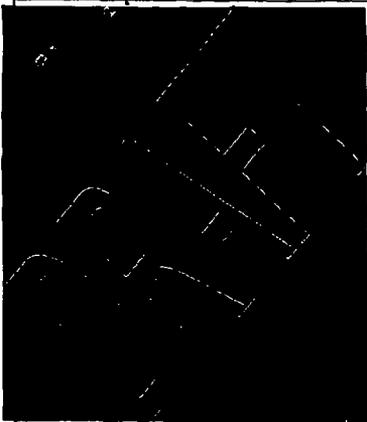


CONFIDENTIAL

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



TLW 0683

# M/710 Magnum

.300 Win. Mag.

& 7mm Rem. Mag.

## Design Acceptance Test (DAT #1)

### Test Plan

PLEASE REVIEW:

① M. KEENEY ✓ <sup>MBK</sup>  
1-15-02

② S. FRANZ ✓ <sup>SF</sup>  
1-21-02 **Revision # 1.0**

③ J. Snedeker 10/16/01

Remington Confidential

ET34724

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

**APPROVALS**..... 4

**INTRODUCTION**: ..... 5

**INITIAL TESTS, MEASUREMENTS AND INSPECTIONS**: ..... 6

**HEADSPACE AND PROOF** - : ..... 6

        TLW0683A - Measure Headspace ..... 6

        TLW0683B - Proof Test ..... 7

        TLW0683C - Re-Measure Headspace after Proof ..... 8.9

        TLW0683AH - Extended Proof Test - 100 Rounds per Rifle ..... 10

**FORCES** - : ..... 11

        TLW0683D - Measure Firing Pin Indent..... 11

        TLW0683E - Measure Sear/Trigger Engagement and Sear Lift..... 12

        TLW0683F - Measure Trigger Pull Forces..... 13

        TLW0683G - Measure Safe On/Off Forces:..... 13

        TLW0683H - Measure Belt Lift and Bolt Closing Forces : ..... 14

        TLW0683I - Measure Magazine Spring Force:..... 15

        TLW0683AD - Safety Operation (S.A.A.M.I.):..... 16

        TLW0683AE - 40 lb. Trigger Pull Test (Remington Test)..... 17

**FIREARMS MEASUREMENTS** - : ..... 19

        TLW0683K - Chamber cast : ..... 19

        TLW0683L - Bore Diameter : ..... 20

        TLW0683M - Groove Diameter : ..... 21

        TLW0683N - Twist Rate (.300 Win. Mag. and the 7mm Rem. Mag.): ..... 21

        TLW0683O - Magazine Capacity Test:..... 22

**FUNCTION & ENDURANCE TESTING**: ..... 22

**FUNCTION AND ENDURANCE TESTING** - : ..... 22

        TLW0683P - Basic Jack Function Test (to 100 Rounds):..... 22

        TLW0683Q - Basic Shoulder Function Test: ..... 24

        TLW0683R - Extended Function & Endurance: ..... 25

        TLW0683S - Clean Rifles and Inspect:..... 28

**ACCURACY TESTING**: ..... 29

**ACCURACY TESTING** - : ..... 29

        TLW0683T - Group Size at 100 yards : ..... 29

**ENVIRONMENTAL TESTING**: ..... 30

J.R.Snedeker

Page 2 of 41

01/08/02

TLW 0683

Remington Confidential

Revision # 1.0

ET34725

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

TEMPERATURE TESTING - : ..... 30

TLW0683U - Hot Function Test: ..... 30

TLW0683V - Cold Function Test: ..... 31

TLW0683AF - Thermal Cycle Test: ..... 31

ABUSIVE TESTING ..... 33

IMPACT TESTING - : ..... 33

TLW0683W - SAAMI Drop Test : ..... 33

TLW0683X - SAAMI Jar-Off Test : ..... 34

TLW0683Y - SAAMI Rotation: ..... 35

TLW0683Z - Extended SAAMI Jar-Off Test: (for Information only): ..... 36

TLW0683AA - Extended SAAMI Rotation Test: (for Information only): ..... 38

TLW0683AB - Extended SAAMI Drop Test: (for Information only): ..... 39

INTENTIONAL ABUSE : ..... 40

TLW0683AC - Obstructed Bore Test: ..... 40

TLW0683AG - High Pressure Test: ..... 40

CONFIDENTIAL

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

M/71010 Magnum Design Acceptance Test Plan #1

**Approvals**

A meeting was held on \_\_\_\_\_, 2002 to discuss the scheduled M/710 Magnum DAT #1 test. The purpose of this meeting was to define the test requirements for this Design Acceptance Test (DAT) scheduled to start in ~~October~~<sup>83</sup>. 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 M/710 Magnum for Trial & Pilot evaluation.

