

**REMINGTON ARMS COMPANY INC.
ILION, NY PLANT SITE**

**TECHNICAL DIVISION
TEST & MEASUREMENTS LAB**

TEST REPORT

Model Seven XMP Trigger Assembly T&P

Request # 20070013

DATE: 3/15/07

**Requested by: J. Doolittle
Prepared by: R. Joy**

DISTRIBUTION LIST

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ABSTRACT:

Remington has redesigned its bolt action trigger assembly incorporating a number of new features. The new design, called the "X-Mark Pro™" was first released in the M/700 and is now being offered in the Model Seven. Figure 1 illustrates the M/700 version of the XMP trigger assembly. The Test Lab received a request to evaluate the first production run of Model Seven XMP trigger assemblies.

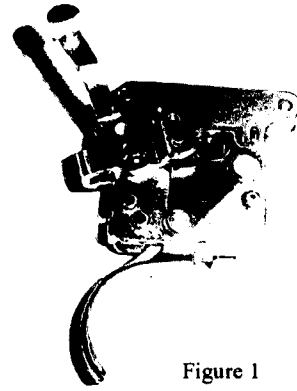


Figure 1

The samples of XMP trigger assemblies submitted individually, as trigger assemblies, and assembled to finished host rifles both passed testing successfully. Full test data from the host rifles is being furnished with this report as a convenience to Production and Manufacturing Engineering to assist them with any needed *rifle* follow-up activity.

SCOPE:

Ten individual trigger assemblies and nine completely finished Model Seven 308 CDL rifles containing the XMP trigger assembly were received for testing.

Individual trigger assemblies were each subjected to dry-cycle testing to 10,000 cycles. Before the dry-cycling began, all trigger assemblies were checked for proper assembly and trigger-pull force and sear-lift was measured.

The finished rifles received a standard series of measurements including trigger-pull, sear-lift and safety operation force. Following the measurement phase each rifle was subjected to 200 rounds of jack-testing, 20 rounds of off-hand shooting from the shoulder and targeting. The safety was operated between each string of 5 rounds. The object of the extra shooting (off-hand and bench-rest targeting) was to assure that the trigger and safety were comfortable to operate and functioned properly.

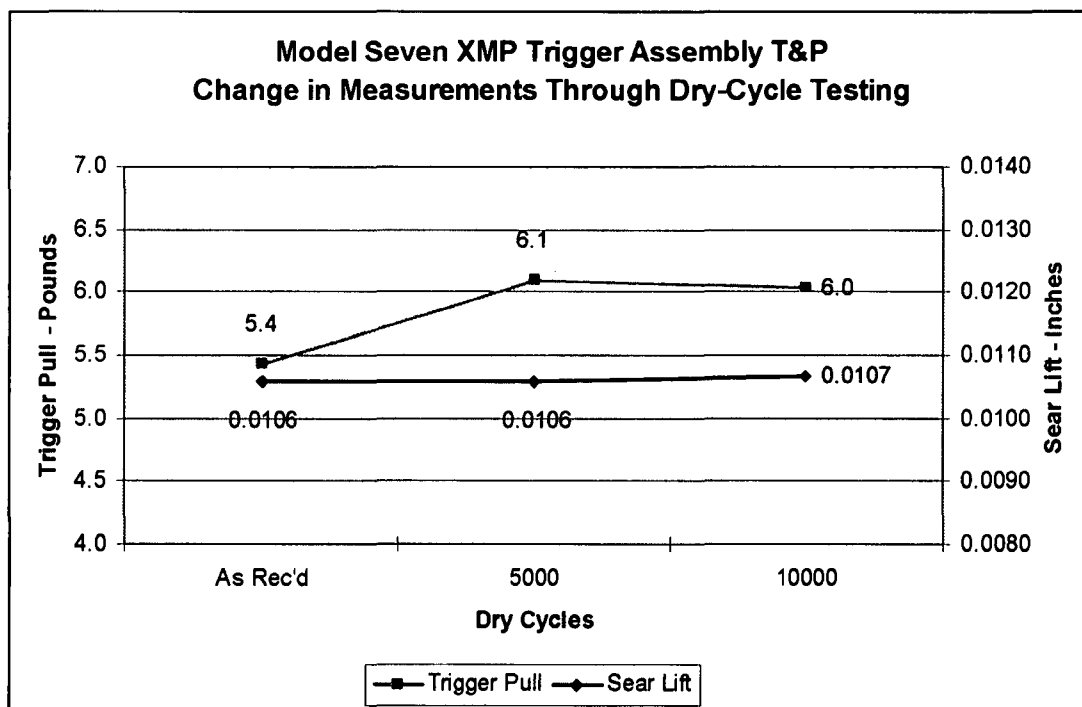
RESULTS:

