle serial numbers
- Measurements of each bore by serial number

TLW0300V - Groove Diameter:

Measure Groove Diameter using standard procedures.

Method:

- Measure .30-06 caliber
- Dimension equals .308/.309

Data Required:

- Rifle serial numbers
- Measurements of each bore by serial number

TLW0300W - Twist Rate (.30-06)

Measure Twist Rate using standard procedures.

Method:

- Measure .30-06 caliber
- 1 turn in 10" ± .25", RH

Data Required:

- Rifle serial numbers
- Measurements of each bore by serial number

TLW0300X - Magazine Capacity Test:

Rifles with the magazine fully loaded must be able to be inserted into firearm with the bolt closed and in the locked position. Model 710 must be able to accept 4 rounds in the magazine and load into a closed bolt.

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Method:

- Check rifle for live ammunition
- With muzzle pointed in a safe direction, close the bolt and lock over an empty chamber
- Load 4 dummy rounds into the magazine
- Insert magazine into the rifle, it must lock securely in place
- Cycle the 4 dummy rounds through the chamber and eject each round
- Remove the magazine box and repeat test two additional times per sample rifle.

Data Required:

- Rifle serial number
- Record any failures to load and cycle properly by box and rifle

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FUNCTION & ENDURANCE TESTING:

FUNCTION AND ENDURANCE TESTING – TLW0300Y THROUGH TLW0300AB

TLW0300Y – Ten (10) Round Safety Function Test with Lanyard:

As an additional safety precaution, each of the 28 sample rifles will be placed in the standard Remington test jack located in the Blow-Up Room and shot with ten rounds of standard load ammunition. Each shot will be fired with a lanyard with the shooter located outside of the room when the rifle is fired. At the completion of the ten rounds the rifle will be examined for any signs of damage or potential damage.

TLW0300Z - Basic Jack Function Test (to 100 Rounds):

To get a picture of the product's functional capability, a 100 round per rifle jack function test will be conducted. Five bullet types will be used, 20 rounds (all Remington) of each in each rifle to evaluate the potential for feeding problems. The test will be conducted in the test jacks with the "belly-protectors" in place and fully closed for each shot. All malfunctions and any unusual behavior will be noted on the data forms. The overall average of all sample rifles should be at or below 2-% malfunction rate. Up to two rifles from the sample of 28 are permitted to be removed from the averaging process if they have excessive malfunction rates relative to the remaining group of 26 samples. No major mechanical failures are allowed in the test sample. Major mechanical failures are defined as those failures that cannot easily be repaired with simple tools and/or readily available replacement parts. At the conclusion of this test the firearms will be carefully examined for signs of excessive wear, especially with respect to the plastic components.

Method:

- Check each rifle for the presence of the proof stamp(s) – do not shoot unless the stamp(s) are present.
- Check each rifle for headspace

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- Draw ammunition from stores – See test lab manager for ammo types to be used for this test.
- Each tester to have five rifles for test at any given time.
- The muzzle of each rifle will be inserted into the shooting port and the rifle placed securely in the test jack before the rifle is loaded.
- Load the five rounds into the rifle, one in the chamber and four in the magazine, do not shoot single shot by hand-feeding single rounds into the chamber.
- Push the safe to the "fire" position, be sure that the barrel is far enough within the port hole so that the muzzle will stay in the port when the rifle recoils. If there is any question, re-adjust the jack into a better position.
- With the lid on the belly protector closed, fire the first round in the chamber, listen for any off-sounds, and be alert for any other unusual behavior.
- Open the bolt; eject the spent round, note any extraction or ejection problems.
- Close the bolt to load the first round from the magazine into the chamber, note any feeding or stemming problems.
- Continue to fire the remaining rounds in the magazine until the last round is fired.
- Push the Safety to "On Safe" position; the safety will be pushed to the fire position at the start of every five round trial and will be pushed to the On Safe position at the end of every five round trial. Repetitive action of the safety lever on the trigger assembly side-plate needs to be determined.
- After firing twenty rounds (1 box of ammo) the rifle will be checked carefully for the presence of any live ammunition and if empty will be removed from the test jack and placed in the cooling rack. The safety will be in the "On Safe" position and the bolt will be unlocked and fully open at all times. Compressed air may be used, if necessary to cool the inside of the chamber area if the rifle is excessively hot from firing.
- All malfunctions will be recorded on the data sheets.

Data Required:

- Rifle serial number
- Tester's name
- Date of test firing

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- The TLW#
- The ammunition used for the test with the ammo lot code number of the rounds actually used.
- Any malfunctions noted or other unusual items of note.

TLW0300AA - Extended Function & Endurance:

This Extended Function & Endurance Test will be shot to determine an estimate of the product's expected malfunction rate over an extended period of shooting. For purposes of definition, a component failure will be one that prevents (or could prevent) the firearm from functioning as intended. These are failures that can be fixed relatively easily by the simple replacement of a part such as could be done by the gun owner using only simple household tools. System failures are defined as failures of a major nature, the extent of which would require specialized tooling or methods to repair not normally available to the average gun owner. Such a repair would be most likely made by a qualified gunsmith or by return to the factory.

This Extended Function & Endurance Test will be shot in the test jacks and the testers will use gloves for protection. The covers on the "belly-protectors" will be down and in-place for each test shot. Careful monitoring of each test gun is essential to evaluate the malfunction rate for each firearm.
The standard Remington test jacks will be used for all jack-related testing.

Each rifle will be shot, using a variety of Centerfire ammunition comprised of light, medium and heavy bullets. In addition, ammunition from the three major manufacturers (Remington, Winchester and Federal) of Centerfire ammunition shall be included in the mix.

Each rifle will be shot no more than 20 rounds before being put aside for cooling. Compressed air applied to the inside of the chamber will be an acceptable method to assist in the cool-down process.