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

**Dale Danner**

Director, Research & Technology

**Scott Franz / Jim Snedeker**

Test & Measurement Lab

**Danny Diaz / Michael Keeney**

Firearms Development

J.R.Snedeker

TLW 0683

Page 4 of 41

Remington Confidential

01/08/02

Revision # 1.0

ET34727

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

## M/710 Magnum

### DESIGN ACCEPTANCE TEST PLAN - DAT #1

#### Introduction:

Upon successfully completing the proof test including one rifle subjected to a 100 proof endurance test, a 100 round per rifle jack-function test is planned for the 15 rifle (per caliber) sample to determine the probable malfunction rate. This test will 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 20 rounds per rifle test shot from the shoulder (standing position) in the long range. These tests are conducted to confirm that each rifle functions as intended when shot in the same manner as would be expected to be used by the customer.

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

After Measurements, preliminary proof and function tests the rifles will be subjected to standard rifle test procedures, comprised of Accuracy, Function & Endurance testing, Environmental and Abusive testing.

J.R.Snedeker  
TLW 0683

Page 5 of 41  
Remington Confidential

01/08/02

Revision # 1.0

ET34728

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

## Initial Tests, Measurements and Inspections:

### HEADSPACE AND PROOF -:

#### TLW0683A – 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:

- Graduated headspace gauges (if available) will be used and the headspace measurements will be recorded to the nearest .001" increment as indicated by the gauge. The .300 Win. Mag. chamber drawing LB-506 and the 7mm Rem. Mag. chamber drawing LB-167 will be used for referenced 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 or equal to 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. + .007".

#### Data Required:

J.R.Snedeker  
TLW 0683

Page 6 of 41

01/08/02

Remington Confidential

Revision # 1.0

ET34729

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

- Rifle serial number
- Headspace measurements for each sample

**TLW0683B - Proof Test**

All test sample firearms will be subjected to a standard .300 Win. Mag. or 7mm Rem. Mag. Factory Proof Load, as appropriate, 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."

J.R.Snedeker  
TLW 0683

Page 7 of 41  
Remington Confidential

01/08/02

Revision # 1.0

ET34730

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

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 "TLW0683A - 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.
- 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.

J.R.Snedeker  
TLW 0683

Page 8 of 41  
Remington Confidential

01/08/02

Revision # 1.0

ET34731

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

- 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 "TLW0683C - Re-Measure Headspace after Proof"*) must remain in range from min. to min. +.005" 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 of front to rear) of the lug with a center punch to indicate that it 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 + .007".
- 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.

**TLW0683C - 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

J.R.Snedeker  
TLW 0683

Page 9 of 41  
Remington Confidential

01/08/02

Revision # 1.0

ET34732

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

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:

- Graduated headspace gauges (if available) will be used and the headspace measurements will be recorded to the nearest .001" increment as indicated by the gauge. The .300 Win. Mag. chamber drawing LB-506 and the 7mm Rem. Mag. chamber drawing LB-167 will be used for referenced chamber dimensions.
- The headspace measurement taken prior to the proof test should be less than or equal to 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. +.005" for a new firearm.
- If at any time during the test program the headspace exceeds a maximum of Min. +.007" 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.

TLW0683AH - Extended Proof Test - 100 Rounds per Rifle

Method:

- Fire proof rounds through rifle in the blow-up room using a lanyard using the following schedule:

<u>Number of Rifles</u>	<u>Cumulative Number of Proof Rounds</u>	<u>Type of Receiver Material</u>
1	100	Carbon Steel

- For the first 10 rounds, measure the headspace after each round.
- For rounds 11 to 25, measure the headspace after every 5 rounds.
- For rounds 26 to 100 measure the headspace after the 100<sup>th</sup> round.

*suggest after  
? 50, 75, 100*

J.R.Snedeker  
TLW 0683

Page 10 of 41  
Remington Confidential

01/08/02

Revision # 1.0

ET34733

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

- In no case can the headspace on a given rifle exceed .007" ?
- Examine all rifles visually for signs of damage before proceeding to the jack fired test following.
- For the rifle that is subjected to the 100 total proof rounds, examine the receiver (outside surface) and the bolt head using the Dye Penetrant method of non-destructive testing.

