

# Test Lab Work Request Form

Rev.3 -20 April, 2000

<b>Date Submitted:</b> 05/02/01	<b>Tracking # :</b> TLW0505
<b>Project # :</b> 241095	<b>Engineer:</b> Franz for Matt Golemboski
<b>Test Objective:</b> To qualify M/710 rifles in .30-06 caliber with Iron Sights by conducting T & P Test Protocol.	
<b>Test Description:</b> Run T & P testing per approved test plan for <u>M/710 rifles with Iron Sights (.30-06 caliber)</u> .  <b>Testing to include the following:</b> <ul style="list-style-type: none"> <li>• Inspect for loose sights.</li> <li>• Measure sight hole screw depth for front &amp; rear sight.</li> <li>• POI Test</li> <li>• SAAMI Drop, Jar-Off &amp; Rotation Test</li> <li>• 60 Rd./gun Live Fire Test</li> </ul>	
<b>Resource Usage:</b> <b>Manpower Requirements -</b>  <b>Facility Requirements -</b>	<b>Test Results Required:</b> <b>Formal Report: X Data Only:</b>  <b>Requested Completion Date:</b>
<b>Required Materials/Parts/Equipment (include quantities):</b> 9 M/710 rifles with Iron Sights (.30-06 Caliber): Available 5/2/01	
<b>Test Parts Availability Date:</b>	
<b>Start Date:</b> <b>Completion Date:</b> 27 June '01 <b>Report Date:</b>	<b>Test Assigned To:</b>  <b>Assignment Date:</b>

ET30210

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315 WEST RING ROAD  
ELIZABETHTOWN, KY 42701

Remington Arms Company, Inc.  
Test Report – Trial & Pilot Test  
M/710 Centerfire Rifle  
w/Iron Sights

.30-06 Springfield

(PART B)

June 2001

Distribution List:

Bristol, R.

Diaz, D.D.

Danner, D.R.

Golemboski, M.

Keeney, M.

Snedeker, J.R.

✓ File

May '01 – Trial & Pilot Test – Remington M/710 Centerfire Rifle w/Iron Sights;  
R & D Technical Center Project No. 241095; TLW0395, TLW0405, TLW 0505  
file: Erdntas3\710 \ Trial & Pilot\_3006 Iron Sight Guns\M710\_T&P\_REPORT\_JUNE26\_Rev0.doc

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Rev 0 - 06/21/01 10:11 AM

ET30211

# Model 710 Sight Screw Hole Depth - Front Sight, Front Hole

Process Data

USL	0.115
Target	0.110
LSL	0.105
Mean	0.101
Sample N	10
StDev (ST)	0.0013790
StDev (LT)	0.0016789

Potential (ST) Capability

Cp	1.21
CPU	3.38
CPL	-0.97
Cpk	-0.97
Cpm	0.17

Overall (LT) Capability

Pp	0.99
PPp	2.78
PPL	-0.79
Ppk	-0.79

Observed Performance

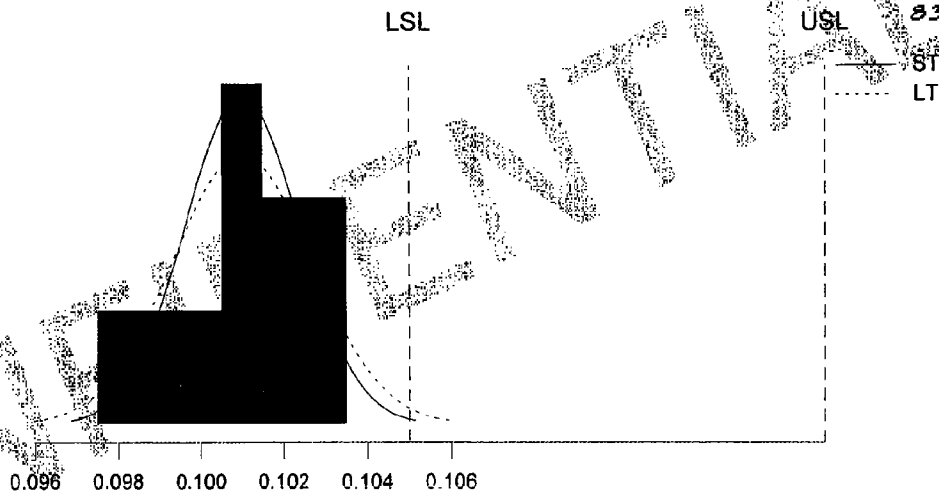
PPM < LSL	1000000.00
PPM > USL	0.00
PPM Total	1000000.00