The S.A.A.M.I. recommendation for the minimum acceptable malfunction rate for a bolt action rifle is a malfunction rate of < 2%. In this case, if the overall malfunction rate average for the test samples is > 2%, the test will be stopped. If the overall average malfunction rate is < 2% but one of the firearms is significantly greater than 2% malfunction rate, the test may continue with the other nine test samples. After assessment and repair, this gun will again be required to pass the 100 round jack function test at < 2% malfunction rate. If the

gun passes these criteria it will then be re-introduced into the Endurance test. It is important that total endurance rounds on the gun include any rounds that are put through the gun for re-test purposes.

The test will be performed according to Remington's standard endurance test procedures for centerfire rifle. Rounds for this test will be ten rifles to 400 rounds each.

Record all instances of malfunctions and failures, and replace parts when they become unserviceable noting the round level when they were replaced.

After every 100 rounds one live round will be extracted and ejected from the chamber to check on live round ejection. The ejected round will then be re-inserted into the chamber and fired to help keep the endurance round count accurate.

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Method:

- Disassemble, thoroughly clean, lubricate per the design team's instructions, and re-assemble. Record headspace for each.
- Fire each test firearm in accordance with the firing procedure (number of rounds, firing cycle) specified by engineering and the test plan.
- Ammunition will be used that comprises at least five types of bullets, change ammunition type every 100 rounds.
- Before commencing design acceptance testing, calibrate, adjust, or re-build the shooting jacks, if necessary.
- Allow the firearm to completely recover in the shooting jack between each shot and do not lean or "stiff arm" the firearm while shooting the gun.
- All ammunition is to be functioned through the magazine - no "single shot" hand feeding permitted.
- Allow the rifle to cool between cycles. One cycle is 20 rounds fired. The use of forced air to accelerate cooling of the barrels between firing trials is permitted. The air should be directed from the chamber toward the muzzle to prevent it from washing the lubricant from the firearm's action.
- Cycle the safety from fire to safe every 5 rounds, from Safe to Fire at the start of the five round cycle and from Fire to Safe at the end of the 5 round cycle.
- After 400 rounds, disassemble, inspect, clean and lubricate the entire mechanism and take all required measurements.

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- The Standard Remington Jacks (using the heavy configuration) are to be used for this test.

Data Required:

- Rifle serial number
- Tester's name
- The Test Jack Identification
- TLW#
- Date of actual testing
- Headspace after the 400 round interval.
- Malfunctions per ammo type, breakage, and replacement parts used.
- Any failure that requires the gun to be removed from testing completely.
- Notify management of any unusual events or malfunctions immediately.
- Any firing of the firearm without the trigger being pulled.
- Record ammunition lot code information as it is used throughout the test.
- Bullet type used for each 20 rounds of the test.

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TLW0300AB - Clean Rifles and Inspect:

After 400 rounds of Extended Function & Endurance, unless other wise specified, each rifle will be disassembled, cleaned and thoroughly inspected.

A list of inspection points will be provided in the gun packet for check-off and sign-off by the inspector. The inspector will be looking for any signs of unusual wear, especially on critical components and surfaces as well as for anything such as cracks or deformed material that might present a safety concern. Photographs will be taken to document unusual wear, damage or other notable characteristics. Use the following checklist for inspection:

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Clean & Inspect Checklist

Model: _____ 710_____ **Project:** _____241095_____

Rifle: _____ **TLW #:** ____TLW0300___

Date: _____/_____/_____ **Inspector:** _____

Round Level: _____

- ❑ **Measure Headspace** _____.
- ❑ **Firing Pin Indent** 1st._____ 2nd._____ 3rd._____ **Ave.**_____ 83
- ❑ **Sear Engagement:** _____.
- ❑ **Trigger Pull:** 1st._____ 2nd._____ 3rd._____ **Ave.**_____
- ❑ **Measure Feed Lip on Mag. Box at front:** _____ **& rear:** _____.

Check the following areas for signs of unusual wear or breakage:

- ❑ **Receiver insert**
- ❑ **Rear surface of Bolt Lugs**
- ❑ **Check for "galling" on rear of Bolt Lugs**
- ❑ **Bolt Plug**
- ❑ **Bolt Plug Insert "ears" on firing pin assembly**
- ❑ **Check for loose or missing pins – make note and re-stake if necessary**
- ❑ **Check plastic inserts for cracks or other damage.**

Take digital photographs, if appropriate, to record unusual wear, damage or other note-worthy observations. List the digital file name for reference along with any comments below.

_____

_____

_____

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ACCURACY TESTING:

ACCURACY AND POI TESTING – TLW0300AC THROUGH TLW0300AF

TLW0300AC – POI & Group Size – Initial Test with High Quality 36X Scope:

The point of impact test involves the verification of the firearms sighting system adjustment and the potential to hit the point of aim. Random variation and/or extreme difference in shot to shot point of impact (as well as group size) typically indicate improper barrel processing and is used as a final inspection flag in production. Shoot three, 5-shot groups from each test rifle. Use the same code of ammunition for all point of impact test shots.

Method:

- Certify the ammunition selected for muzzle velocity and pressure.
- Pick the point of aim on the target
- Adjust point of aim to the bulls-eye at 100 yards.
- Shoot five "warmer" shots
- Shot three, 5-shot groups

Data Required:

- Measure the center of the impact groups to the point of aim in terms of "x" and "y" positions.
- Record takedown screw torque
- Record ammunition lot number used during the test
- Record and label any fail-to-fire ammunition

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TLW0300AD (@zero) - Group Size at 100 yards (System Stability Test, w/Bushnell Scope @ "zero" rounds

One hundred-yard accuracy testing will be completed utilizing standard factory ammunition. The test will consist of three, 5-shot groups. Guns will be cooled after every other group. Each firearm will be cleaned and fired with five fouling shots prior to beginning the accuracy work-up. Group sizes will be measured from actual targets and recorded. The same code of ammunition and same type of ammunition will be used for all group size test shots. Average group sizes must be ≤ 2.7" at 100 yards.

