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Research & Development Technical Center  
315 West Ring Road  
Elizabethtown, KY 42701

TLW0407

Remington Arms Company, Inc.

Test Report – Trial & Pilot Test

M/710 Centerfire

Rifle

.270 Win.

(PART A)

July 2001

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**Page 1**

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*Page 2*

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## PART A

|  |    |
|--|----|
| ABSTRACT.....  | 5  |
| INTRODUCTION.....  | 6  |
| 1.0 PURPOSE & SCOPE OF TEST PROGRAM.....   | 7  |
| 1.1 Purpose .....  | 7  |
| 1.2 Scope .....  | 7  |
| 2.0 EXECUTIVE SUMMARY.....   | 7  |
| 2.1 Test Summary Table.....  | 9  |
| 3.0 T&P SUMMARY – (DETAILED).....  | 13 |
| 3.1 Initial Inspections, Tests & Measurements .....  | 13 |
| Visual Examination, Packaging Audit & Packaging Test.....  | 13 |
| 3.1.1.1 TLW0407A – (T&P series “A”) Visual Examination – Performed by Elizabethtown Technicians..... | 13 |
| 3.1.1.2 TLW0407B – Packaging Audit – .....   | 13 |
| Headspace and Proof .....  | 16 |
| 3.1.1.3 TLW0407E – Measure Headspace .....   | 16 |
| 3.1.1.4 TLW0407F – Proof Test .....  | 16 |
| 3.1.1.5 TLW0407G – Re-Measure Headspace after Proof * .....  | 16 |
| Forces .....   | 16 |
| 3.1.1.6 TLW0407H – Measure Firing Pin Indent .....   | 16 |
| 3.1.1.7 TLW0407I – Trigger/Sear Engagement .....   | 17 |
| 3.1.1.8 TLW0407J – Measure Trigger Pull Forces .....   | 17 |
| 3.1.1.9 TLW0407K – Measure Safe On/Off Forces .....  | 18 |
| 3.1.1.10 TLW0407M – Measure Magazine Spring Force .....  | 18 |
| 3.1.1.11 TLW0407N – Measure Firing Pin Head to Sear Engagement .....                                 | 18 |
| 3.1.1.12 TLW0407O – Bolt Stop Function Check .....   | 19 |
| 3.1.1.13 TLW0407P – Function Check of ISS System .....   | 19 |
| 3.1.1.14 TLW0407AT – Perform bore sighting Using Bushnell Scope .....                                | 19 |

Aug. '01 – Trial & Pilot Test – Remington M/710 Centerfire Rifle;  
R & D Technical Center Project No. 241039; TLW 0407  
file: E:\Test Reports\Firearms Tests\710 T&P\_270M710\_270\_T&P\_REPORT\_JUL01\_Rev0.6.doc

Page 3

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|  |    |
|--|----|
| <b>Firearms Measurements</b> .....   | 21 |
| 3.1.1.15 TLW0407T - Chamber Cast .....   | 21 |
| 3.1.1.16 TLW0407U - Bore Diameter .....  | 21 |
| 3.1.1.17 TLW0407V - Groove Diameter .....  | 21 |
| 3.1.1.18 TLW0407W - Twist Rate (.270) .....  | 21 |
| 3.1.1.19 TLW0407X - Magazine Capacity Test .....   | 22 |
| <b>3.2 Function &amp; Endurance Testing</b> .....  | 23 |
| <b>Function and Endurance Testing</b> .....  | 23 |
| 3.2.1.1 TLW0407Y - Ten (10) Round Safety Function Test with Lanyard .....                            | 23 |
| 3.2.1.2 LW0300Z - Basic Jack Function Test (60 Rounds with Remington & Winchester Ammunition.) ..... | 23 |
| 3.2.1.3 TLW0407AA - 400 Round Extended Function Test .....   | 24 |
| 3.2.1.4 TLW0407AB - Clean Rifles and Inspect .....   | 25 |
| <b>3.3 Accuracy and POI Testing</b> .....  | 25 |
| <b>Accuracy and POI Testing</b> .....  | 25 |
| 3.3.1.1 TLW0407AC - POI & Group Size - Initial Test with High Quality 36X Scope .....                | 25 |
| <b>3.4 Environmental Testing</b> .....   | 26 |
| <b>Temperature &amp; Humidity Testing</b> .....  | 26 |
| 3.4.1.1 TLW0407AG - Hot Function Test .....  | 26 |
| 3.4.1.2 TLW0407AH - Cold Function Test .....   | 26 |
| 3.4.1.3 TLW0407AI - Heat & Humidity Test .....   | 27 |

Aug. '01 - Trial & Pilot Test - Remington M/710 Centerfire Rifle;  
R & D Technical Center Project No. 241039; TLW 0407  
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Page 4

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Remington Arms Company, Inc.

Test Report – Trial & Pilot Test

August 2001

M/710 Centerfire Rifle

Caliber: .270 Winchester

## ABSTRACT:

This Report covers the results of the Trial & Pilot Testing (T&P) procedures performed on the Remington M/710 .270 Win. Centerfire Rifle during December 2000 through July 2001 at the Remington Arms Company, Inc., Research & Development Technical Center located at Elizabethtown, KY.

This Testing Program was designed around the goal of determining if this new product met design specifications as specified by R&D and produced using production methods and processes at the Remington Arms Mayfield KY plant.

Several "information only" tests were also conducted during the same test program for the purpose of evaluating the products under extreme conditions.

The following general grouping of test procedures were used to determine product and process capability.

1. - Headspace and Proof Checks
2. - Initial Inspections, Tests and Measurements
3. - Firearms Measurements
4. - Functional / Endurance Testing
5. - Accuracy
6. - Environmental Tests

It should be noted that although there were a couple of minor areas of concern (primarily pertaining to firing pin head assembly, Magazine Box and Bolt Stop function, the team determined that the product presented no concerns relative to safety. There were also some concerns with the Bushnell optics that still must be addressed by Mayfield. With the understanding that these concerns will be addressed prior to warehousing, the team concluded that production could proceed and product released for shipment to the warehouse.

After reviewing each of the individual tests in the program and taking the entire series of T&P tests as a whole, the Research Test Lab and the Research Design Group have concluded that this product met the acceptance requirements as set forth by the Trial & Pilot Test Plan.

Report Prepared By:

J. R. Snedeker.

August 2001.