Expected ST Performance

PPM < LSL	0.00
PPM > USL	0.00
PPM Total	0.00

Expected LT Performance

PPM < LSL	0.00
PPM > USL	0.00
PPM Total	0.00



.110 ± .005

.105 - .115 ✓

ET30212

## Model 710 Sight Screw Hole Depth - Front Sight, Front Hole

Process Data

USL	0.115
Target	0.110
LSL	0.105
Mean	0.101
Sample N	10
StDev (ST)	0.0013790
StDev (LT)	0.0016789

Potential (ST) Capability

Cp	1.21
CPU	1.38
CPL	-0.97
Cpk	-0.97
Cpm	0.17

Overall (LT) Capability

Pp	0.99
PPU	2.78
PPL	-0.79
Ppk	-0.79

Observed Performance

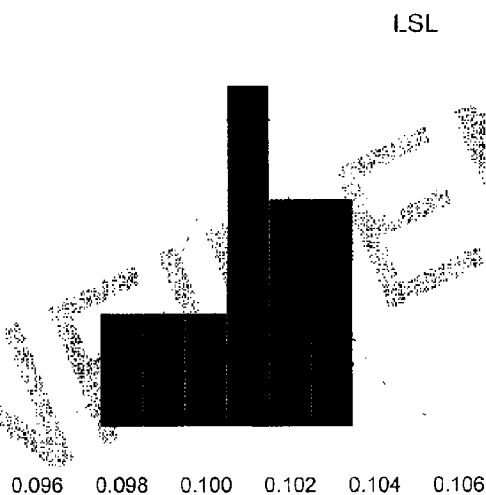
PPM < LSL	1000000.00
PPM > USL	0.00
PPM Total	1000000.00

Expected ST Performance

PPM < LSL	0.00
PPM > USL	0.00
PPM Total	0.00

Expected LT Performance

PPM < LSL	0.00
PPM > USL	0.00
PPM Total	0.00



ET30213

# Model 710 Sight Screw Hole Depth - Front Sight, Rear Hole

Process Data

USL	0.1150
Target	0.1100
LSL	0.1050
Mean	0.1035
Sample N	10
StDev (ST)	0.0020686
StDev (LT)	0.0022342

Potential (ST) Capability

Cp	0.81
CPU	1.85
CPL	-0.24
Cpk	-0.24
Cpm	0.23

Overall (LT) Capability

Pp	0.75
PPL	1.72
PPL	-0.22
Ppk	-0.22

Observed Performance

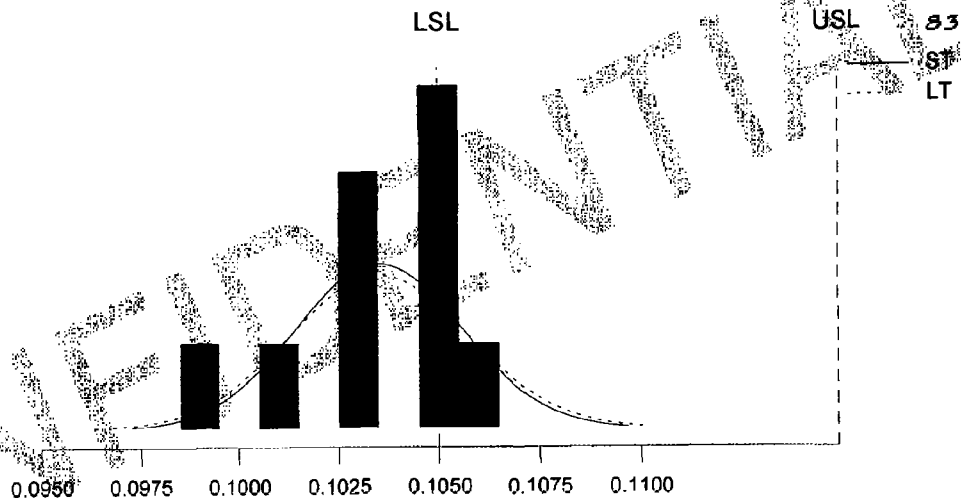
PPM < LSL	500000.00
PPM > USL	0.00
PPM Total	500000.00