Data Required:

- Rifle serial numbers
- Headspace measurements per the schedule outlined above.
- Notes of the visual examine.
- The results of the Dye Penetrant examination.

FORCES -:TLW0683D - 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 either the .300 Win. Mag. or the 7mm Rem. Mag. 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.

J.R.Snedeker  
TLW 0683

Page 11 of 41  
Remington Confidential

01/08/02

Revision # 1.0

ET34734

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

- 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.

TLW0683E - 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.

J.R.Snedeker  
TLW 0683

Page 12 of 41  
Remington Confidential

01/08/02

Revision # 1.0

ET34735

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

- 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

TLW0683F - Measure Trigger Pull Forces:

*new*  
*JIM) let's start using the Dvorak trigger meas. system*  
*is parallel for awhile.*

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. *plus the Dvorak method* The spring scale method may also be used.
- 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.

*OK NOT NEEDED*

• *Dvorak trigger pull Force vs time curves (3/rifle)*

TLW0683G - 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.

J.R.Snedeker

Page 13 of 41

01/08/02

TLW 0683

Remington Confidential

Revision # 1.0

ET34736

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

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 either the Spring Scale or 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.
- Average the results of each of the three trials.
- The ISS system will be checked for proper function.

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

TLW0683H - 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, pull the trigger to release the firing pin. Using the Chatillion gauge, pull the gauge straight up and perpendicular to the bore, measure the force required to open the bolt.

J.R.Snedeker  
TLW 0683

Page 14 of 41  
Remington Confidential

01/08/02

Revision # 1.0

ET34737

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

- 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 <sup>rotate</sup> push the bolt closed. *by pulling downward on the bolt handle.*
- 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.
- *A forward force may have to be applied before bolt closing can be started.*
- 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

TLW0683I - 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.

J.R.Snedeker

Page 15 of 41

01/08/02

TLW 0683

Remington Confidential

Revision # 1.0

ET34738

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

- 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.

TLW0683AD - Safety Operation (S.A.A.M.I.)

This S.A.A.M.I. required test measures the operation of the manual safety to determine if the force required to move the safety from the "safe" to the "fire" position is less than 1 lb. In addition, an examination of the safety is made to determine if the "fire" and "safe" position of the safety are clearly discernible to the user. Finally, a 40-lb. load is applied to the trigger from several directions with the safety in the "on" or "safe" position to determine that the mechanical operation of the safety is not impaired.

*JTA! Saw as TLW0683G  
Suggest you eliminate G +  
keep here.*

Method:

- Inspect and verify the rifle is not loaded and the safe is in the "On-Safe" position
- With the rifle's safety in the "On-Safe" position, use the Chatillion 10 lb. gauge with a "V" notch attached and carefully push the safety to the "fire" position and measure the force required to move the safety. Perform 3 trials for each rifle and record all three force measurements. These will be averaged to determine the final force measurement for each rifle.
- Make a specific observation as to the position of the "on-safe" and the "fire" and determine if there a discernible "detent" detectable when the safety is moved between the two positions. Record the observation for each sample rifle.
- Finally, lock the rifle securely in a holding device and proceed to apply a 40-lb. load to the trigger. Place the Chatillion 50 lb. gauge v-notch in each of four locations from the front (or as close as you can get from the front.) Then from the rear of the trigger (or as close as you can get from the rear.) Finish by applying the 40 lb. load to the trigger, first from the left side and then from the right side in turn and apply a 40-lb. load. In each application of the 40-lb. load, placement of the load should be at about the center of the finger curve of the trigger. After each application of the load test the fire control mechanism by attempting to pull the trigger with the safe in the "on-safe" position and the rifle pointed in a safe direction. Gun must not fire. Push the safety to the "fire" position. Gun must not fire when the safety is moved to the "fire" position.

J.R.Snedeker  
TLW 0683

Page 16 of 41  
Remington Confidential

01/08/02

Revision # 1.0

ET34739

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

Finally, with the rifle still pointed in a safe direction, pull the trigger, the firing pin must release to the fired position.

**TLW0683AE - 40 lb. Trigger Pull Test (Remington Test)**

*Jim I've always been uncomfortable the way this is written. I'd suggest we use the Chatillon Ford Gauge & use copper crush instead of spring steel.*

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 in the "On-Safe" position. In addition, sufficient force is applied to the trigger with the safe in the "On-Safe" position to assure 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.