Aug. '01 – Trial & Pilot Test – Remington M/710 Centerfire Rifle;  
R & D Technical Center Project No. 241039; TLW 0407  
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Page 5

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### INTRODUCTION

The Model 710, Centerfire Rifle is a new product line for the Remington Arms Company.

This report will review and summarize the results of various Trial & Pilot Tests (T&P) conducted during the Spring/Summer 2001 time period at the Remington Arms Company, Inc., Research & Development Technical Center located in Elizabethtown, KY.

Due to the extensive nature of the testing involving this product this report will consist of two parts. Part A (this document) presents a brief explanation of each of the individual tests that were a part of the overall Trial & Pilot test plan, along with a brief review of the results for that particular test. Part B consists of 1 large binder and contains the raw data for the T&P as well as the individual test reports and any statistical analysis associated with the test program. It is more extensive in both volume and detail and is intended to give the reader an in-depth look at each of the individual tests completed during this series. Part B also provides additional details such as the flow chart for the T&P test plan, copies of the individual test requests and any supplementary reports or data that was generated during or after the completion of a particular test.

For reference and consistency, the same section numbering scheme is used in both Part A and in Part B where appropriate.

Aug. '01 - Trial & Pilot Test - Remington M710 Centerfire Rifle;  
R & D Technical Center Project No. 241039; TLW 0407  
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Page 6

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### 1.0 PURPOSE & SCOPE OF TEST PROGRAM

#### 1.1 PURPOSE

The first purpose of this series of tests was to determine if the Model 710 Centerfire Rifle would perform as designed and meet the established function and safety criteria as proposed by the Research & Development Firearms Design Group. The second purpose of this series of tests was to assure that Mayfield production processes were capable of meeting the function, safety and design criteria established for this model by R&D.

#### 1.2 SCOPE

This report covers Trial & Pilot testing of the Remington Model 710 Centerfire in .270 caliber only.

### 2.0 EXECUTIVE SUMMARY

This section of the report is a summary of the test work accomplished through a series of three Trial & Pilot (T&P) Test Programs for Remington's new Model 710 Centerfire Rifle. The testing and associated design development improvements were completed during the time period November through December 2000.

The following is a summary letter issued at the end of Trial & Pilot testing (per D. Danner) and is a good summary description of the status of the project and the necessary further steps to be taken prior to shipment of product.

The Test and Measurement organization within the Elizabethtown Research and Development facility formally supports exit from both Design Acceptance and Trial and Pilot testing of the M/710 Bolt Action Firearm (configured in .270 caliber with Bushnell 763942 riflescope) subject to the following issues and conditions:

1. Prior to product shipment from Mayfield a Design Transmittal must occur to formally establish component dimensional parameters. All product must conform to these parameters or a written deviation from design must be obtained from the Design team.
2. Mayfield must address the continuing problem of the Firing Pin Head loosing from the Firing Pin Body. Test recommends a statistically significant audit of product by Mayfield to confirm resolution of the issue.
3. Mayfield must re-examine the process, which allowed two firearms to be swapped between boxes. This issue is driven by BATF serial number tracking requirements.

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R & D Technical Center Project No. 241039; TLW 0407  
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Page 7

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4. Several issues continue to exist which Test reasonably believes will result in customer dissatisfaction. These issues have no test objective criteria associated with them so Test has no basis to withhold ship approval. Consequently, Test supports ship contingent on Marketing approval of these issues:

- Magazine Box Bottom Retention – Latest data from Series C product indicates that 17% of the product will experience this problem within the first 100 rounds of use. During the Series C test the earliest occurrence was at round 49.
- Magazine Box Difficult to Remove - This problem was pervasive on the Series C product and may potentially contribute to the Bottom Retention issue above.
- Bolt Stop Detent Freedom – Latest data from Series C product suggests that 20% of the product will experience a loosening of the detent lever during the first 100 rounds of use.
- Bushnell Scope – Data from Series B product suggests that approximately 8% of the product will experience scope issues early in life. Bushnell has confirmed that an assembly issue exists with the scope.
- Take Down Screw Torque – Data from Series C product indicates that 37% of the product will have some loosening of the takedown screws. Further, data obtained by Mayfield and reported on 20 NOV '00 supports the conclusion that some loss of torque does occur. While this does not constitute a safety issue consumers may potentially notice the phenomena.

Test further recommends that these issues be resolved as quickly as possible via design/process change to limit negative customer exposure.

5. Test recommends that Mayfield re-examine process controls and limits around the Trigger Pull Force via a process capability study. Data obtained in E'town from the Series C product indicated that some product was slightly below the low pull specification of 4.00 pounds. All product however was in excess of the SAAMI specified minimum of 3.00 pounds.

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R & D Technical Center Project No. 241039; TLW 0407  
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**Page 8**

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## 2.1 TEST SUMMARY TABLE

The following Table lists the individual test procedures that were completed during the T&P series and the Final Status of each by individual category.

1. Note on Final Status: Determination made after final review of all test data was completed by Test management team.

| TEST PROCEDURE<br>TRIAL & PILOT TEST                                  | A-<br>SERIES<br>Status | B-<br>SERIES<br>Status | C-<br>SERIES<br>Status | D-<br>SERIES<br>Status | E-<br>SERIES<br>Status | Final<br>Status        |
|---|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| <b>3.1 INITIAL INSPECTIONS, TESTS &amp; MEASUREMENTS</b>              |                        |                        |                        |                        |                        |                        |
| <b>3.1.1 Visual Examination, Packaging Audit &amp; Packaging Test</b> |                        |                        |                        |                        |                        |                        |
| 3.1.1.1 TLW0407A – Visual Examination                                 | Completed              |                        |                        | Completed              | Completed              | For Information        |
| 3.1.1.2 TLW0407B – Packaging Material Audit                           | Completed              |                        |                        |                        |                        | Passed                 |
| 3.1.1.3 TLW0407C – Packaging Test                                     | Completed              |                        |                        |                        |                        | Passed                 |
| <b>3.1.2 Headspace and Proof</b>                                      |                        |                        |                        |                        |                        |                        |
| 3.1.2.1 TLW0407E – Measure Headspace                                  | See Mayfield Records   |                        |                        |                        |                        |                        |
| 3.1.2.2 TLW0407F – Proof Test   | Completed by Mayfield  |                        |                        |                        |                        | Passed (By Inspection) |
| 3.1.2.3 TLW0407G – Re-Measure Headspace after Proof                   |                        | Completed              | Completed              | Completed              |                        | Passed                 |