Expected ST Performance

PPM < LSL	0.00
PPM > USL	0.00
PPM Total	0.00

Expected LT Performance

PPM < LSL	0.00
PPM > USL	0.00
PPM Total	0.00



ET30214

Model 710 Sight Screw Hole Depth - Rear Sight, Front Hole

Process Data

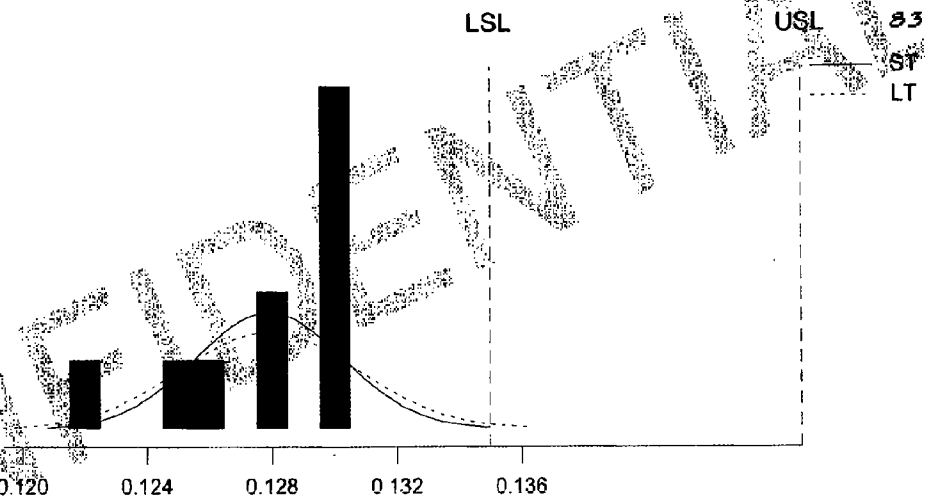
USL	0.1450
Target	0.1400
LSL	0.1350
Mean	0.1279
Sample N	10
StDev (ST)	0.0023641
StDev (LT)	0.0028446

Potential (ST) Capability

Cp	0.71
CPU	-2.41
CPL	-1.00
Cpk	-1.00
Cpm	0.13

Overall (LT) Capability

Pp	0.59
PPU	2.00
PPL	-0.83
Ppk	-0.83



Observed Performance		Expected ST Performance		Expected LT Performance	
PPM < LSL	1000000.00	PPM < LSL	0.00	PPM < LSL	0.00
PPM > USL	0.00	PPM > USL	0.00	PPM > USL	0.00
PPM Total	1000000.00	PPM Total	0.00	PPM Total	0.00

