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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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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. Smedley

August 2001

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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.

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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 M710 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 loosening 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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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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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	A	B	C	D	E	Final Status
TRIAL & PILOT TEST	SERIES	SERIES	SERIES	SERIES	SERIES	Status
3.1 INITIAL INSPECTIONS, TESTS & MEASUREMENTS	Series	Series	Status	Status	Status	Status
3.1.1 Visual Examination, Packaging Audit & Packaging Test						
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
3.1.2 Headspace and Proof						
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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3.1.3 Forces						
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		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
3.1.5 Firearms Measurements						
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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3.2 FUNCTION & ENDURANCE TESTING	A-SERIES Status	B-SERIES Status	C-SERIES Status	D-SERIES Status	E-SERIES Status	Final Status
3.2.1 Function and Endurance Testing						
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. (50 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	
3.3 ACCURACY AND POI TESTING						
3.3.1 Accuracy and POI Testing						
3.3.1.1 TLW0407AC - POT & Group Size - Initial Test with High Quality 36X Scope	Completed	Completed				Passed
3.4 ENVIRONMENTAL TESTING						
3.4.1 Temperature & Humidity Testing						
3.4.1.1 TLW0407AG - Hot Function Test		Completed				Passed
3.4.1.2 TLW0407AH - Cold Function Test		Completed				Passed
3.4.1.3 TLW0407AI - Heat & Humidity Test		Completed				Passed

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