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R & D Technical Center Project No. 241039; TLW 0407  
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Page 9

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|  |           |           |           |           |  |                 |
| <b>3.1.3 Forces</b>  |           |           |           |           |  |                 |
| 3.1.3.1 TLW0407H – Measure Firing Pin Indent                     |           | Completed | Completed | Completed |  | Passed          |
| 3.1.3.2 TLW0407I – Measure Sear/Trigger Engagement and Sear Lift |           |           |           | Completed |  | Passed          |
| 3.1.3.3 TLW0407J – Measure Trigger Pull Forces                   |           | Completed |           | Completed |  | Passed          |
| 3.1.3.4 TLW0407K – Measure Safe On/Off Forces                    |           |           |           | Completed |  | 83 Passed       |
| 3.1.3.6 TLW0407M – Measure Magazine Spring Force                 | Completed |           |           |           |  | For Information |
| 3.1.3.7 TLW0407N – Measure Firing Pin Head / Sear Engagement     |           |           |           | Completed |  | Passed          |
| 3.1.3.8 TLW0407O – Bolt Stop Function Check                      |           |           |           | Completed |  | Passed          |
| 3.1.3.9 TLW0407P – Function Check of ISS System                  | Completed |           |           |           |  | Passed          |
| 3.1.3.11 TLW0407AT – Perform Bore Sighting Using Bushnell Scope. | Completed |           |           |           |  | Passed          |
| <b>3.1.5 Firearms Measurements</b>                               |           |           |           |           |  |                 |
| 3.1.5.1 TLW0407T – Chamber Cast                                  | Completed |           |           |           |  | Passed          |
| 3.1.5.2 TLW0407U – Bore Diameter                                 | Completed |           |           |           |  | Passed          |
| 3.1.5.3 TLW0407V – Groove Diameter                               | Completed |           |           |           |  | Passed          |
| 3.1.5.4 TLW0407W – Twist Rate (.270)                             | Completed |           |           |           |  | Passed          |
| 3.1.5.5 TLW0407X – Magazine Capacity Test                        | Completed |           |           |           |  | Passed          |

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R & D Technical Center Project No. 241039; TLW 0407  
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Page 10

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| <b>3.2 FUNCTION &amp; ENDURANCE TESTING</b>   | <b>A-<br/>SERIES<br/>Status</b> | <b>B-<br/>SERIES<br/>Status</b> | <b>C-<br/>SERIES<br/>Status</b> | <b>D-<br/>SERIES<br/>Status</b> | <b>E-<br/>SERIES<br/>Status</b> | <b>Final<br/>Status</b> |
|---|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|-------------------------|
| <b>3.2.1 Function and Endurance Testing</b>   |                                 |                                 |                                 |                                 |                                 |                         |
| 3.2.1.1 TLW0407Y – Ten (10) Round Safety Function Test with Lanyard.                                | Completed                       | Completed                       |                                 |                                 |                                 | Passed                  |
| 3.2.1.2 TLW0407Z – Basic Jack Function Test (100 Rounds with Rem. Ammo.(60 rounds for Series D & E) | Completed                       | Completed                       |                                 | Completed                       | Completed                       | Passed                  |
| 3.2.1.3 TLW0407AA– Extended Function & Endurance (400 Rounds w/Rem. & Competitive Ammo)             |                                 | Completed                       | Completed                       |                                 |                                 | Passed                  |
| 3.2.1.4 TLW0407AB – Clean Rifles and Inspect  | Completed                       | Completed                       | Completed                       | Completed                       | Completed                       |                         |
| <b>3.3 ACCURACY AND POI TESTING</b>   |                                 |                                 |                                 |                                 |                                 |                         |
| <b>3.3.1 Accuracy and POI Testing</b>   |                                 |                                 |                                 |                                 |                                 |                         |
| 3.3.1.1 TLW0407AC – POI & Group Size – Initial Test with High Quality 36X Scope                     | Completed                       | Completed                       |                                 |                                 |                                 | Passed                  |
| <b>3.4 ENVIRONMENTAL TESTING</b>  |                                 |                                 |                                 |                                 |                                 |                         |
| <b>3.4.1 Temperature &amp; Humidity Testing</b>   |                                 |                                 |                                 |                                 |                                 |                         |
| 3.4.1.1 TLW0407AG – Hot Function Test   |                                 | Completed                       |                                 |                                 |                                 | Passed                  |
| 3.4.1.2 TLW0407AH – Cold Function Test  |                                 | Completed                       |                                 |                                 |                                 | Passed                  |

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R & D Technical Center Project No. 241039; TLW 0407  
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Page 11

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| 3.4.1.3 TLW0407AI - Heat &<br>Humidity Test |  | Completed |  |  |  | Passed |
|---|--|-----------|--|--|--|--------|

CONFIDENTIAL 83

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R & D Technical Center Project No. 241039; TLW 0407  
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Page 12

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Rev. 04 12/16/01 2 12/01/01

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## 3.0 T&P SUMMARY - (DETAILED)

Note: The most recent series of tests is reported on in Part A unless otherwise listed. See Part B for previous series results.

## 3.1 INITIAL INSPECTIONS, TESTS & MEASUREMENTS

### Visual Examination, Packaging Audit & Packaging Test

3.1.1.1 TLW0407A - (T&P series "A") Visual Examination - Performed by Elizabethtown Technicians

&

3.1.1.2 TLW0407B - Packaging Audit -

(T&P Series "A")