Dry-Cycle Summary:

Each of the ten trigger assemblies were mounted in automated, computer-controlled fixtures that operate the bolt, the safety and the trigger in the same manner that a shooter would.

A complete bolt assembly and receiver are included in the setup. The bolt is fully cocked to load the sear, the safety is operated and then the trigger pulled to complete the cycle. The trigger assemblies received only lubrication attention. Trigger-pull and sear-lift measurements were taken after 5,000 cycles, half-way through the test.

All ten trigger assemblies endured the entire 10,000 cry-cycles without damage or parts working loose. The following graph shows a ½ pound increase in trigger-pull force even though the adjustment screws held tightly. Sear-lift is shown to have held steady throughout the test at just under .011 with a specification of .008 to .018.



Measurement Summary:

Measurements taken on all of the nine rifles received for testing were found to be within specifications as received. Initial measurement data is shown in the chart below:

Initial Measurements								
Serial #	Trigger Pull (lbs)	Safety Force (lbs)		Firing Pin Indent (in)	Sear Lift (in.)	Bolt Lift Force (lbs)		Headspace Min + (in.)
		To On	To Off			Cocked	Fired	
7815136	3.8	2.7	1.4	0.0208	0.011	4.8	7.0	0.001
7821468Z	4.8	2.6	1.3	0.0207	0.012	5.0	6.6	0.003
7821557	4.5	5.8	3.0	0.0203	0.010	4.9	6.5	0.005
7821852	3.6	6.1	3.1	0.0203	0.012	4.2	6.2	0.001
7815077	3.8	5.9	2.7	0.0190	0.012	4.1	6.3	0.000
7820940	4.4	5.9	2.6	0.0185	0.012	4.4	6.1	0.000
7821396	3.8	2.7	1.4	0.0208	0.011	4.8	7.0	0.001
7821838	5.1	3.2	1.5	0.0205	0.010	4.3	7.2	0.004
7821023	4.5	5.6	4.6	0.0197	0.010	5.2	6.4	0.003
Average	4.3	4.5	2.4	0.0201	0.011	4.6	6.6	0.002

Visual examination of the rifles during the measurement phase revealed some notable items. Some of the rifles had sights; some had plain barrels or sight holes with no sights assembled. This condition was known however and was allowed to facilitate the expedition of sample rifles to host the XMP trigger assembly Trial & Pilot.

Another visual item noted was the tendency for the safety button to contact the right side of the bolt plug. The contact did not interfere with operation of the safety. The visual observations are summarized in the following chart and the safety button rub is depicted in the images at figures 2 and 3.

Serial #	Comments	
	Sights	Safety Arm
7815136	OK	Rubs bolt plug
7821468Z	No Sights (drilled & tapped)	Rubs bolt plug
7821557	No Sights (drilled & tapped)	Rubs bolt plug
7821852	No Sights (<i>NOT</i> drilled & tapped)	Rubs bolt plug
7815077	OK	OK
7820940	OK	Rubs bolt plug
7821396	OK	Rubs bolt plug
7821838	No Sights (<i>NOT</i> drilled & tapped)	OK
7821023	No Sights (drilled & tapped)	Rubs bolt plug