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Method:

- Certify the ammunition selected for muzzle velocity and pressure.
- Fire three, 5-shot groups at 100 yards, for each ammunition type selected. Prior to beginning of the test, clean the bore and shoot 5 "fouling" shots to seat in the rifle.
- Cycle the safety from fire to safe every 5 rounds.
- Accuracy should be shot from a recoiling rest. Shoulder shooting is acceptable but not the preferred way.

Data Required:

- Measure group sizes center to center
- Record takedown screw torque
- Record make and identifier of scope
- Record ammunition type used.
- Record ammunition lot numbers used during the test
- Record and label any fail-to-fire ammunition.
- Record any malfunctions that occur during the test.

TLW0300AE (@100)- Group Size at 100 yards (System Stability Test, w/Bushnell Scope @ "100" rounds

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One hundred-yard accuracy testing will be completed utilizing standard factory ammunition. The test will consist of three, 5-shot groups. Guns will be cooled after every other group. Each firearm will be cleaned and fired with five fouling shots prior to beginning the accuracy work-up. Group sizes will be measured from actual targets and recorded. The same code of ammunition and same type of ammunition will be used for all group size test shots. Average group sizes must be ≤ 2.7" at 100 yards.

Method:

- Certify the ammunition selected for muzzle velocity and pressure.
- Fire three, 5-shot groups at 100 yards, for each ammunition type selected. Prior to beginning of the test, clean the bore and shoot 5 "fouling" shots to seat in the rifle.
- Cycle the safety from fire to safe every 5 rounds.
- Accuracy should be shot from a recoiling rest. Shoulder shooting is acceptable but not the preferred way.

Data Required:

- Measure group sizes center to center
- Record takedown screw torque
- Record make and identifier of scope
- Record ammunition type used.
- Record ammunition lot numbers used during the test
- Record and label any fail-to-fire ammunition.
- Record any malfunctions that occur during the test.

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TLW0300AF (@200) - Group Size at 100 yards (System Stability Test, w/Bushnell Scope @ "200" rounds

One hundred-yard accuracy testing will be completed utilizing standard factory ammunition. The test will consist of three, 5-shot groups. Guns will be cooled after every other group. Each firearm will be cleaned and fired with five fouling shots prior to beginning the accuracy work-up. Group sizes will be measured from

actual targets and recorded. The same code of ammunition and same type of ammunition will be used for all group size test shots. Average group sizes must be ≤ 2.7" at 100 yards.

Method:

- Certify the ammunition selected for muzzle velocity and pressure.
- Fire three, 5-shot groups at 100 yards, for each ammunition type selected. Prior to beginning of the test, clean the bore and shoot 5 "fouling" shots to seat in the rifle.
- Cycle the safety from fire to safe every 5 rounds.
- Accuracy should be shot from a recoiling rest. Shoulder shooting is acceptable but not the preferred way.

Data Required:

- Measure group sizes center to center
- Record takedown screw torque
- Record make and identifier of scope
- Record ammunition type used.
- Record ammunition lot numbers used during the test
- Record and label any fail-to-fire ammunition.
- Record any malfunctions that occur during the test.

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ENVIRONMENTAL TESTING:

TEMPERATURE & HUMIDITY – TLW0300AG THROUGH TLW0300AI

TLW0300AG - Hot Function Test:

This test evaluates the effect of extreme high temperatures on the functioning performance of firearms.

Method:

- Condition test firearm and 100 rounds of ammunition of each caliber in a climatic chamber for at least 6 hours at a temperature of 120 degrees F. (or as close to 120 degrees F. as the equipment can be maintained.)
- Test each firearm after removing from the chamber as follows:
  - Fire 20 rounds of ammunition. Replace the rifle in the chamber. Wait 2 hours and repeat procedure until all 100 rounds have been fired.
  - Do not perform maintenance during the 100 round cycle.
  - Cycle the safety from fire to safe every 5 rounds.
  - The tester should wear gloves to protect his hands from the hot metal.
- After 100 rounds have been fired through each firearm, disassemble, thoroughly inspect, clean and lubricate.

Data Required:

- Record temperature and exposure times
- Record all malfunctions.
- Record damage noted during inspection

TLW0300AH - Cold Function Test:

This test evaluates the effect of extreme low temperatures on the functioning performance of the firearms. Shoot the firearm after removing from the environmental test cabinet.

Method:

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- Condition the firearm and 100 rounds of ammunition of climatic chamber for at least 6 hours at a temperature of -20 degrees F.
- Test each firearm after removing from the chamber as follows:
- Fire 20 rounds of ammunition. Return the firearm to the chamber. Wait 2 hours and repeat procedure until all 100 rounds have been fired.
- Do not perform maintenance during the 100 round cycle.
- Cycle the safety from fire to safe every 5 rounds.
- After 100 rounds have been fired through the firearm, disassemble, thoroughly inspect, clean and lubricate.

Data Required:

- Record temperature and exposure times
- Record all malfunctions.
- Record damage noted during inspection

TLW0300AI - Heat & Humidity Function Test:

Method:

- Shoot the firearm after removing from the environmental test cabinet in the long range.
- Store the gun and ammunition for a minimum of six hours at a temperature of +100°F and 80-90% Relative Humidity.
- Shoot 100 rounds and record all malfunctions or other unusual events.
- Test each firearm after removing from the chamber as follows:
- Fire 20 rounds of ammunition. Return the firearm to the chamber. Wait 2 hours and repeat procedure until all 100 rounds have been fired.
- Do not perform maintenance during the 100 round cycle.
- Cycle the safety from fire to safe every 5 rounds.
- After 100 rounds have been fired through the firearm, disassemble, thoroughly inspect, clean and lubricate.