| RECEIVING INSPECTION & PACKAGING AUDIT       |                               |                                  |                 |                 |                            |                         |                             |                  |                  |                                |
|--|-------------------------------|----------------------------------|-----------------|-----------------|----------------------------|-------------------------|-----------------------------|------------------|------------------|--------------------------------|
| MODEL 710, 270 WIN. TRIAL & PILOT            |                               |                                  |                 |                 |                            |                         |                             |                  |                  |                                |
| TLW0407                                      |                               |                                  |                 |                 |                            |                         |                             |                  |                  |                                |
| 12/11/2000                                   |                               |                                  |                 |                 |                            |                         |                             |                  |                  |                                |
| PROOF TEST & MAGNAFLUX COMPLETED AT MAYFIELD |                               |                                  |                 |                 |                            |                         |                             |                  |                  |                                |
| SERIAL NUMBER                                | SERIAL NUMBER MATCH-GUN & BOX | ALL MATERIAL IN BOX, MANUAL ETC. | ISS KEYS IN BOX | SAFETY POSITION | INTEGRATED SECURITY SYSTEM | INSPECT FOR PROOF STAMP | INSPECT FOR MAGNAFLUX STAMP | TRIGGER POSITION | CONDITION OF GUN | GENERAL CONDITION OF PACKAGING |
|  | YES/NO                        | YES/NO                           | YES/NO          | ON/OFF          | ON/OFF                     | YES/NO                  | YES/NO                      | RT/LF            | OK/NOT           | OK/NOT                         |
| 71008145                                     | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | FRT/BACK         | OK               | OK                             |
| 71008154                                     | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71008138                                     | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71008121                                     | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71008176                                     | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71008150                                     | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71008104                                     | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71008117                                     | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71008102                                     | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71008485                                     | NO*                           | YES                              | YES             | OFF             | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71008143                                     | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71008155                                     | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71008167                                     | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71008473                                     | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71008461                                     | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71008194                                     | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71008481                                     | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71008199                                     | NO*                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71008491                                     | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71008171                                     | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71008458                                     | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71008133                                     | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71008166                                     | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71008139                                     | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71008107                                     | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71008453                                     | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71008471                                     | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71008152                                     | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71008134                                     | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71008188                                     | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |

\*Gun Serial Number did not match serial number on shipping box; two rifles were switched relative to the shipping boxes

Aug. '01 - Trial & Pilot Test - Remington M/710 Centerfire Rifle;  
R & D Technical Center Project No. 241039; TLW 0407  
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Page 13

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Rev. 04.12.14M 2.12.01

ET30011

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# Remington Arms Company Inc.

Research & Development Technical Center  
315 West Ring Road  
Elizabethtown, KY 42701

(T&P Series "D") -

| RECEIVING INSPECTION & PACKAGING AUDIT  |                               |                                  |                 |                 |                            |                         |                             |                  |                  |                                |
|---|-------------------------------|----------------------------------|-----------------|-----------------|----------------------------|-------------------------|-----------------------------|------------------|------------------|--------------------------------|
| MODEL 710, 270 WIN. TRIAL & PILOT, SERIES- D  |                               |                                  |                 |                 |                            |                         |                             |                  |                  |                                |
| TLW0407   |                               |                                  |                 |                 |                            |                         |                             |                  |                  |                                |
| 7/13/01 PROOF TEST & MAGNAFLUX COMPLETED AT MAYFIELD  |                               |                                  |                 |                 |                            |                         |                             |                  |                  |                                |
| SERIAL NUMBER   | SERIAL NUMBER MATCH-GUN & BOX | ALL MATERIAL IN BOX, MANUAL ETC. | ISS KEYS IN BOX | SAFETY POSITION | INTREGATED SECURITY SYSTEM | INSPECT FOR PROOF STAMP | INSPECT FOR MAGNAFLUX STAMP | TRIGGER POSITION | CONDITION OF GUN | GENERAL CONDITION OF PACKAGING |
|   | YES/ NO                       | YES/ NO                          | YES/ NO         | ON/ OFF         | ON/ OFF                    | YES/ NO                 | YES/ NO                     | RT/ LF           | OK/ NOT          | OK/ NOT                        |
| 71020708  | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | RT               | OK               | OK                             |
| 71022075  | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71021953  | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71020693  | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71022084  | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71022155  | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71021961  | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | RT               | OK               | OK                             |
| 71020759  | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | RT               | OK               | OK                             |
| 71020740  | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | RT               | OK               | OK                             |
| 71020754  | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71021738  | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71022082  | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71021947  | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | RT               | OK               | OK                             |
| 71022173  | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71021904  | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71022461  | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71021784  | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71021787  | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71021832  | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| 71021741  | YES                           | YES                              | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |
| NOTE: GUN 71021947 SCOPE MOUNTED CORRECT BUT SCOPE CROSS HAIRS ARE WAY LEFT, SCOPE NO GOOD. |                               |                                  |                 |                 |                            |                         |                             |                  |                  |                                |

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R & D Technical Center Project No. 241039; TLW 0407  
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Page 14