Method:

- 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 determine if the loading in the next steps has deformed the trigger.
- Using the "pegboard" for primed cases (please refer to procedure TLP 0210.0) - remove the primed case from the pegboard and 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 40-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.

J.R.Snedeker

Page 17 of 41

01/08/02

TLW 0683

Remington Confidential

Revision # 1.0

ET34740

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

- 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.

CONFIDENTIAL 83

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

**FIREARMS MEASUREMENTS -:****TLW0683K - Chamber cast :**

Use the .300 Win. Mag or the 7mm Rem. Mag.-chamber drawing  
LB-506 and LB-167 for reference.

**Method:**

- Make chamber cast using standard procedure
- Use the 30" optical comparator
- Measure the following dimensions:

.300 Win. Mag.	7mm Rem. Mag
• .514/.516	.514/.516
• .4916/.4901	.4927/.4935
• 25° Angle -	25° Angle
• .3421/.3441	.317/.3185
• .3407/.3427	.316/.3175

**Data Required:**

- Rifle serial numbers
- Record dimensions requested above.

**Test Description:**

Note that Cerrosafe™ has some unique features that make it suitable for making chamber casts. During the first 30 minutes of cooling Cerrosafe™ shrinks making removal from a rifle chamber easier. After about an hour the cast is exactly the size of the chamber in which it was cast.

**Be sure to be use all caution when making chamber casts. Although the material melts at a relatively low temperature, the temperature is still hot enough to cause severe burns if spilled on bare flesh. Use**

J.R.Snedeker  
TLW 0683

Page 19 of 41  
Remington Confidential

01/08/02

Revision # 1.0

ET34742

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

protective gloves, clothing and safety glasses with side-shields.

Chamber cast procedure:

- Use Cerrosafe™ chamber casting alloy. As long as it is kept clean, the material can be reused multiple times.
- Clean chamber of the rifle thoroughly and apply a very thin film of oil or graphite.
- Plug the bore of the rifle immediately ahead of the throat with a small rag – but not so tightly it cannot be driven out.
- Melt the Cerrosafe™ in a clean iron ladle. It will melt between 158° and 190°F.
- The source of heat should be removed as soon as the alloy is completely melted, at which time it is ready to pour.
- If practical, pour the molten Cerrosafe™ through a small tube into the bottom of the cast, gradually removing the tube as the chamber fills. A funnel with a heat resistant tube securely attached should work.
- If the barrel is cold, warm it to room temperature or slightly above room temperature before making the cast.
- Make note of the time of the pour.
- The solidified casting should be removed from the chamber before or when it cools to room temperature (about 30 minutes.) If allowed to remain in the chamber for over an hour, it will grip the chamber walls and will be difficult to remove.
- After approximately 30 minutes of cooling time remove the cast from the chamber using a rod or dowel inserted from the muzzle end of the barrel.
- At one hour past the time of pour, the casting will be exactly the size of the chamber. (At the end of 200 hours (a little over a week) it will have expanded approximately .0025% (1/4<sup>th</sup> of 1%)

**TLW0683L - Bore Diameter :**

Measure Bore Diameter using standard procedures.

**Method:**

J.R.Snedeker

Page 20 of 41

01/08/02

TLW 0683

Remington Confidential

Revision # 1.0

ET34743

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

- Measure .300 Win. Mag. or the 7mm Rem. Mag. caliber
- Dimension equals\* .300/.301                      Dimension equals \*.277/.278

Data Required:

- Rifle serial numbers *OK not needed*
- Measurements of each bore by serial number *OK not needed*

\*Dimensions to be supplied by Design Engineer.

TLW0683M - Groove Diameter :

Measure Groove Diameter using standard procedures.

Method:

- Measure .300 Win. Mag. or the 7mm Rem. Mag
- Dimension equals \* .308/.309 - (.300 Win. Mag) *OK not needed*
- Dimension equals \* .2837/.2847 - (7mm Rem. Mag) *OK not needed*

Data Required:

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

TLW0683N - Twist Rate (.300 Win. Mag. and the 7mm Rem. Mag.):

Measure Twist Rate using standard procedures.

