

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

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File

December 15, 1981

TO: R. E. Nightingale
FROM: S. R. Franz
SUBJECT: Competitive Bolt Action Status

*Scott: I need
some explanations
on Pg 2 Jim W?*

Introduction:

The Engineering Sample Rifles were further tested and evaluated. The following tests have been completed.

- Safety Operation
- Safety Sear Mechanism
- Safety Mechanism Function
- Follow Down
- Extractor Strength
- Cold
- No Lube

In addition, the following tests still remain to be completed.

- Dangerous Combination
- Defective Ammo
- Predictable Misuse
- Vibration

Results:

Safety Operation

The five bolt action safety mechanisms were subjected to a 200 cycle/rifle test. No rifle experienced malfunctions or problems during this test.

12-15-81

Results: (continued)Safety Sear Mechanism

This test was performed once per rifle. It determines the bolt displacement from the normal firing position needed to prevent trigger pull by the safety sear mechanism. The following displacements were measured.

	Trigger Releases Sear (in.)	Trigger Doesn't Release Sear (in.)
Browning BBR	.0105	.0115
Remington M/700	.0605	.0615
Ruger M/77	.0415	.0425
Smith & Wesson M/1500	.0640	.0650
Winchester M/70	.1005	.1015

Safety Mechanism Function

This test determines if the rifle will fire when: the trigger is held back, safety "on", and the bolt is sharply closed. No rifle fired during this test. Each rifle was tried ten times.

Follow Down Test

This test determines if the rifle will fire when: the trigger is held back, safety "off", and the bolt is closed sharply. Each rifle was tried ten times. No rifle fired, however, all four competitor's rifles did mark the primers while the Remington did not. (See table below)

	Fired Rounds Out of 10	Primers Marked Out of 10	Indentation Diameter
Browning BBR	0	10	.026
Remington M/700	0	0	—
Ruger M/77	0	10	.017
Smith & Wesson M/1500	0	10	.018
Winchester M/70	0	10	.027

* (Avg. of 5)

Results: (continued)Extractor Strength

This test determines the ultimate extractor strength of Bolt Action Rifles. The measured load is the required force needed to separate the bolt head and extractor from the cartridge rim. Only one measurement per rifle was taken.

	Maximum Force (lbs.)	Type Failure
Browning BBR	940	Broken Claw
Remington M/700 (rivetless)	680	Bolt Shroud Failed
Ruger M/77	200	Slipped Over Cartridge Rim - Claw Deformed
Smith & Wesson M/1500	280	Slipped Over Cartridge Rim
Winchester M/70	520	Broken Claw

Cold Test

This live ammo test determines a gun's functional characteristics at low temperatures. Each rifle was shot 100 times except the Browning, which was stopped after 59 rounds due to an unsafe condition found during testing. Test temperatures varied from -30°F → -60°F. The ammo used was Rem. 30-06 cal., 150 gr. PSP.

	Rounds Fired	Malfunctions	Malf. Rate (%)
Browning BBR	59	1 stem low, 2 light indents, 3 delay fired	10.2
Remington M/700	100	0	0
Ruger M/77	100	2 light indents	2
Smith & Wesson M/1500	100	2 stem low, 1 stem right, 1 misfire (*)	3
Winchester M/70	100	6 light indents	6

* Defective Round

The Browning was stopped after three rounds delay fired. This was considered an unsafe condition, so further testing was ceased. The rifle would not fire when the trigger was pulled, even though the trigger and sear disengaged. It would fire when

Results: (continued)Cold Test (continued)

jolted or if the operating handle was slightly rotated. It is suspected the firing pin was freezing to the inside bolt body surface.

The Smith & Wesson had one round fail to fire. The indent was good, so it was called a bad round. All other misfires were called rifle malfunctions since they had light primer indents.

The cold affected bolt operation on every rifle, but to different degrees. See table below for comparison between rifles. Rating is relative between rifles.

	Bolt Rotation (up and down)	Bolt Travel forward and rearward
Browning BBR	Medium	Hardest
Remington M/700	Hardest	Medium
Ruger M/77	Easiest	Easiest
Smith & Wesson M/1500	Easiest	Easiest
Winchester M/70	Medium	Easiest

No Lube Test

This test evaluates a gun's operating characteristics with no lubrication. Each rifle was shot 200 times and dry cycled. The results are tabulated below. Ammo used was Rem. 30-06 cal., 150 gr. PSP.

	Rounds Shot	Malfunctions	Malf. Rate (%)
Browning BBR	200	56 did not feed from mag.	28
Remington M/700	200	0	0
Ruger M/77	200	0	0
Smith & Wesson M/1500	200	3 stem lows, 3 stem rights	3
Winchester M/70	200	0	0

Results:(continued)No Lube Test (continued)

The Browning had a problem feeding left rounds from the magazine. The feeding rounds are contacted by part of one bolt locking lug. There is not much coverage here. A stripped trigger guard screw hole further compounded this problem. This prevented a tight fit between the floorplate and the stock which resulted in a lower magazine box position.

All the bolts operated slightly harder without lubrication than with it. Remington's closing bolt rotation was much harder than the four competitor's rifles.

All five rifles froze up during the dry cycle test without lubrication. This resulted from the high friction build-up between the cocking cam surface and the firing pin cocking piece. Lubrication was applied to open the bolts.

	Cycles to Freeze Up
Browning BBR	220
Remington M/700	100
Ruger M/77	615
Smith & Wesson M/1500	311
Winchester M/70	262