.14 ± .010

.13 - .15

ET30215

# Model 710 Sight Screw Hole Depth - Rear Sight, Front Hole

Process Data

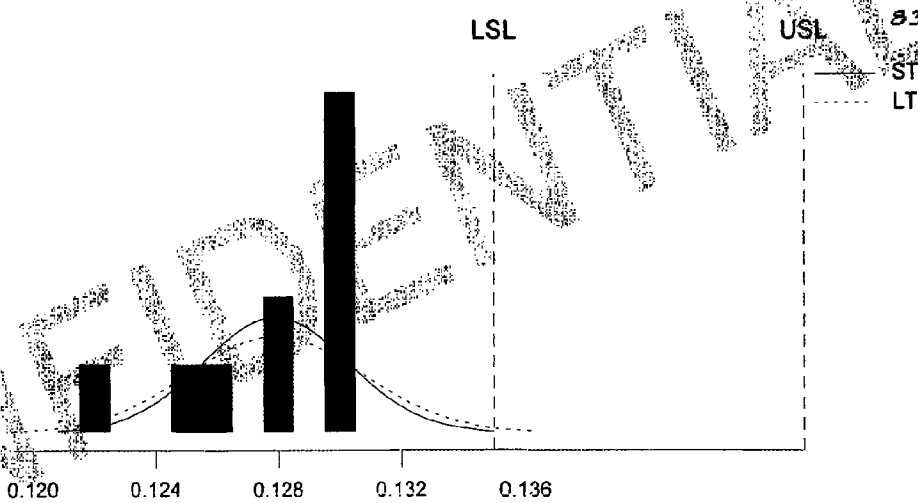
USL	0.1450
Target	0.1400
LSL	0.1350
Mean	0.1279
Sample N	10
StDev (ST)	0.0023641
StDev (LT)	0.0028446

Potential (ST) Capability

Cp	0.71
CPU	2.41
CPL	1.00
Cpk	-1.00
Cpm	0.13

Overall (LT) Capability

Pp	0.59
PPU	2.00
PPL	-0.83
Ppk	-0.83



Observed Performance		Expected ST Performance		Expected LT Performance	
PPM < LSL	1000000.00	PPM < LSL	0.00	PPM < LSL	0.00
PPM > USL	0.00	PPM > USL	0.00	PPM > USL	0.00
PPM Total	1000000.00	PPM Total	0.00	PPM Total	0.00

ET30216

# Model 710 Sight Screw Hole Depth - Rear Sight, Rear Hole

Process Data

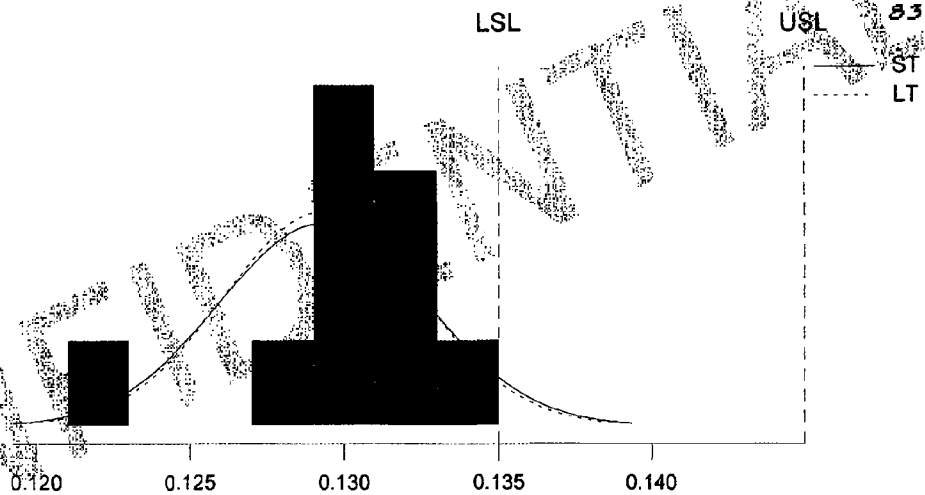
USL	0.1450
Target	0.1400
LSL	0.1350
Mean	0.1293
Sample N	10
StDev (ST)	0.0033491
StDev (LT)	0.0031799

Potential (ST) Capability

Cp	0.50
CPU	1.56
CPL	-0.67
Cpk	-0.67
Cpm	0.14

Overall (LT) Capability

Pp	0.52
PPU	1.65
PPL	-0.60
Ppk	-0.60



Observed Performance		Expected ST Performance		Expected LT Performance	
PPM < LSL	1000000.00	PPM < LSL	0.00	PPM < LSL	0.00
PPM > USL	0.00	PPM > USL	0.00	PPM > USL	0.00
PPM Total	1000000.00	PPM Total	0.00	PPM Total	0.00