Data Required:

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- Record temperature and exposure times
- Record all malfunctions.
- Record damage noted during inspection

ABUSIVE TESTING

IMPACT TESTING – TLW0300AJ THROUGH TLW0300AM

TLW0300AJ – SLAM Test:

For this test the sample firearm will be placed in the standard Remington test jack. Four live rounds will be loaded into the rifle's magazine and the magazine installed in the rifle. The tester will use a glove for hand protection.

For each of the four rounds in the magazine the tester will close the bolt "smartly" – (i.e. as quickly as practical) – and be prepared for the rifle to inadvertently follow down or fire. After each bolt closing the round will be fired then the bolt will be opened and the spent round will be ejected and the next round in the box will again be loaded into the chamber in a "smart" manner. The purpose of this test is to determine if the firing pin will "follow-down" if the round is rammed home into the chamber as quickly as possible. Repeat this cycle until all 20 rounds of the test are completed. There should be no follow-downs or inadvertent firings.

Data required:

- Record whether or not the firearm fires or follows-down.
- Record round level on the firearm.
- Record the serial number of the rifle.

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TLW0300AK - SAAMI Drop Test – "System' (Includes the Scope and Mounting Rails):

This test will simulate abusive dropping of the firearm from a distance of 48 inches onto a 1" thick 85 durometer (Shore A) rubber mat backed by concrete. Trigger Pull weight will be adjusted to minimum specification (4 lb.) The Trigger/Sear engagement will be set to the minimum specification (0.020"). Test will be performed according to SAAMI Technical Committee procedures. Magazine capacity will be filled according to SAAMI procedures. After each series of test, the primed case will be discharged to insure validity of test. This test will be performed on a sample of six firearms of .30-06 caliber.

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Method:

- With the firearm safety in the SAFE state, the firearm shall be capable of passing the below test criteria for drop testing from a height of four feet onto an 85±5 Durometer, Shore A, rubber mat, one-inch thick backed by concrete. The mat and concrete shall be large enough so that when the gun is dropped it will fall and come to rest without interference within the perimeter of the mat. The four feet shall be measured from the surface of the rubber mat to the center of gravity of the firearm. The center of gravity shall be determined to an accuracy of ± one inch by any recognized method for finding the center of gravity of an irregular shaped object. The primed case shall be discharged following the drop and a fresh primed cartridge re-chambered prior to the next drop. A "fresh" firearm may be substituted into the test at any point.
- The firearm or firearms shall be dropped in such a way as to strike the rubber mat surface once in each of the following attitudes:
    - Barrel vertical, muzzle down.
    - Barrel vertical, muzzle up.
    - Barrel horizontal, bottom up.
    - Barrel horizontal, bottom down.
    - Barrel horizontal, left side up.
    - Barrel horizontal, right side up.

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- Tests shall be conducted with the trigger pull force set at the minimum force specified, with engagement set to the minimum specified, and with the firecontrol lubricated as in the owner's manual.
- The test shall be conducted with the magazine or clip fully loaded with dummy cartridges and inserted in the firearm.
- Parts breakage or other damage as a result of drop testing does not constitute failure as long as the empty primed case does not fire and the firearm can be unloaded safely after each drop. More stocks are required than the amount of test guns to allow for breakage due to the drop testing. If a stock cracks - replace before continuing test.

Data required:

- Record whether or not the firearm fires an empty primed case of its designated cartridge when tested in accordance with this procedure.
- Record round level

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TLW0300AL - SAAMI Jar-Off Test – "System" (Includes the Scope and Mounting Rails):

The objective of the jar-off test is to simulate the abusive impacting (bumping) of the firearm against a hard surface with the firearm in a condition of maximum readiness. With the firearm in the ready to fire condition, the firearm shall be capable of withstanding a jar-off shock equivalent to being dropped from a height of 12" inches onto a 1" thick 85 Durometer (Shore A) rubber mat backed by concrete. Trigger Pull weight will be adjusted to minimum specification. The test will be performed according to SAAMI Technical Committee procedures. Magazine will be loaded to maximum capacity with dummy rounds according to SAAMI procedures. A fresh primed case will be chambered prior to each drop. After each drop the primed case will be discharged to verify its validity. This test will be performed on a sample of firearms made up of .30-06 caliber.

Method:

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- With the firearm cocked and the safety in the FIRE position the firearm shall be capable of withstanding jar-off shock equivalent to being dropped from a height of twelve inches onto a 85±5 Durometer, Shore A, rubber mat, one-inch thick backed by concrete. The mat and concrete shall be large enough so that when the gun is dropped it will fall within the perimeter of the mat striking the mat once. The twelve inches will be measured from the test surface to the lowest point on the firearm. As an alternate to free dropping, other methods may be substituted if they provide equivalent impact characteristics. The primed case shall be discharged following the drop and a fresh primed cartridge re-chambered prior to the next drop. A "fresh" firearm may be substituted into the test at any point.
- The firearm or firearms shall be dropped in such a way as to strike the rubber mat surface once in each of the following attitudes:
    - Barrel vertical, muzzle down.
    - Barrel vertical, muzzle up.
    - Barrel horizontal, bottom up.
    - Barrel horizontal, bottom down.
    - Barrel horizontal, left side up.
    - Barrel horizontal, right side up.
- Tests shall be conducted with the trigger pull force set at the minimum force specified, with engagement set to the minimum specified, and with the firecontrol lubricated per the owner's manual.
- The test shall be conducted with the magazine or clip fully loaded with dummy cartridges and inserted in the firearm.
- Parts breakage or other damage as a result of drop testing does not constitute failure as long as the empty primed case does not fire and the firearm can be unloaded safely after each drop. More stocks are required than the amount of test guns to allow for breakage due to the drop testing. If a stock cracks - replace before continuing test.