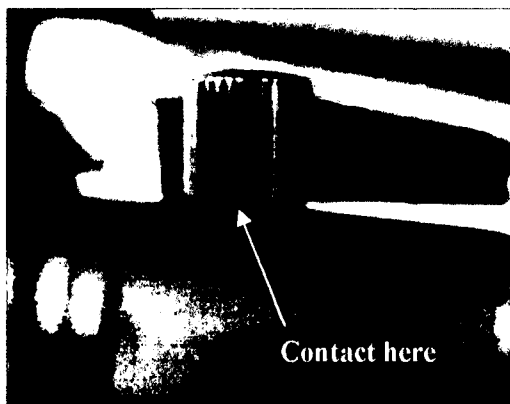


Figure 2

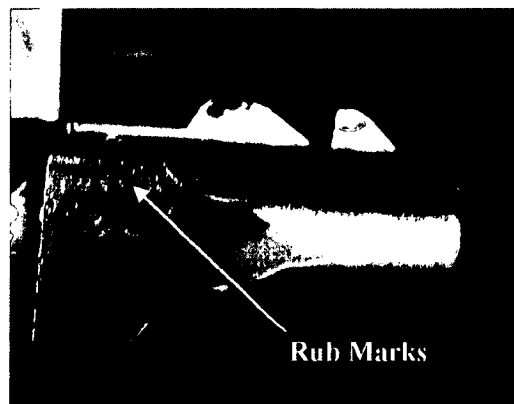


Figure 3

Jack-Test Summary:

Jack testing was completed with an overall malfunction rate of 2.8%. There were no malfunctions chargeable to the trigger assembly and all were related to feeding.

MALFUNCTIONS SORTED BY SERIAL NUMBER									
Serial #	# of	# of	Malf.	Malfunction					
	Malf	Rds. Fired	Rate	BOR	SI	SLC	SOR	SRC	SC
7815136	13	200	6.5%	1			12		
7821468Z	2	200	1.0%			1	1		
7821557	5	200	2.5%				5		
7821852	3	200	1.5%		3				
7815077	3	200	1.5%				3		
7820940	2	200	1.0%				2		
7821396	8	200	4.0%		1		7		
7821838	14	200	7.0%	2			4	1	7
7821023	0	200	0.0%						
TOTALS	50	1800	2.8%	3	4	1	34	1	7

Ammunition		Description
Remington	R308W1	150 gr Core-Lokt PSP

BOR	Bolt Over Ride
SI	Stems Incline
SLC	Stems Left Chamber
SOR	Stem Override
SRC	Stems Right Chamber
SC	Stems Chamber

Two of the nine rifles experienced a larger number of malfunctions than the rest. The SC malfunctions encountered in rifle 7821838 were related the magazine follower binding against the left wall of the magazine while attempting to feed the last round.

Shoulder-Test Summary:

The shoulder test was performed to simulate field shooting in standing "off-hand" position. The XMP trigger assembly performed well with smooth operation of both the safety and the trigger. The rifle malfunction rate overall was similar from the shoulder to the results obtained from the test jack.

MALFUNCTIONS SORTED BY SERIAL NUMBER						
	# of	# of	Malf.	Malfunction		
Serial #	Malf	Rds. Fired	Rate	SLC	SOR	SRC
7815136	1	20	5.0%		1	
7821468Z	3	20	15.0%	2		1
7821557	0	20	0.0%			
7821852	0	20	0.0%			
7815077	1	20	5.0%			1
7820940	0	20	0.0%			
7821396	1	20	5.0%		1	
7821838	0	20	0.0%			
7821023	0	20	0.0%			
TOTALS	6	180	3.3%	2	2	2

MALFUNCTIONS SORTED BY AMMO						
	# of	# of	Malf.	Malfunction		
Ammo	Malf	Rds. Fired	Rate	SLC	SOR	SRC
R308W1	3	90	3.3%	1	1	1
R308W2	3	90	3.3%	1	1	1
TOTALS	6	180	3.3%	2	2	2