Method:

- Measure 1 turn in 10" ± .25", RH for the .300 Win. Mag. *OK not needed*
- Measure 1 turn in 9-1/4" ± .25", RH for the 7mm Rem. Mag. *OK not needed*

Data Required:

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

J.R.Snedeker

Page 21 of 41

01/08/02

TLW 0683

Remington Confidential

Revision # 1.0

ET34744

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

**TLW0683O - Magazine Capacity Test:**

The .300 Win. Mag. or the 7mm Rem. Mag. rifles with the magazine fully loaded must be able to be inserted into firearm with the bolt closed and in the locked position. The Model 710 must be able to accept 3 rounds in the magazine and with one round in the chamber still be able to close the bolt over a load of 3 rounds.

**Method:**

- Check rifle for live ammunition
- With muzzle pointed in a safe direction, close the bolt and lock over an empty chamber
- Load 3 dummy rounds into the magazine *← insert in the gun. (must latch fully)*
- Cycle the 3 dummy rounds through the chamber and eject each round.

**Data Required:**

- Rifle serial number
- *Record in 3 rds fit in the magazine*
- *Record if mag. box latches fully when inserted into gun.*
- Record any failures to load and cycle properly by box and rifle

**FUNCTION & ENDURANCE TESTING:****FUNCTION AND ENDURANCE TESTING --:****TLW0683P - Basic Jack Function Test (to 100 Rounds):**

To get an early picture of the product's functional capability, a 100 round per rifle jack function test will be conducted. 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 10 are permitted to be removed from the averaging process if they have excessive malfunction rates relative to the remaining group of 8 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

J.R.Snedeker  
TLW 0683

Page 22 of 41  
Remington Confidential

01/08/02

Revision # 1.0

ET34745

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

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 four rounds into the rifle, one in the chamber and three in the magazine, do not shoot single shot<sup>53</sup> 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~~<sup>four</sup> round trial and will be pushed to the On Safe position at the end of every ~~five round trial~~<sup>Firing Cycle</sup>. 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

J.R.Snedeker

Page 23 of 41

01/08/02

TLW 0683

Remington Confidential

Revision # 1.0

ET34746

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

- 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.

**TLW0683Q - Basic Shoulder Function Test:**

To get an early picture of the product's functional capability from the perspective of the customer, a 20 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.

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.

J.R.Snedeker  
TLW 0683

Page 24 of 41  
Remington Confidential

01/08/02

Revision # 1.0

ET34747

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

- Load the four rounds into the rifle, one in the chamber and three 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.
- 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.

- Repeat 10 rd test
- 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.

*we need to specify how the shooter cycles the action i.e. while shouldering the rifle or moving to waist position to cycle. It's OK either way, we just need to be consistent. Been an issue in the past.*

*SJB*

TLW0683R - 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

J.R.Snedeker

Page 25 of 41

01/08/02

TLW 0683

Remington Confidential

Revision # 1.0

ET34748

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

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 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 shot according to the attached schedule. 83

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 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.
- 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 4 rounds, from Safe to Fire at the start of the <sup>four</sup> five round cycle and from Fire to Safe at the end of the 4 round cycle.

J.R.Snedeker  
TLW 0683

Page 26 of 41  
Remington Confidential

01/08/02

Revision # 1.0

ET34749

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

- After 500 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 500 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.

**TEST ROUND SCHEDULE**

( DOES NOT COUNT ROUNDS FOR ACCURACY OR OTHER TESTING)

	FUNCTION TEST 100 Rd.	SHOULDER FIRED TEST 20 Rd.	ENDURANCE TEST 120-500 Rd.	ENDURANCE TEST 500-1000 Rd.	ENDURANCE TEST 1000-4000 Rd.	TOTAL ROUNDS
A1	X	X	X	X	X	4000
A2	X	X	X	X		1000
A3	X	X	X	X		500
A4	X	X	X	X		500
A5	X	X	X	X		500
A6	X	X	X	X		500
A7	X	X	X	X		500
A8	X	X	X	X		500
A9	X	X	X	X		500

*Suggest larger sample to 1000 level*

J.R.Snedeker  
TLW 0683

Page 27 of 41  
Remington Confidential

01/08/02

Revision # 1.0

ET34750

CONFIDENTIAL

Remington Arms Company Inc.  
 RESEARCH & DEVELOPMENT TECHNICAL CENTER  
 315 WEST RING ROAD

A10	X	X	X			500
A11	X	X				120
A12	X	X				120
A13	X	X				120
A14	X	X				120
A15	X	X				120
	1500	300	3800	1000	3000	9600

53

**TLW0683S - Clean Rifles and Inspect:**

500?