Data required:

- Record engagement and trigger pull.

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- Record whether or not the firearm fires an empty primed case of its designated cartridge when tested in accordance with this procedure.
- Record the round level on the firearm.

TLW0300AM - SAAMI Rotation Test – "System" (Includes the Scope and Mounting Rails):

The test will be conducted according to SAAMI Technical Committee procedures. The firearm will be placed in the "Safe Carrying" condition and dropped from an upright position with its butt resting on the surface of a 1" thick 85 durometer (Shore A) rubber mat backed by concrete. Trigger Pull weight will be adjusted to minimum specification. Magazine will be loaded to maximum capacity with dummy rounds according to SAAMI procedures. The firearm shall be tested (dropped) on both the right and left sides. After each rotation, the primed case will be discharged to insure validity of test.

Method:

- With the firearm safety in the SAFE state, the firearm shall be capable of passing the below test criteria when allowed to fall freely from an upright position with its butt resting on the surface of a 85±5 Durometer, Shore A, rubber mat, one-inch thick backed by concrete. The mat and concrete shall be large enough so that when the gun falls it will come to a rest without interference within the perimeter of the mat. The firearm shall be tested so as to fall once on its right-hand side and once on its left-hand side. The primed case shall be discharged following the drop and a fresh primed cartridge re-chambered prior to the next drop. A "fresh" firearm may be substituted into the test at any point.
- Tests shall be conducted with the trigger pull force set at the minimum force specified, with engagement set to the minimum specified, and with the firecontrol lubricated per the owner's manual.
- The test shall be conducted with the magazine or clip fully loaded with dummy cartridges, inserted in the firearm.
- Parts breakage or other damage as a result of drop testing does not constitute failure as long as the empty primed case does not fire and the firearm can be unloaded safely after each drop. More stocks are required

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than the amount of test guns to allow for breakage due to the drop testing. If a stock cracks - replace before continuing test.

Data required:

- Record whether or not the firearm fires an empty primed case of its designated cartridge when tested in accordance with this procedure.
- Record round level on the firearm

TLW0300AN - SAAMI Drop Test – Rifle Only (Without the Scope and Mounting Rails): 83

This test will simulate abusive dropping of the firearm from a distance of 48 inches onto a 1" thick 85 durometer (Shore A) rubber mat backed by concrete. Trigger Pull weight will be adjusted to minimum specification (4 lb.) The Trigger/Sear engagement will be set to the minimum specification (0.020"). Test will be performed according to SAAMI Technical Committee procedures. Magazine will be loaded to maximum capacity with dummy rounds according to SAAMI procedures. After each series of test, the primed case will be discharged to insure validity of test. This test will be performed on a sample of four firearms (for Phase I) and six firearms (Phase II) of .30-06 calibers only and six rifles of .270 caliber when available.

Method:

- With the firearm safety in the SAFE state, the firearm shall be capable of passing the below test criteria for drop testing from a height of four feet onto an 85±5 Durometer, Shore A, rubber mat, one-inch thick backed by concrete. The mat and concrete shall be large enough so that when the gun is dropped it will fall and come to rest without interference within the perimeter of the mat. The four feet shall be measured from the surface of the rubber mat to the center of gravity of the firearm. The center of gravity shall be determined to an accuracy of ± one inch by any recognized method for finding the center of gravity of an irregular shaped object. The primed case shall be discharged following the drop and a fresh primed cartridge re-chambered prior to the next drop. A "fresh" firearm may be substituted into the test at any point.
- The firearm or firearms shall be dropped in such a way as to strike the rubber mat surface once in each of the following attitudes:

- Barrel vertical, muzzle down.
- Barrel vertical, muzzle up.
- Barrel horizontal, bottom up.
- Barrel horizontal, bottom down.
- Barrel horizontal, left side up.
- Barrel horizontal, right side up.

- Tests shall be conducted with the trigger pull force set at the minimum force specified, with engagement set to the minimum specified, and with the firecontrol lubricated as in the owner's manual.
- The test shall be conducted with the magazine or clip fully loaded with dummy cartridges and inserted in the firearm.
- Parts breakage or other damage as a result of drop testing does not constitute failure as long as the empty primed case does not fire and the firearm can be unloaded safely after each drop. More stocks are required than the amount of test guns to allow for breakage due to the drop testing. If a stock cracks - replace before continuing test.

Data required:

- Record whether or not the firearm fires an empty primed case of its designated cartridge when tested in accordance with this procedure.
- Record round level

TLW0300AO - SAAMI Jar-Off Test – Rifle Only (Without the Scope and Mounting Rails):

The objective of the jar-off test is to simulate the abusive impacting (bumping) of the firearm against a hard surface with the firearm in a condition of maximum readiness. With the firearm in the ready to fire condition, the firearm shall be capable of withstanding a jar-off shock equivalent to being dropped from a height

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of 12" inches onto a 1" thick 85 Durometer (Shore A) rubber mat backed by concrete. Trigger Pull weight will be adjusted to minimum specification. The test will be performed according to SAAMI Technical Committee procedures. Magazine will be loaded to maximum capacity with dummy rounds according to SAAMI procedures. A fresh primed case will be chambered prior to each drop. After each drop the primed case will be discharged to verify its validity. This test will be performed on a sample of firearms made up of .30-06 caliber.