ET30217



PROJECT# 241095

M/710 T&amp;P WITH IRON SIGHTS

POINT OF AIM AND POINT OF IMPACT TESTING 100 YARDS

GUN	CENTER OF IMPACT FROM POINT OF AIM			COMMENTS
	GROUP# 1	GROUP# 2	AVERAGE	
71002460				COULD NOT ZERO GUN. MOVED REAR SIGHT ALL THE WAY BACK. GUN SHOOTING 10" HIGH.
71002459				COULD NOT ZERO GUN. MOVED REAR SIGHT ALL THE WAY BACK. GUN SHOOTING 12" HIGH.
71002457	2.25	0.5	1.375	REAR SIGHT ALL THE WAY BACK. WINDAGE 3 NOTCHES RIGHT.
71002455				COULD NOT ZERO GUN. MOVED REAR SIGHT ALL THE WAY BACK. GUN SHOOTING 12" HIGH.
71002467				COULD NOT ZERO GUN. MOVED REAR SIGHT ALL THE WAY BACK. GUN SHOOTING 10" HIGH.
71003108				COULD NOT ZERO GUN. MOVED REAR SIGHT ALL THE WAY BACK. GUN SHOOTING 6" HIGH.
71002458				COULD NOT ZERO GUN. MOVED REAR SIGHT ALL THE WAY BACK. GUN SHOOTING 12" HIGH.
71002465				COULD NOT ZERO GUN. MOVED REAR SIGHT ALL THE WAY BACK. GUN SHOOTING 12" HIGH.
71003109	0.25	2.5	1.375	REAR SIGHT ALL THE WAY BACK. WINDAGE 2 NOTCHES LEFT.

ET30218

710 T&amp;B 30-06

9 guns.

{ POI - POA

3 guns.

60 rds. 1 gun  
100 rds. 2 guns


(all nine guns).

{ SAAFI TESTING

6 guns.

TLW 405

TLW 395



Measure depth of sight holes in bbl.  
front & rear.

Check on availability of previous  
hole depth data - use old data<sup>83</sup>  
if available.