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8/1/01 12:14:00 2:11 PM

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Elizabethtown, KY 42701

(T&P Series "E") -

| RECEIVING INSPECTION & PACKAGING AUDIT       |                               |                                 |                 |                 |                            |                         |                             |                  |                  |                                |  |
|--|-------------------------------|---------------------------------|-----------------|-----------------|----------------------------|-------------------------|-----------------------------|------------------|------------------|--------------------------------|--|
| MODEL 710, 270 WIN TRIAL & PILOT SERIES E    |                               |                                 |                 |                 |                            |                         |                             |                  |                  |                                |  |
| TLW 0407                                     |                               |                                 |                 |                 |                            |                         |                             |                  |                  |                                |  |
| DATE: 7/24/01                                |                               |                                 |                 |                 |                            |                         |                             |                  |                  |                                |  |
| PROOF TEST & MAGNAFLUX COMPLETED AT MAYFIELD |                               |                                 |                 |                 |                            |                         |                             |                  |                  |                                |  |
| SERIAL NUMBER                                | SERIAL NUMBER MATCH GUN & BOX | ALL MATERIAL IN BOX, MANUAL ETC | ISS KEYS IN BOX | SAFETY POSITION | INTERGATED SECURITY SYSTEM | INSPECT FOR PROOF STAMP | INSPECT FOR MAGNAFLUX STAMP | TRIGGER POSITION | CONDITION OF GUN | GENERAL CONDITION OF PACKAGING | NOTES or COMMENTS                              |
| YES/NO                                       | YES/NO                        | YES/NO                          | ON/OFF          | ON/OFF          | YES/NO                     | YES/NO                  | YES/NO                      | RT/LF            | OK/NOT           | OK/NOT                         |  |
| 71023805                                     | YES                           | YES                             | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |  |
| 71023404                                     | YES                           | YES                             | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |  |
| 71023251                                     | YES                           | YES                             | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |  |
| 71024005                                     | YES                           | YES                             | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |  |
| 71023521                                     | YES                           | YES                             | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |  |
| 71023433                                     | YES                           | YES                             | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | NOT                            | BOX TORN ON SIDES                              |
| 71024088                                     | YES                           | YES                             | YES             | ON              | OFF                        | YES                     | YES                         | RT               | OK               | OK                             |  |
| 71023302                                     | YES                           | YES                             | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |  |
| 71024057                                     | YES                           | YES                             | YES             | ON              | OFF                        | YES                     | YES                         | RT               | OK               | OK                             |  |
| 71023811                                     | YES                           | YES                             | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |  |
| 71023399                                     | YES                           | YES                             | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |  |
| 71024003                                     | YES                           | YES                             | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |  |
| 71023510                                     | YES                           | YES                             | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |  |
| 71023321                                     | YES                           | YES                             | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |  |
| 71022467                                     | YES                           | YES                             | YES             | ON              | OFF                        | YES                     | YES                         | RT               | OK               | OK                             |  |
| 71024049                                     | YES                           | YES                             | YES             | ON              | OFF                        | YES                     | YES                         | RT               | OK               | OK                             |  |
| 71024086                                     | YES                           | YES                             | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |  |
| 71023558                                     | YES                           | YES                             | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |  |
| 71023832                                     | YES                           | YES                             | YES             | ON              | OFF                        | YES                     | YES                         | RT               | OK               | OK                             |  |
| 71023268                                     | YES                           | YES                             | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |  |
| 71024031                                     | YES                           | YES                             | YES             | ON              | OFF                        | YES                     | YES                         | RT               | OK               | OK                             |  |
| 71024070                                     | YES                           | YES                             | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |  |
| 71023802                                     | YES                           | YES                             | YES             | ON              | OFF                        | YES                     | YES                         | RT               | OK               | OK                             |  |
| 71024079                                     | YES                           | YES                             | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |  |
| 71024085                                     | YES                           | YES                             | YES             | ON              | OFF                        | NO                      | YES                         | OK               | OK               | OK                             | NO PROOF STAMP (PROOFED & STAMPED 7/24/01 FKS) |
| 71024064                                     | YES                           | YES                             | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |  |
| 71024090                                     | YES                           | YES                             | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |  |
| 71023238                                     | YES                           | YES                             | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |  |
| 71022440                                     | YES                           | YES                             | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |  |
| 71024000                                     | YES                           | YES                             | YES             | ON              | OFF                        | YES                     | YES                         | OK               | OK               | OK                             |  |

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Page 15

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### Headspace and Proof

**Note:** For each of the submitted samples in the test series of sample rifles, the proof test and Magnaflux™ inspections were performed at Mayfield prior to shipment to R&D. R&D Technicians, as part of the incoming inspection procedure, determined for each rifle that the Proof stamp and Magnaflux™ inspection stamps were present. Actual measurements of the headspace were not made.

However, for series "B" & series "C" rifles, measurements of the headspace were recorded. These readings are summarized in the table below.

The Headspace readings are well within the Min. to Min+ 0.007" range.

- 3.1.1.3 TLW0407E – Measure Headspace  
(Please see Note above)  
3.1.1.4 TLW0407F – Proof Test  
(Please see Note above)  
3.1.1.5 TLW0407G – Re-Measure Headspace after Proof \*

(T&P Series "B" & "C") – Specification:  $\leq$  Min. + 0.007" after Proof.

| Variable  | N  | Mean        | Std. Dev.   | 95% Confidence Interval |
|---|----|-------------|-------------|-------------------------|
| Headspace: Series B<br>(all readings are in the min. + range) | 30 | 0.00113 in. | 0.00051 in. | 0.00095; 0.00132        |
| Headspace: Series C<br>(all readings are in the min. + range) | 30 | 0.00100 in. | 0.00045 in. | 0.00084, 0.00116        |

Note that the raw data for Series "B" Headspace is found in Part B listed under tab "Series B FIRING PIN INDENT."  
Raw data for Series "C" Headspace is found in Part B listed under tab "Series C PRELIMINARY MEASUREMENTS."

### Forces

- 3.1.1.6 TLW0407H – Measure Firing Pin Indent

(T&P Series "B") - Specification:  $\geq$  0.017 indent.

| Variable  | N  | Mean        | Std. Dev.   | 95% Confidence Interval |
|---|----|-------------|-------------|-------------------------|
| Firing Pin Indent – Series B<br>After Live Fire Test. | 10 | 0.01823 in. | 0.00045 in. | 0.01791, 0.01855        |

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R & D Technical Center Project No. 241039; TLW 0407  
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Page 16

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Rev 04 11/14/01 2:12PM

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|   |    |             |             |                  |
|---|----|-------------|-------------|------------------|
| Firing Pin Indent - Series C<br>After Live Fire Test. | 10 | 0.01707 in. | 0.00072 in. | 0.01655, 0.01758 |
|---|----|-------------|-------------|------------------|

## 3.1.1.7 TLW04071 - Trigger/Sear Engagement

(T&P, Series "C") Specification: 0.020 to 0.025 inches.

| Variable                | N  | Mean       | Std. Dev.   | 95% Confidence Interval |
|-------------------------|----|------------|-------------|-------------------------|
| Trigger/Sear Engagement | 30 | 0.0278 in. | 0.00209 in. | 0.02705, 0.02854        |

Sear Lift, (T&P, Series "C"); specification: 0.006 to 0.018 inches.

| Variable  | N  | Mean        | Std. Dev.  | 95% Confidence Interval |
|-----------|----|-------------|------------|-------------------------|
| Sear Lift | 30 | 0.01578 in. | 0.0017 in. | 0.01531, 0.01624        |

## 3.1.1.8 TLW04071 - Measure Trigger Pull Forces

(T&P, Series "B" & "C"); specification: 4.0 to 5.5 lbs.

| Variable                                      | N  | Mean     | Std. Dev. | 95% Confidence Interval |
|---|----|----------|-----------|-------------------------|
| Trigger Pull Forces, in Stock<br>Series B     | 30 | 3.99 lb. | 0.375     | 3.85 lb., 4.13 lb.      |
| Trigger Pull Forces, in Stock<br>Series C     |    |          |           |                         |
| Trigger Pull Forces, out of Stock<br>Series B | 30 | 4.17 lb. | 0.334     | 4.05 lb., 4.30 lb.      |
| Trigger Pull Forces, out of Stock<br>Series C |    |          |           |                         |

(Note: spring scale used for measurements.)