Method:

- With the firearm cocked and the safety in the FIRE position the firearm shall be capable of withstanding jar-off shock equivalent to being dropped from a height of twelve inches onto a 85±5 Durometer, Shore A, rubber mat, one-inch thick backed by concrete. The mat and concrete shall be large enough so that when the gun is dropped it will fall within the perimeter of the mat striking the mat once. The twelve inches will be measured from the test surface to the lowest point on the firearm. As an alternate to free dropping, other methods may be substituted if they provide equivalent impact characteristics. The primed case shall be discharged following the drop and a fresh primed cartridge re-chambered prior to the next drop. A "fresh" firearm may be substituted into the test at any point.
- The firearm or firearms shall be dropped in such a way as to strike the rubber mat surface once in each of the following attitudes:
    - Barrel vertical, muzzle down.
    - Barrel vertical, muzzle up.
    - Barrel horizontal, bottom up
    - Barrel horizontal, bottom down.
    - Barrel horizontal, left side up.
    - Barrel horizontal, right side up.
- Tests shall be conducted with the trigger pull force set at the minimum force specified, with engagement set to the minimum specified, and with the firecontrol lubricated per the owner's manual.
- The test shall be conducted with the magazine or clip fully loaded with dummy cartridges and inserted in the firearm.

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- Parts breakage or other damage as a result of drop testing does not constitute failure as long as the empty primed case does not fire and the firearm can be unloaded safely after each drop. More stocks are required than the amount of test guns to allow for breakage due to the drop testing. If a stock cracks - replace before continuing test.

Data required:

- Record engagement and trigger pull.
- Record whether or not the firearm fires an empty primed case of its designated cartridge when tested in accordance with this procedure.
- Record the round level on the firearm.

TLW0300AP - SAAMI Rotation Test – Rifle Only (Without Scope and Mounting Rails):

The test will be conducted according to SAAMI Technical Committee procedures. The firearm will be placed in the "Safe Carrying" condition and dropped from an upright position with its butt resting on the surface of a 1" thick 85 durometer (Shore A) rubber mat backed by concrete. Trigger Pull weight will be adjusted to minimum specification. Magazine will be loaded to maximum capacity with dummy rounds according to SAAMI procedures. The firearm shall be tested (dropped) on both the right and left sides. After each rotation, the primed case will be discharged to insure validity of test.

Method:

- With the firearm safety in the SAFE state, the firearm shall be capable of passing the below test criteria when allowed to fall freely from an upright position with its butt resting on the surface of a 85±5 Durometer, Shore A, rubber mat, one-inch thick backed by concrete. The mat and concrete shall be large enough so that when the gun falls it will come to a rest without interference within the perimeter of the mat. The firearm shall be tested so as to fall once on its right-hand side and once on its left-hand side. The primed case shall be discharged following the drop and a fresh primed cartridge re-chambered prior to the next drop. A "fresh" firearm may be substituted into the test at any point.

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- Tests shall be conducted with the trigger pull force set at the minimum force specified, with engagement set to the minimum specified, and with the firecontrol lubricated per the owner's manual.
- The test shall be conducted with the magazine or clip fully loaded with dummy cartridges, inserted in the firearm.
- Parts breakage or other damage as a result of drop testing does not constitute failure as long as the empty primed case does not fire and the firearm can be unloaded safely after each drop. More stocks are required than the amount of test guns to allow for breakage due to the drop testing. If a stock cracks - replace before continuing test.

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Data required:

- Record whether or not the firearm fires an empty primed case of its designated cartridge when tested in accordance with this procedure.
- Record round level on the firearm

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INTENTIONAL ABUSE- TLW0300AV THROUGH TLW0300AX

Note that for all of the following tests, the rounds are to be loaded remotely and the test setup shall have the capability of unloading live rounds remotely if required.

TLW0300AQ - Pierced Primer Test:

For this test, a firing pin will be altered to have a "wedge-shaped" point. This type of firing pin point should produce a pierced primer when fired. The purpose of piercing the primer is to allow high-pressure gases to escape into the action and thereby determine the effect of high-pressure gases when dumped into the bolt, magazine box and receiver areas. All standard Remington high-pressure ammunition safety procedures will be used for this test. A standard round of .30-06 ammunition will be used.

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After firing the rifle will be examined for damage. Photographs of damaged components will be taken and kept for record. The rifle will be tagged and saved for possible future review.

Method:

- Position firearm in test jack located in the "Blow-up" room with the muzzle through the port.
- Set witness paper at the rear of the action perpendicular to the bore.
- Locate witness paper at the approximate location expected for the shooter's face.
- Set up the High Speed Video to tape the firing test.
- Fasten a lanyard around the stock and run through the trigger guard in front of the trigger.
- Load a standard factory .30-06 round into the chamber, and carefully close the bolt.
- All personnel are to leave the room.
- When ready to conduct the test start the high speed video and pull the lanyard.
- Carefully examine the scene looking for any broken or missing parts, holes in the witness paper etc.

Data Required:

- Rifle serial number.
- The condition of the witness paper.
- Notes of any broken or missing parts.
- Photographs of broken or missing parts.

TLW0300AR - High Pressure Test:

The rifle will be tested to 120,000 psi. The purpose of this test is to determine the extent of damage if an individual does purposely or accidentally handload an extremely high pressure load. Use standard Remington high-pressure ammunition safety procedures for these tests. The pressures for the test round will be worked up using various grain size loads giving pressures below 95,000 psi, (approaching the limits of the transducer gauges.) The grain size load will be plotted and a curve extrapolated to determine the load expected to produce a load of approximately 120,000-psi.

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All testing will be done in the blow-up room using the high-speed video camera and witness paper. Before removing or otherwise disturbing the test samples after blow-up, photographs will be taken for the record. After collection and removal of the parts additional photographs of the various individual components will be taken for the record. All parts will be put in sample bags, boxed and temporarily stored for review if required.

TLW0300AS - Obstructed Bore Test:

One of the sample rifles will have a rifle bullet driven into the bore to a position immediately ahead of the chamber. A standard round (.30-06, 220 gr. factory load) will be loaded and fired remotely. All testing will be done in the blow-up room using the high-speed video camera and witness paper. Before removing or otherwise disturbing the test samples after blow-up photographs will be taken for the record. After collection and removal of the parts additional photographs of the various individual components will be taken for the record. All parts and will put in sample bags, boxed and temporarily stored for review if required.