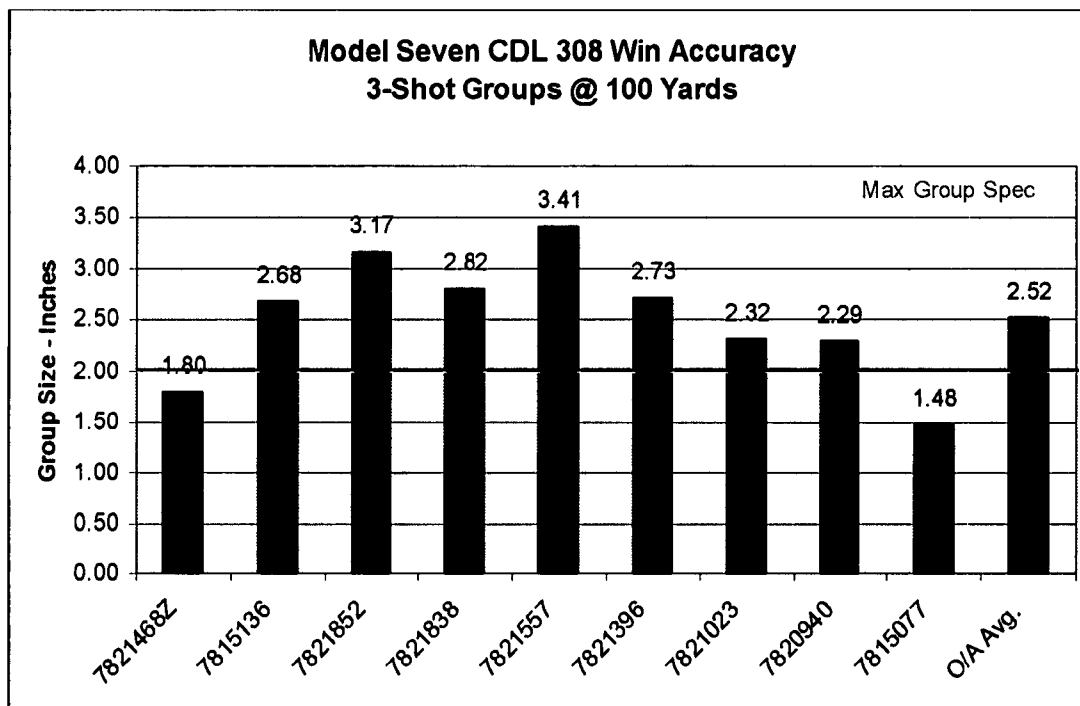
Ammunition		Description
Remington	R308W1	150 gr Core-Lokt PSP
Remington	R308W2	180 gr Core-Lokt SP

SLC	Stems Left Chamber
SOR	Stem Override
SRC	Stems Right Chamber

Accuracy-Test Summary:

The accuracy test was performed from a bench rest with the rifle shouldered creating another opportunity to sense the operation of the trigger and the safety in “real-world” conditions. Again, the XMP trigger assembly performed extremely well with good, crisp release of the trigger and good safety operation.

The Model Seven is normally tested for accuracy using 3-shot groups due to the small profile of the barrel and rapid heating. The 3-shot group size specification for 308 Win is 2.0 inches. The overall 9-gun average was 2.52 inches.



**REMINGTON ARMS COMPANY INC.
ILION, NY PLANT SITE**

**TECHNICAL DIVISION
TEST & MEASUREMENTS LAB**

TEST REPORT

**M/700 XMP Externally Adjustable
Trigger Assembly
Trial & Pilot**

Request # 20080042

DATE: 10/28/2009

Prepared by: K Farrington

DISTRIBUTION LIST

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Test Lab File

Issued: 10/30/2009

XMP-EA Trigger Assy T&P 20080042 102909
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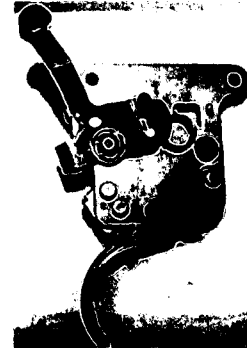
IL 17440

CONCLUSIONS:

The samples of XMP- EA trigger assemblies submitted individually as trigger assemblies, and assembled to finished host rifles all passed testing successfully.

INTRODUCTION:

Remington has redesigned its bolt action trigger assembly incorporating a number of new features. The new design, called the "X-Mark Pro™" was successfully released in the M/700, the Model 700 Left Hand, and the Model Seven. The Test Lab received a request to evaluate the newest design, the XMP- Externally Adjustable (EA) trigger assembly.



SCOPE:

Ten individual trigger assemblies (8- M/700 & 2- M/7) and thirty eight completely finished rifles containing the XMP- EA trigger assembly were received for testing.