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R & D Technical Center Project No. 241039; TLW 0407  
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Page 17

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Rev. 08 12/10/01 233PM

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### 3.1.1.9 TLW0407K – Measure Safe On/Off Forces

(T&P, Series "C"); specification:  $\geq 1.0$  lb.

| Variable       | N  | Mean   | Std. Dev. | 95% Confidence Interval |
|----------------|----|--------|-----------|-------------------------|
| Safe Off Force | 10 | 3.2973 | 0.3080    | 3.0770, 3.5176          |
| Safe On Force  | 10 | 6.130  | 0.696     | 5.632, 6.628            |

### 3.1.1.10 TLW0407M – Measure Magazine Spring Force

(T&P, Series "A"); no specification established – measurements taken for information.

| Variable                     | N  | Mean   | Std. Dev. | 95% Confidence Interval |
|------------------------------|----|--------|-----------|-------------------------|
| Magazine Spring Force @ 0.2" | 10 | 1.6180 | 0.1652    | 1.4998, 1.7362          |
| Magazine Spring Force @ 1.0" | 10 | 2.8390 | 0.1484    | 2.7329, 2.9451          |

### 3.1.1.11 TLW0407N – Measure Firing Pin Head to Sear Engagement

(T&P, Series "C"); Specification: Minimum Vertical Engagement to be  $\geq .049$ ".

Note that the measurement method produces a dimensional range.

| Variable                                      | N  | Mean<br>(Range)   | Std. Dev. | 95% Confidence Interval |
|---|----|-------------------|-----------|-------------------------|
| Firing Pin Head to Sear<br>Engagement - range | 30 | 0.06717 – 0.07830 | 0.00214   | 0.06640, 0.07907        |

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R & D Technical Center Project No. 241039; TLW 0407  
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Page 18

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Rev 06 12/14/01 7:32 PM

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### 3.1.1.12 TLW04070 - Bolt Stop Function Check

(T&P, Series "C", no Release Detent Force specification established)

| Variable                          | Passed | Marginal / Loose |
|-----------------------------------|--------|------------------|
| Stop Function                     | 10     | 0                |
| Average Release Detent Force, lb. |        |                  |
| Release Detent                    | 4.707  |                  |

### 3.1.1.13 TLW0407P - Function Check of ISS System

(T&P, Series "A")

All ten samples, A-11 to A-20, passed the ISS Function Test without incident.

### 3.1.1.14 TLW0407AT - Perform bore sighting Using Bushnell Scope

(T&P, Series "A"), no specification established -- measurements taken for information.

Prior to the start of live fire or accuracy testing a sample of the rifles was tested to determine if production had performed a bore sighting/adjustment after mounting the Bushnell Scopes. The scopes were not adjusted prior to testing. One 5-shot group was shot from each of the test rifles.

The general goal of this test was to determine if the shots would 'hit the paper' without adjustment of the scope by the shooter. See Pattern Chart next page. The individual points represent the location of each rifles POI (Point of Impact) relative to POA (Point of Aim), (with the POA located at (0,0))

The "Overall Average Position" on the chart represents the average POI relative to POA for the ten rifles tested.

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R & D Technical Center Project No. 241039; TLW 0407  
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Page 19

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8/3/01 12:14:01 1/2 PM

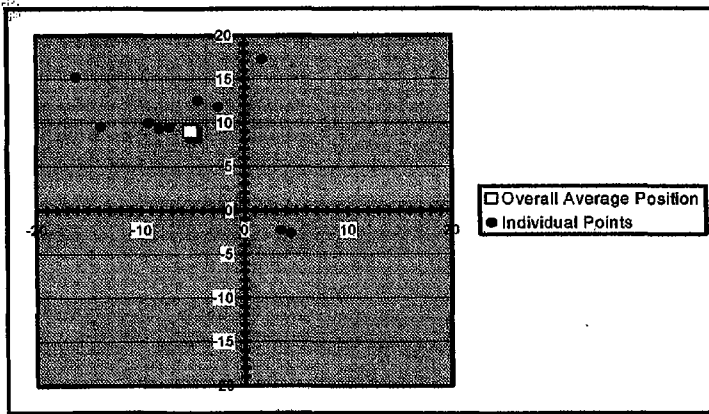
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315 West Ring Road  
Elizabethtown, KY 42701

| MODEL 710 T&P POI RELATIVE TO POA BORE SIGHTING USING BUSHNELL SCOPE |          |                  |            |   |                     |                         |
|--|----------|------------------|------------|---|---------------------|-------------------------|
| GUN  | SCOPE    | AMMO             | GROUP SIZE |   | POI RELATIVE TO POA | TOTAL<br>DISTANCE (in.) |
| B-21   | BUSHNELL | REM R30064 180GR | 2.68       | X | -2.49               | 12.07                   |
|  |          |                  |            | Y | 11.81               |                         |
| B-22   | BUSHNELL | REM R30064 180GR | 2.37       | X | -7.25               | 11.93                   |
|  |          |                  |            | Y | 9.47                |                         |
| B-23   | BUSHNELL | REM R30064 180GR | 2.46       | X | -8.52               | 12.63                   |
|  |          |                  |            | Y | 9.32                |                         |
| B-24   | BUSHNELL | REM R30064 180GR | 3.52       | X | -16.11              | 22.12                   |
|  |          |                  |            | Y | 15.15               |                         |
| B-25   | BUSHNELL | REM R30064 180GR | 1.05       | X | 4.45                | 5.17                    |
|  |          |                  |            | Y | -2.65               |                         |
| B-26   | BUSHNELL | REM R30064 180GR | 1.54       | X | 1.72                | 17.30                   |
|  |          |                  |            | Y | 17.22               |                         |
| B-27   | BUSHNELL | REM R30064 180GR | 2.34       | X | -13.83              | 16.78                   |
|  |          |                  |            | Y | 9.50                |                         |
| B-28   | BUSHNELL | REM R30064 180GR | 2.62       | X | -4.47               | 13.26                   |
|  |          |                  |            | Y | 12.49               |                         |
| B-29   | BUSHNELL | REM R30064 180GR | 1.89       | X | 3.50                | 4.17                    |
|  |          |                  |            | Y | -2.28               |                         |
| B-30   | BUSHNELL | REM R30064 180GR | 2.387      | X | -9.279              | 13.63                   |
|  |          |                  |            | Y | 9.978               |                         |
|  |          |                  |            |   | AVERAGE             | 12.9                    |
|  |          |                  |            |   | STD. DEV.           | 5.4                     |