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ORIGINAL

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M/710 TRIAL & PILOT, .30-06
TEST PLAN

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M/710 Trial & Pilot

Test Plan

Model 710, New Centerfire Rifle

With Iron Sights;

.30-06 Caliber

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Revision # 0

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M/710 CENTERFIRE RIFLE
TRIAL & PILOT TEST PLAN

Introduction:

The Model 710 Centerfire Rifle was previously introduced to the public as a complete system with included scope and rail system. Remington is now introducing the M/710 without scope and rails but with iron sights. This Trial & Pilot test examines the product with emphasis on the iron sight addition and the effects on the product due to this change.

For this test program the depth of the sight holes in the barrels will be measured.

A shooting test (60 rounds per rifle) will be conducted to determine if the sights will loosen during shooting.

Included in this test will be a test to determine if the Point of Impact (POI) matches the Point of Aim (POA). If there is a significant difference in the POI versus the POA it will then be determined if there is adequate adjustment in the sight assembly for both windage and elevation to bring the POI close to the POA.

Finally, the standard S.A.A.M.I. Drop, Jar-Off and Rotation test will be conducted. Drop testing was previously completed with the Scope and Rail System attached. Due to the weight change from the Scope and Rail system versus that of iron sights the standard Drop, Jar-Off and Rotation tests will be repeated with only iron sights attached to the rifle.

Measurements and Inspections:

MEASUREMENTS OF SIGHT HOLES IN BARREL–

To assure that the screw holes in the barrels used for attaching the front and rear sight bases are drilled to the correct model drawing depth, both of the two front sight screw holes and both of the rear sight screw holes will be measured for depth.

Method:

- The barrel will be secured in a horizontal position with the bore level.
- A Dial indicator with a sharp point will be attached to a gauge base.
- For each hole to be measured the gauge point will be zeroed on the highest point on the radius of the barrel located just in front of the sight screw hole to be measured.
- The point of the indicator will then be centered in the hole, finding the bottom of the hole where the drill point is located.
- The measurement of this depth will be recorded.
- Repeat process for each of the other 3 sight holes on each sample rifle.
- All rifles in the sample will be checked.
- Specification for the Front Sight Hole Depth is 0.110"
- Specification for the Rear Sight Hole Depth is 0.140"

Data Required:

- Rifle serial number
- Measured depth of each screw hole by serial number.

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Function & Endurance Testing

TESTING OF SIGHT FOR LOOSENESS:

During previous Trial & Pilot testing some sights became loose during the live fire test. To determine if production has eliminated this problem with the current run of product a live fire test will be completed on the sample rifles provided for this Trial & Pilot test.

Sixty (60) rounds will be fired through each of the nine sample rifles. The front and rear sights will be checked for looseness at the start of the test, after 20 rounds, after 40 rounds and after the completion of the 60 rounds.

There is currently no listed specification in terms of force to check the "looseness" of the sight relative to the base. For this test procedure, "looseness" will be defined as whether the tester can move the sight in the base using two-finger pressure.

Method:

- The rifle will be checked for presence of live ammunition
- Secure the rifle in a gun cradle.
- Test both the front and rear sight by using the thumb and index finger of one hand and attempt to move the sight to the left and to the right. Repeat this procedure 2 additional times for a total of three times left and 3 time right for each front and each rear sight.
- Complete this check before the start of live fire testing, after 20 rounds, after 40 rounds and finally after completing 60 rounds.
- Use caution, as barrel may be hot and use caution due to potentially sharp edges of the sight and base.

Data Required:

- Serial number of each rifle tested.
- Record results of each check at start of test and at each round level.

Accuracy Testing:

POINT OF AIM AND POINT OF IMPACT TESTING –

To insure that each rifle can hit where it is aimed when using iron sights a test will be conducted to evaluate this property.

The shooter will shoot three (3) 5-shot groups with each sample rifle. The shooter will select a point of aim for each of the three 5-shot groups. For each of the 3, 5-shot groups the center of impact will be calculated. The 3 centers of impact will then be averaged and this location will be compared to the point of aim for each group. This group average should be within a 2.7" circle inscribed around the point of aim. If the group average is within the 2.7" circle go to the next rifle. Repeat process.

If a group average is located outside the 2.7" circle, adjust the sight for either elevation or windage or both in the direction that will bring the group average with the 2.7" circle. Repeat test until group average is within the 2.7" circle or there is no adjustment left in the sight for either elevation or windage.

Method:

- Shoot test at 100 yards.
- Use Remington 30-06 ammunition. R30065, 180 grain, Point Soft Point, Core-Lokt®
- Shoot a warmer shot.
- Select point of aim for a given 5-shot group
- Repeat for remaining two 5-shot groups.
- Collect target(s) and calculate the center of impact for each group from the Point of Aim
- Average the center of impacts from the point of aim for the 3 groups
- Determine if the average point of impact for the 3 groups is within the 2.7" circle.
- If average point of impact is within 2.7" of point of aim go to next sample rifle.
- If average point of impact is outside of 2.7" circle of point of aim re-adjust sight for either windage, elevation or both in the direction that will bring the average point of impact toward the point of aim.

- Repeat this procedure until average point of impact is within the 2.7" circle or there is no adjustment left in the sight.

Data Required:

- Serial number of each sample rifle
- Average point of impact for each of the three 5-shot groups per rifle.
- The calculated group point of impact for each trial of a sample rifle.

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ABUSIVE TESTING

IMPACT TESTING

SAAMI Drop Test – Rifle with Iron Sights Installed:

This test will simulate abusive dropping of the firearm from a distance of 48 inches onto a 1" thick 85 durometer (Shore A) rubber mat backed by concrete. Trigger Pull weight will be adjusted to minimum specification (4 lb.) The Trigger/Sear engagement will be set to the minimum specification (0.020"). Test will be performed according to SAAMI Technical Committee procedures. Magazine will be loaded to maximum capacity with dummy rounds according to SAAMI procedures. After each series of test, the primed case will be discharged to insure validity of test. This test will be performed on a sample of six firearms.