Individual trigger assemblies were each subjected to dry-cycle testing to 10,000 cycles. Before the dry-cycling began, all trigger assemblies were checked for proper assembly and trigger-pull force and sear-lift was measured. The trigger assemblies subjected to dry-cycling were rechecked at 5000 cycles and again at 10000 cycles for trigger-pull and sear-lift.

The finished rifles received the standard series of measurements including trigger-pull, sear-lift and safety operation force. Following the measurement phase rifles were drop-tested. Another group was subjected to extensive jack-testing followed by field function testing. The safety was operated between each string of 5 rounds.

RESULTS:

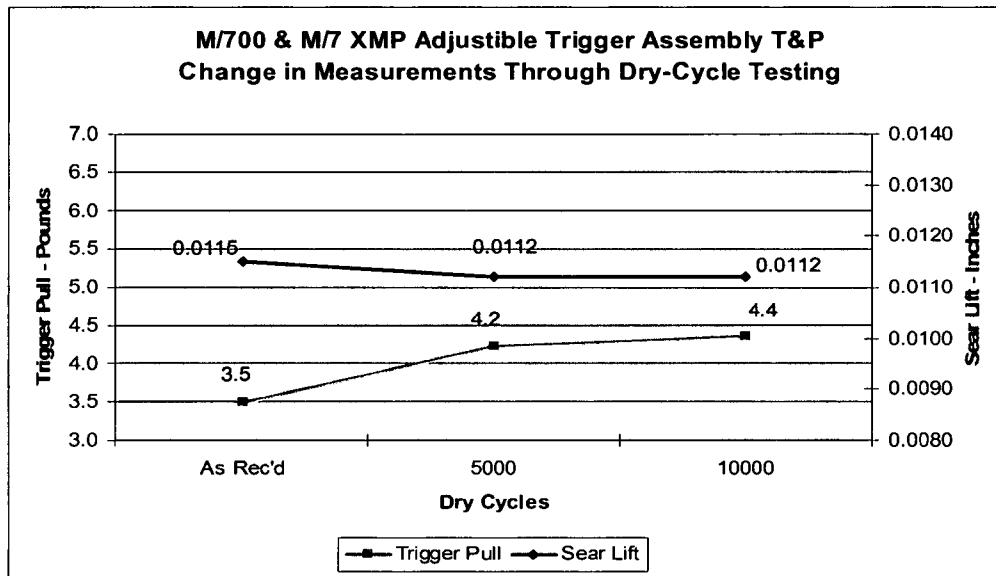
Dry-Cycle Summary:

Each of the ten individual trigger assemblies was mounted in automated, computer-controlled fixture that operates the bolt, the safety and the trigger in the same manner that a shooter would.

A complete bolt assembly and receiver are included in the setup. The bolt is fully cocked to load the sear, the safety is operated and then the trigger pulled to complete the cycle. The trigger assemblies received only lubrication attention. Trigger-pull and sear-lift measurements were taken after 5,000 cycles, half-way through the test.

All ten trigger assemblies endured the entire 10,000 dry-cycles without damage or parts working loose. The following graph shows a .9 pound increase in trigger-pull force even though the adjustment screws held tightly. Sear-lift is shown to have held steady throughout the test at just over .011 with a specification of .008 to .018.

IL 17441



Measurement Summary:

Measurements taken on all of the thirty eight rifles received for testing were found to be within specifications as received. Initial measurement data is shown in the chart below:

Initial Measurements								
	Caliber	Serial #	Trigger Pull (lbs)	Safety Force (lbs)		Firing Pin Indent (in)	Sear Lift (in.)	Headspace Min + (in.)
				To On	To Off			
A1	223 Rem	G6710034	3.4	6.2	3.6	0.0213	0.013	0.002
A2	300 Win Mag	TT009856	3.4	5.5	2.9	0.0217	0.012	0.001
A3	243 Win	G6775952	3.7	6.3	3.6	0.0208	0.012	0.001
A4	270 WSM	S7666002	3.6	6.2	3.7	0.0202	0.013	0.002
A5	270 Win	G6794912	3.5	5.9	3.6	0.0208	0.012	0.000
A6	300 Win Mag	TT009886	3.7	6.7	3.2	0.0220	0.014	0.000
A7	30-06 Sprgld	D6634319	3.5	5.5	3.4	0.0208	0.012	0.002
A8	223 Rem	G6710045	3.5	5.5	3.4	0.0208	0.012	0.002
A9	300 Win Mag	TT009620	3.5	5.7	3.1	0.0217	0.011	0.001
A10	270 Win	G6794916	3.2	5.8	2.8	0.0217	0.013	0.000
A11	270 WSM	S7666149	3.3	5.8	3.2	0.0197	0.012	0.002
A12	270 Win	G6794918	3.5	5.7	3.1	0.0217	0.012	0.001
A13	300 Win Mag	TT009888	3.6	6.3	3.0	0.0217	0.012	0.000
A14	270 WSM	S7666151	3.6	6.1	2.7	0.0192	0.012	0.002
A15	223 Rem	G6710093	3.7	6.2	3.1	0.0212	0.012	0.002
A16	270 Win	G6794937	3.4	6.2	3.0	0.0127	0.012	0.000
A17	243 Win	G6775976	3.4	5.9	3.1	0.0208	0.013	0.001
A18	30-06 Sprgld	D6634391	3.4	6.0	3.2	0.0218	0.012	0.000
A19	30-06 Sprgld	D6634389	3.6	5.3	3.1	0.0210	0.010	0.000
A20	243 Win	G6775991	3.4	5.2	3.0	0.0205	0.012	0.003
Averages			3.5	5.9	3.2	0.0206	0.012	0.001

Drop-Test Summary:

Eighteen of the thirty eight rifles received were subjected to SAAMI Jar-Off, Drop and Rotation testing. No trigger or firing related problems were detected in this test. A complete summary of the test series follows:

Drop-test Summary Data:

JAR OFF TEST (See S.A.A.M.I. volume VII, centerfire rifle, section 7-95.04)							
12 inch drop measured from the lowest point of the firearm. Firearm in the SAFE OFF position.							
Fire Arm	Serial #	BV, MU	BV, MD	BH, BD	BH, BU	BH, RSU	BH, LSU
A21	TT010146	OK	OK	OK	OK	OK	OK
A22	TT010147	OK	OK	OK	OK	OK	OK
A23	TT010152	OK	OK	OK	OK	OK	OK
A24	G6794928	OK	OK	OK	OK	OK	OK
A25	G6794926	OK	OK	OK	OK	OK	OK
A26	G6795071	OK	OK	OK	OK	OK	OK
A27	S7666167	OK	OK	OK	OK	OK	OK
A28	S7666183	OK	OK	OK	OK	OK	OK
A29	S7666215	OK	OK	OK	OK	OK	OK
A30	G6714165	OK	OK	OK	OK	OK	OK
A31	G6714181	OK	OK	OK	OK	OK	OK
A32	G6714199	OK	OK	OK	OK	OK	OK
A33	D6634401	OK	OK	OK	OK	OK	OK
A34	D6634412	OK	OK	OK	OK	OK	OK
A35	D6634316	OK	OK	OK	OK	OK	OK
A36	G6776006	OK	OK	OK	OK	OK	OK
A37	G6776016	OK	OK	OK	OK	OK	OK
A38	G6776018	OK	OK	OK	OK	OK	OK

DROP TEST (see S.A.A.M.I. volume VII, centerfire rifle, section 7-95.02)							
48 inch drop measured from the center of gravity of the firearm. Firearm in the SAFE ON position.							
Fire Arm	Serial #	BV, MU	BV, MD	BH, BD	BH, BU	BH, RSU	BH, LSU
A21	TT010146	OK	OK	OK	OK	OK	OK
A22	TT010147	OK	OK	OK	OK	OK	OK
A23	TT010152	OK	OK	OK	OK	OK	OK
A24	G6794928	OK	OK	OK	OK	OK	OK
A25	G6794926	OK	OK	OK	OK	OK	OK
A26	G6795071	OK	OK	OK	OK	OK	OK
A27	S7666167	OK	OK	OK	OK	OK	OK
A28	S7666183	OK	OK	OK	OK	OK	OK