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R & D Technical Center Project No. 241039; TLW 0407  
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Page 20

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10-1 00-1244-01 2-02 PM

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315 West Ring Road  
Elizabethtown, KY 42701

### Firearms Measurements

#### 3.1.1.15 TLW0407T - Chamber Cast

(From series "A" - see "Variable" column for specifications)

| Variable         | N  | Mean    | Std. Dev. | 95% Confidence Interval |
|------------------|----|---------|-----------|-------------------------|
| .4708-.4728      | 10 | 0.47108 | 0.00109   | 0.47030, 0.47186        |
| .4425 - .4440    | 10 | 0.44384 | 0.00067   | 0.44336, 0.44432        |
| 30.0 - 34.0 Deg. | 10 | 34.055° | 0.283     | 33.8523°, 34.2577°      |
| .308 - .310      | 10 | 0.30988 | 0.00038   | 0.30961, 0.31015        |

#### 3.1.1.16 TLW0407U - Bore Diameter

(T&P, Series "A"), specification: 0.270"/0.271"

| Variable      | N  | Mean   | Std. Dev. | 95% Confidence Interval |
|---------------|----|--------|-----------|-------------------------|
| Bore Diameter | 10 | 0.2710 | 0.0000    | 0.2710, 0.2710          |

#### 3.1.1.17 TLW0407V - Groove Diameter

(T&P, Series "A"), specification: 0.277"/0.278"

| Variable        | N  | Mean    | Std. Dev. | 95% Confidence Interval |
|-----------------|----|---------|-----------|-------------------------|
| Groove Diameter | 10 | 0.27865 | 0.00090   | 0.27800, 0.27930        |

#### 3.1.1.18 TLW0407W - Twist Rate (.270)

(T&P, Series "A"), specification: 1" in 10",  $\pm 0.25$ ", RH

| Variable   | N  | Mean          | Std. Dev.  | 95% Confidence Interval |
|------------|----|---------------|------------|-------------------------|
| Twist Rate | 10 | 1 in 9-15/16" | 1 in 5/16" | 1 in 10", 1 in 9-7/8"   |

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R & D Technical Center Project No. 241039; TLW 0407  
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Page 21

CONFIDENTIAL

Rev. 00 12/00/01 432/01

ET30019

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**3.1.1.19 TLW0407X - Magazine Capacity Test**

(T&P, Series "A"), specification: with 4 rounds in magazine box, must be able to load and latch into receiver.

All ten rifles (A11 to A20) passed the Magazine Capacity Test.

CONFIDENTIAL 83

Aug. '01 - Trial & Pilot Test - Remington M/710 Centerfire Rifle;  
R & D Technical Center Project No. 241039; TLW 0407  
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**Page 22**

CONFIDENTIAL

Rev 06-17-00 2:12 PM

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### 3.2 FUNCTION & ENDURANCE TESTING

## Function and Endurance Testing

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

Test completed without incident.

### 3.2.1.2 *LW0300Z – Basic Jack Function Test (60 Rounds with Remington & Winchester Ammunition.)*

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R & D Technical Center Project No. 241039; TLW-0407  
file: E:\Test Reports\Firearms Tests\710 T&P\_270M710\_270\_T&P\_REPORT\_JUL01\_Rev0.6.doc

Page 23

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Ref 0.6-121-001 2.32 P.1

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ET30021

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3.2.1.3 TLW0407AA - 400 Round Extended Function Test

PROJECT # 214095

TLW 0407

M/710 .270 T&amp;P (B) SERIES 400 RD EXTENDED JACK FUNCTION TEST.

| GUN | AMMO                | ROUNDS     | STEM      |  |
|-----|---------------------|------------|-----------|--|
| B-2 | REM R270W1 100GR    | 40         |           |  |
|     | REM PRB270WA 140GR  | 40         | 5         | 3 <sup>RD</sup> RD - 1; 5 <sup>TH</sup> RD - 4 83  |
|     | REM RS270WA 140GR   | 40         | 8         | 2 <sup>ND</sup> RD - 2; 3 <sup>RD</sup> RD - 4; 4 <sup>TH</sup> RD - 1; 5 <sup>TH</sup> RD - 1 |
|     | REM R270W4          | 40         | 4         | 5 <sup>TH</sup> RD - 4   |
|     | FED 270A 130GR      | 40         |           |  |
|     | FED 270GS 130GR     | 40         | 1         | 5 <sup>TH</sup> RD - 1   |
|     | FED 270B 150GR      | 40         | 1         | 5 <sup>TH</sup> RD - 1   |
|     | WIN X2703 130GR     | 40         | 18        | 2 <sup>ND</sup> RD - 2; 3 <sup>RD</sup> RD - 4; 4 <sup>TH</sup> RD - 6; 5 <sup>TH</sup> RD - 6 |
|     | WIN X2705 130GR     | 40         | 10        | 3 <sup>RD</sup> RD - 2; 4 <sup>TH</sup> RD - 3; 5 <sup>TH</sup> RD - 5                         |
|     | WIN X2704 150GR     | 40         | 10        | 3 <sup>RD</sup> RD - 2; 4 <sup>TH</sup> RD - 5; 5 <sup>TH</sup> RD - 3                         |
|     | <b>TOTAL ROUNDS</b> | <b>400</b> | <b>57</b> |  |
| B-6 | REM R270W1 100GR    | 40         |           |  |
|     | REM PRB270WA 140GR  | 40         | 5         | 2 <sup>ND</sup> RD - 1; 5 <sup>TH</sup> RD 4   |
|     | REM RS270WA 140GR   | 40         | 3         | 3 <sup>RD</sup> RD - 5 <sup>TH</sup> RD - 2  |
|     | REM R270W4          | 40         |           |  |
|     | FED 270A 130GR      | 40         |           |  |
|     | FED 270GS 130GR     | 40         |           |  |
|     | FED 270B 150GR      | 40         |           |  |
|     | WIN X2703 130GR     | 40         | 10        | 2 <sup>ND</sup> RD - 1; 3 <sup>RD</sup> RD - 2; 4 <sup>TH</sup> RD - 2; 5 <sup>TH</sup> RD - 5 |
|     | WIN X2705 130GR     | 40         | 2         | 5 <sup>TH</sup> RD - 2   |
|     | WIN X2704 150GR     | 40         |           |  |
|     | <b>TOTAL ROUNDS</b> | <b>400</b> | <b>20</b> |  |