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PROJECT# 241095

M/710 30.06 T&amp;P WITH IRON SIGHTS

POINT OF AIM AND POINT OF IMPACT TESTING 100 YARDS

TLW 0505

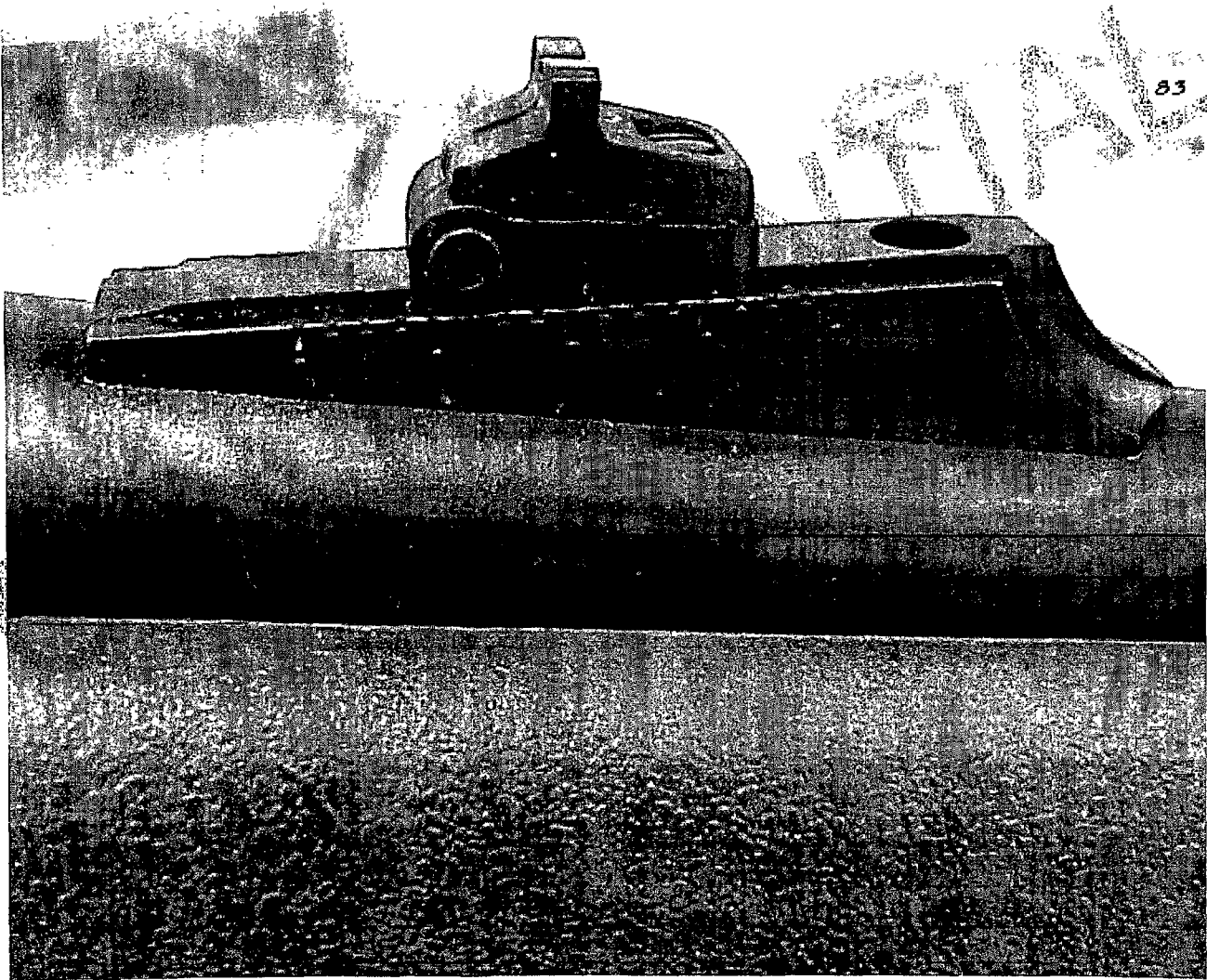
GUN	CENTER OF IMPACT FROM POINT OF AIM	COMMENTS
71015900	(PASSED) WITHIN 2.7" DIA REAR SIGHT 2 NOTCHES FROM REAR.	
7105377	(PASSED) WITHIN 2.7" DIA REAR SIGHT 2 NOTCHES FROM REAR.	
71015887	(PASSED) WITHIN 2.7" DIA REAR SIGHT 2 NOTCHES FROM REAR.	
71015893	(PASSED) WITHIN 2.7" DIA REAR SIGHT 6 NOTCHES FROM REAR.	
71015421	(PASSED) WITHIN 2.7" DIA REAR SIGHT 2 NOTCHES FROM REAR.	
71015413	(PASSED) WITHIN 2.7" DIA REAR SIGHT 2 NOTCHES FROM REAR.	
71015417	(PASSED) WITHIN 2.7" DIA REAR SIGHT 4 NOTCHES FROM REAR.	
71015431	(PASSED) WITHIN 2.7" DIA REAR SIGHT 6 NOTCHES FROM REAR.	
71015296	(PASSED) WITHIN 2.7" DIA REAR SIGHT 2 NOTCHES FROM REAR.	
71015412	(PASSED) WITHIN 2.7" DIA REAR SIGHT 2 NOTCHES FROM REAR.	

NOTE: TRIGGER PULL ON THIS GUN WAS 3.75 LBS

ET30220



2 click  
to it



ET30222

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# M/710 Trial & Pilot

## Test Plan

### Model 710, New Centerfire Rifle

With Iron Sights;

.30-06 Caliber

Revision # 0

05/01/01

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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.

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315 WEST RING ROAD**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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315 WEST RING ROAD**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 times 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.

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## 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 within 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.

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- 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.

## 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  $\pm$  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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315 WEST RING ROAD**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.

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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.

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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CONFIDENTIAL

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

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.

J.R.Snedeker

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