A29	S7666215	OK	OK	OK	OK	OK	OK
A30	G6714165	OK	OK	OK	OK	OK	OK
A31	G6714181	OK	OK	OK	OK	OK	OK
A32	G6714199	OK	OK	OK	OK	OK	OK
A33	D6634401	OK	OK	OK	OK	OK	OK
A34	D6634412	OK	OK	OK	OK	OK	OK
A35	D6634316	OK	OK	OK	OK	OK	OK
A36	G6776006	OK	OK	OK	OK	OK	OK
A37	G6776016	OK	OK	OK	OK	OK	OK
A38	G6776018	OK	OK	OK	OK	OK	OK

ROTATION TEST (see S.A.A.M.I. volume VII, centerfire rifle, section 7-95.03)							
With the butt on the mat, let the firearm fall to the right & left. Firearm in the SAFE ON position							
		LEFT SIDE UP				RIGHT SIDE UP	
A21	TT010146	OK	OK	OK	OK	OK	OK
A22	TT010147	OK	OK	OK	OK	OK	OK
A23	TT010152	OK	OK	OK	OK	OK	OK
A24	G6794928	OK	OK	OK	OK	OK	OK
A25	G6794926	OK	OK	OK	OK	OK	OK
A26	G6795071	OK	OK	OK	OK	OK	OK
A27	S7666167	OK	OK	OK	OK	OK	OK
A28	S7666183	OK	OK	OK	OK	OK	OK
A29	S7666215	OK	OK	OK	OK	OK	OK
A30	G6714165	OK	OK	OK	OK	OK	OK
A31	G6714181	OK	OK	OK	OK	OK	OK
A32	G6714199	OK	OK	OK	OK	OK	OK
A33	D6634401	OK	OK	OK	OK	OK	OK
A34	D6634412	OK	OK	OK	OK	OK	OK
A35	D6634316	OK	OK	OK	OK	OK	OK
A36	G6776006	OK	OK	OK	OK	OK	OK
A37	G6776016	OK	OK	OK	OK	OK	OK
A38	G6776018	OK	OK	OK	OK	OK	OK

Key to Test Details:

DROP ORDER	FIREARM ATTITUDES
1	BARREL VERTICAL, MUZZLE UP
2	BARREL VERTICAL, MUZZLE DOWN
3	BARREL HORIZONTAL, BOTTOM DOWN
4	BARREL HORIZONTAL, BOTTOM UP
5	BARREL HORIZONTAL, RIGHT SIDE UP
6	BARREL HORIZONTAL, LEFT SIDE UP

BH	Barrel Horizontal
BV	Barrel Vertical
MU	Muzzle Up
MD	Muzzle Down
BD	Bottom Down
BU	Bottom Up
LSU	Left Side Up
RSU	Right Side Up

Endurance Summary:

Rifles A-1 through A-20 received endurance testing in a test jack. The test assignments were designed to insure that most calibers were represented in the highest levels of testing and that the overall test was well distributed among all the calibers. The calibers themselves were selected to offer a range of firing impulses from relatively light to relatively heavy.

25500 rounds were fired with a total of 8 malfunctions, producing an overall malfunction rate of just 0.03%. The table below summarizes the malfunctions:

MALFUNCTIONS SORTED BY SERIAL NUMBER											
					Malfunction						
	Serial #	# of Malf	# of Rds. Fired	Malf. Rate	BOR	OH	SLC	SOR	SRC	SC	Caliber
A1	G6710034	0	500	0.0%							223 Rem
A2	TT009856	0	500	0.0%							300 Win Mag
A3	G6775952	0	500	0.0%							243 Win
A4	S7666002	4	500	0.8%	4						270 WSM
A5	G6794912	0	1000	0.0%							270 Win
A6	TT009886	0	1000	0.0%							300 Win Mag
A7	D6634319	0	2000	0.0%							30-06 Sprgfld
A8	G6710045	0	2000	0.0%							223 Rem
A9	TT009620	4	3000	0.1%		4					300 Win Mag
A10	G6794916	0	3000	0.0%							270 Win
A11	S7666149	0	3000	0.0%							270 WSM
A12	G6794918	0	2000	0.0%							270 Win
A13	TT009888	0	2000	0.0%							300 Win Mag
A14	S7666151	0	1000	0.0%							270 WSM
A15	G6710093	0	1000	0.0%							223 Rem
A16	G6794937	0	500	0.0%							270 Win
A17	G6775976	0	500	0.0%							243 Win
A18	D6634391	0	500	0.0%							30-06 Sprgfld
A19	D6634389	0	500	0.0%							30-06 Sprgfld
A20	G6775991	0	500	0.0%							243 Win
	TOTALS	8	25500	0.03%	4	4	0	0	0	0	