Aug. '01 - Trial & Pilot Test - Remington M/710 Centerfire Rifle;  
R & D Technical Center Project No. 241039; TLW 0407  
file: E:\Test Reports\Firearms Tests\710 T&P\_270\M710\_270\_T&P\_REPORT\_JUL01\_Rev0.6.doc

Page 24

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Rev. 04.12.2001 2:31PM

ET30022

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### 3.2.1.4 TLW0407AB - Clean Rifles and Inspect

See "Clean & Inspect Checklist, series C, T&P", Part B; raw data sheets for details of the results of inspections and measurements.

## 3.3 ACCURACY AND POI TESTING

### Accuracy and POI Testing

#### 3.3.1.1 TLW0407AC - POI & Group Size - Initial Test with High Quality 36X Scope

83

This point of impact test involves the verification of the firearm's sighting system adjustment and the potential to hit the point of aim. Random variation and /or extreme differences shot to shot point of impact (as well as group size) typically indicate improper barrel processing and is used as a final inspection flag in production. Standard factory ammunition is used for this test and the same code of ammunition is used throughout the test. Three, 5-shot groups were shot in each of the test rifles B-21 to B-30. For this product and this caliber the average group must be  $\leq 2.7"$  at 100 yards.

All rifles in the test sample were under the 2.7" group size with the overall average group size calculated to be 2.12", (95% confidence interval = 1.873" to 2.369").

| Rifle | Scope             | Ammo                | Group #1 | Group #2 | Group #3 | Average Group |
|-------|-------------------|---------------------|----------|----------|----------|---------------|
| B-21  | Swarovski 6-24x50 | Rem R270W2, 130 gr. | 1.765    | 1.780    | 2.138    | 1.894         |
| B-22  | Swarovski 6-24x50 | Rem R270W2, 130 gr. | 1.719    | 2.694    | 2.856    | 2.423         |
| B-23  | Swarovski 6-24x50 | Rem R270W2, 130 gr. | 1.582    | 2.694    | 1.352    | 1.876         |
| B-24  | Swarovski 6-24x50 | Rem R270W2, 130 gr. | 1.588    | 1.632    | 2.405    | 1.875         |
| B-25  | Swarovski 6-24x50 | Rem R270W2, 130 gr. | 2.720    | 2.194    | 1.853    | 2.256         |

Aug. '01 - Trial & Pilot Test - Remington M/710 Centerfire Rifle;  
R & D Technical Center Project No. 241039; TLW 0407  
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Page 25

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ET30023

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|                           |                   |                     |       |       |       |             |
|---------------------------|-------------------|---------------------|-------|-------|-------|-------------|
| B-26                      | Swarovski 6-24x50 | Rem R30064, 180 gr. | 3.769 | 1.584 | 2.288 | 2.547       |
| B-27                      | Swarovski 6-24x50 | Rem R30064, 180 gr. | 3.630 | 1.814 | 2.645 | 2.696       |
| B-28                      | Swarovski 6-24x50 | Rem R30064, 180 gr. | 1.065 | 2.077 | 2.830 | 1.991       |
| B-29                      | Swarovski 6-24x50 | Rem R30064, 180 gr. | 2.824 | 1.677 | 1.604 | 2.035<br>83 |
| B-30                      | Swarovski 6-24x50 | Rem R30064, 180 gr. | 1.118 | 1.987 | 1.724 | 1.610       |
| Group Size - Overall Mean |                   |                     |       |       |       | 2.12        |

## 3.4 ENVIRONMENTAL TESTING

### Temperature & Humidity Testing

#### 3.4.1.1 TLW0407AG - Hot Function Test

(T&amp;P Series "B")

This test evaluates the effect(s) of extreme high temperatures on the functioning performance of firearms with special interest in the synthetic parts of the product. For this test Rifle B-2 (serial # 71008103) and 100 rounds of ammunition (Remington R270W2, Lot # M29NB6628) were placed in the environmental chamber set at a temperature of 120°F for a minimum of six hours. After six hours, the rifle and 20 rounds of ammunition were removed from the chamber and shot in the test jack, cycling the safety every five rounds. After shooting the 20 rounds the rifle is returned to the chamber and allowed to return to the chamber temperature for two hours. At that point the rifle is again removed from the chamber with another 20 rounds and the shooting test is continued. This procedure is continued until the entire 100 rounds are fired through the rifle. No malfunctions or other items of note were observed during this test.

#### 3.4.1.2 TLW0407AH - Cold Function Test

Aug. '01 - Trial & Pilot Test - Remington M/710 Centerfire Rifle;  
R & D Technical Center Project No. 241039; TLW 0407  
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Page 26

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(T&P Series "B")

This test evaluates the effect(s) of extreme low temperatures on the functioning performance of firearms. Rifle B-1 (serial # 71008100) and 100 rounds of ammunition (Remington R270W2, Lot # M29NB6628) were put in the freezer set at a -20°F for a minimum of six hours. After six hours the rifle and 20 rounds were removed from the freezer and shot with the safety being cycled every five rounds. The rifle was then replaced in the freezer for a minimum of two hours. This procedure was repeated until the 100 rounds had been shot through the rifle.

There were 12 misfires noted during the 100 rounds of testing. All misfires had a light indent.

### 3.4.1.3 TLW0407AI - Heat & Humidity Test

(T&P Series "B")

For this test, rifle B-4 (serial # 71008118) was placed in the environmental chamber with 100 rounds of ammunition (Remington R270W2, Lot # M29NB6628) for a minimum of six hours. The chamber was set at 100°F and 80-90% Relative Humidity. After the initial six hours of conditioning the rifle and 20 rounds of ammunition were removed and shot in the test jack. The safety was cycled every five rounds. Every 20 rounds the test was repeated. There were no malfunctions noted during this test.

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R & D Technical Center Project No. 241039; TLW 0407  
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Page 27

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Rev 06 11/14/01 2:31 PM

ET30025