Method:

- With the firearm safety in the SAFE state, the firearm shall be capable of passing the below test criteria for drop testing from a height of four feet onto an 85±5 Durometer, Shore A, rubber mat, one-inch thick backed by concrete. The mat and concrete shall be large enough so that when the gun is dropped it will fall and come to rest without interference within the perimeter of the mat. The four feet shall be measured from the surface of the rubber mat to the center of gravity of the firearm. The center of gravity shall be determined to

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an accuracy of ± one inch by any recognized method for finding the center of gravity of an irregular shaped object. The primed case shall be discharged following the drop and a fresh primed cartridge re-chambered prior to the next drop. A "fresh" firearm may be substituted into the test at any point.

- The firearm or firearms shall be dropped in such a way as to strike the rubber mat surface once in each of the following attitudes:
    - Barrel vertical; muzzle down.
    - Barrel vertical; muzzle up.
    - Barrel horizontal; bottom up.
    - Barrel horizontal; bottom down.
    - Barrel horizontal; left side up.
    - Barrel horizontal; right side up.
- Tests shall be conducted with the trigger pull force set at the minimum force specified, with engagement set to the minimum specified, and with the firecontrol lubricated as in the owner's manual.
- The test shall be conducted with the magazine or clip fully loaded with dummy cartridges and inserted in the firearm.
- Parts breakage or other damage as a result of drop testing does not constitute failure as long as the empty primed case does not fire and the firearm can be unloaded safely after each drop. More stocks are required than the amount of test guns to allow for breakage due to the drop testing. If a stock cracks - replace before continuing test.

<u>Data required:</u>

- Record whether or not the firearm fires an empty primed case of its designated cartridge when tested in accordance with this procedure.
- Record round level

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SAAMI Jar-Off Test – Rifle with Iron Sights Installed

The objective of the jar-off test is to simulate the abusive impacting (bumping) of the firearm against a hard surface with the firearm in a condition of maximum readiness. With the firearm in the ready to fire condition, the firearm shall be capable of withstanding a jar-off shock equivalent to being dropped from a height of 12" inches onto a 1" thick 85 Durometer (Shore A) rubber mat backed by concrete. Trigger Pull weight will be adjusted to minimum specification. The test will be performed according to SAAMI Technical Committee procedures. Magazine will be loaded to maximum capacity with dummy rounds according to SAAMI procedures. A fresh primed case will be chambered prior to each drop. After each drop the primed case will be discharged to verify its validity.

Method:

- With the firearm cocked and the safety in the FIRE position the firearm shall be capable of withstanding jar-off shock equivalent to being dropped from a height of twelve inches onto a 85±5 Durometer, Shore A, rubber mat, one-inch thick backed by concrete. The mat and concrete shall be large enough so that when the gun is dropped it will fall within the perimeter of the mat striking the mat once. The twelve inches will be measured from the test surface to the lowest point on the firearm. As an alternate to free dropping, other methods may be substituted if they provide equivalent impact characteristics. The primed case shall be discharged following the drop and a fresh primed cartridge re-chambered prior to the next drop. A "fresh" firearm may be substituted into the test at any point.
- The firearm or firearms shall be dropped in such a way as to strike the rubber mat surface once in each of the following attitudes:
    - Barrel vertical; muzzle down.
    - Barrel vertical; muzzle up.
    - Barrel horizontal; bottom up
    - Barrel horizontal; bottom down.
    - Barrel horizontal; left side up.
    - Barrel horizontal; right side up.

- Tests shall be conducted with the trigger pull force set at the minimum force specified, with engagement set to the minimum specified, and with the firecontrol lubricated per the owner's manual.
- The test shall be conducted with the magazine or clip fully loaded with dummy cartridges and inserted in the firearm.
- Parts breakage or other damage as a result of drop testing does not constitute failure as long as the empty primed case does not fire and the firearm can be unloaded safely after each drop. More stocks are required than the amount of test guns to allow for breakage due to the drop testing. If a stock cracks - replace before continuing test.

Data required:

- Record engagement and trigger pull.
- Record whether or not the firearm fires an empty primed case of its designated cartridge when tested in accordance with this procedure.
- Record the round level on the firearm.

SAAMI Rotation Test - Rifle with Iron Sights Installed.

The test will be conducted according to SAAMI Technical Committee procedures. The firearm will be placed in the "Safe Carrying" condition and dropped from an upright position with its butt resting on the surface of a 1" thick 85 durometer (Shore A) rubber mat backed by concrete. Trigger Pull weight will be adjusted to minimum specification. Magazine will be loaded to maximum capacity with dummy rounds according to SAAMI procedures. The firearm shall be tested (dropped) on both the right and left sides. After each rotation, the primed case will be discharged to insure validity of test.

Method:

- With the firearm safety in the SAFE state, the firearm shall be capable of passing the below test criteria when allowed to fall freely from an upright position with its butt resting on the surface of a 85±5 Durometer, Shore A, rubber mat, one-inch thick backed by concrete. The mat and concrete shall be large enough so that when the gun falls it will come to a rest without interference within the perimeter of the mat.

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The firearm shall be tested so as to fall once on its right-hand side and once on its left-hand side. The primed case shall be discharged following the drop and a fresh primed cartridge re-chambered prior to the next drop. A "fresh" firearm may be substituted into the test at any point.

Data required:

- Record engagement and trigger pull.
- Record whether or not the firearm fires an empty primed case of its designated cartridge when tested in accordance with this procedure.
- Record the round level on the firearm.

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M/710 IRON SIGHTS T&P, .30-06
TEST PLAN

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