BOR	Bolt Over Ride
OH	Opens Hard
SLC	Stems Left Chamber
SOR	Stem Override
SRC	Stems Right Chamber
SC	Stems Chamber

Field Test Summary:

The same types of ammunition listed for the endurance test were also used to conduct the field test. 1600 total rounds of ammunition were fired through 20 rifles with an overall malfunction rate of 0.4%. No malfunctions were chargeable to the trigger assembly.

MALFUNCTIONS SORTED BY SERIAL NUMBER											
	Serial #	Caliber	# of Malf	# of Rds. Fired	Malf. Rate	Malfunction					Model
						BO	DE	SLC	SOR	SRC	
A1	G6710034	223 Rem	0	80	0.0%						700
A2	TT009856	300 Win Mag	0	80	0.0%						700
A3	G6775952	243 Win	1	80	1.3%	1					700
A4	S7666002	270 WSM	4	80	5.0%		4				Seven
A5	G6794912	270 Win	0	80	0.0%						700
A6	TT009886	300 Win Mag	0	80	0.0%						700
A7	D6634319	30-06 Sprgfld	1	80	1.3%	1					700
A8	G6710045	223 Rem	0	80	0.0%						700
A9	TT009620	300 Win Mag	0	80	0.0%						700
A10	G6794916	270 Win	0	80	0.0%						700
A11	S7666149	270 WSM	0	80	0.0%						Seven
A12	G6794918	270 Win	0	80	0.0%						700
A13	TT009888	300 Win Mag	0	80	0.0%						700
A14	S7666151	270 WSM	0	80	0.0%						Seven
A15	G6710093	223 Rem	0	80	0.0%						700
A16	G6794937	270 Win	0	80	0.0%						700
A17	G6775976	243 Win	0	80	0.0%						700
A18	D6634391	30-06 Sprgfld	1	80	1.3%	1					700
A19	D6634389	30-06 Sprgfld	0	80	0.0%						700
A20	G6775991	243 Win	0	80	0.0%						700
TOTALS			7	1600	0.4%	3	4	0	0	0	

MALFUNCTIONS SORTED BY TESTER								
		# of Rds. Fired	Malf. Rate	Malfunction				
Tester	# of Malf			BO	DE	SLC	SOR	SRC
Farrington	2	400	0.5%		2			
Kucharski	1	400	0.3%	1				
Morris	0	400	0.0%					
Paestella	4	400	1.0%	2	2			
TOTALS	7	1600	0.4%	3	4	0	0	0

MALFUNCTIONS SORTED BY AMMO								
Ammo	# of Malf	# of Rds. Fired	Malf. Rate	Malfunction				
				BO	DE	SLC	SOR	SRC
300WGS	0	40	0.0%					
BH300WMAG	0	40	0.0%					
L223R7	0	60	0.0%					
P270C	0	80	0.0%					
P270WSMC	1	60	1.7%		1			
PRA223RB	0	60	0.0%					
PRA243WA	0	60	0.0%					
PRA270WSMC	0	60	0.0%					
PRA300WC	0	40	0.0%					
PRC270WB	0	80	0.0%					
PRC300WA	0	40	0.0%					
R223R2	0	60	0.0%					
R223R3	0	60	0.0%					
R243W1	0	60	0.0%					
R270W1	0	80	0.0%					
R30062	1	60	1.7%	1				
R30063	0	60	0.0%					
R30064	0	60	0.0%					
R30065	1	60	1.7%	1				
R300W1	0	40	0.0%					
RS300WA	0	40	0.0%					
SBST243	0	60	0.0%					
SBST270SA	3	60	5.0%		3			
SBST300	0	40	0.0%					
X2432	1	60	1.7%	1				
X2704	0	80	0.0%					
X270WSM	0	60	0.0%					
X300WM2	0	40	0.0%					
TOTALS	7	1600	0.4%	3	4	0	0	0

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