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.

CONFIDENTIAL

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

**ACCURACY TESTING:**

**ACCURACY TESTING - :**

**TLW0683T - 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 less than or equal to the sizes per the attached schedule (as shown by the Gallery Specs.)

	<u>3 Shot Groups</u>	<u>4 Shot Groups</u>	<u>5 Shot Groups</u>
<b>.300 Win. Mag.</b> <b>180 grain PSPCL</b> <b>(Gallery Specs.)</b>	2.5"	3.0"	3.5"
<b>.7mm Rem. Mag.</b> <b>175 grain PSPCL</b> <b>(Gallery Specs.)</b>	2.5"	3.0"	3.5"

**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.

J.R.Snedeker  
TLW 0683

Page 29 of 41  
Remington Confidential

01/08/02

Revision # 1.0

ET34752

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

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.

**ENVIRONMENTAL TESTING:**

**TEMPERATURE TESTING - :**

**TLW0683U - 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

J.R.Snedeker

TLW 0683

Page 30 of 41

01/08/02

Remington Confidential

Revision # 1.0

83

ET34753

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

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

#### TLW0683V - 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:

- 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.

#### Data Required:

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

#### TLW0683AF - 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 ~~-40°F.~~ <sup>-20°F</sup> for at least 3 complete cycles, brought back to

J.R.Snedeker

Page 31 of 41

01/08/02

TLW 0683

Remington Confidential

Revision # 1.0

ET34754

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

*Done 100 rds in past testing, I'm OK w/ 200, your call*

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. *(100 rds)*
- Do not clean rifle
- Place rifle in freezer that is pre-set to ~~-40°F~~ <sup>-20°F</sup> 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.
- 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.
- 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.

J.R.Snedeker  
TLW 0683

Page 32 of 41  
Remington Confidential

01/08/02

Revision # 1.0

ET34755

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

## ABUSIVE TESTING

### IMPACT TESTING - :

#### TLW0683W - 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 (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 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.

#### 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.

J.R.Snedeker  
TLW 0683

Page 33 of 41  
Remington Confidential

01/08/02

Revision # 1.0

ET34756

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

- 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

TLW0683X - 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 Sear engagement will be set to min.. 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 four firearms.

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

J.R.Snedeker

Page 34 of 41

01/08/02

TLW 0683

Remington Confidential

Revision # 1.0

ET34757

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

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.

TLW0683Y - SAAMI Rotation:

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

J.R.Snedeker  
TLW 0683

Page 35 of 41  
Remington Confidential

01/08/02

Revision # 1.0

ET34758

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

of a 1" thick 85 durometer (Shore A) rubber mat backed by concrete. Trigger Pull weight will be adjusted to minimum specification. Sear engagement will be set to minimum. 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 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

TLW0683Z- Extended SAAMI Jar-Off Test: (for Information only):

J.R.Snedeker  
TLW 0683

Page 36 of 41  
Remington Confidential

01/08/02

Revision # 1.0

ET34759

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

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.

*using 4 in std. SAAMI drops.*

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 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 *per owners manual.* 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:

J.R.Snedeker  
TLW 0683

Page 37 of 41  
Remington Confidential

01/08/02

Revision # 1.0

ET34760

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

- 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

**TLW0683AA – 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.

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.

J.R.Snedeker

Page 38 of 41

01/08/02

TLW 0683

Remington Confidential

Revision # 1.0

ET34761

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

**TLW0683AB – 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.

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.
- 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

J.R.Snedeker

Page 39 of 41

01/08/02

TLW 0683

Remington Confidential

Revision # 1.0

ET34762

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

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.

**INTENTIONAL ABUSE :**

**Note that for 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.**

**TLW0683AC - 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 (300 Win. Mag. or the 7mm Rem. Mag. 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.

**TLW0683AG - 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

J.R.Snedeker

Page 40 of 41

01/08/02

TLW 0683

Remington Confidential

Revision # 1.0

ET34763

CONFIDENTIAL

Remington Arms Company Inc.  
RESEARCH & DEVELOPMENT TECHNICAL CENTER  
315 WEST RING ROAD

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 and will put in sample bags, boxed and temporarily stored for review if required.

CONFIDENTIAL 83

J.R.Snedeker  
TLW 0683

Page 41 of 41  
Remington Confidential

01/08/02

Revision # 1.0

ET34764