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RESEARCH TEST AND MEASUREMENT REPORT
REPORT# 900081
MARCH 13, 1990

MODEL 700 SYNTHETIC LONG STOCK EVALUATION

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ABSTRACT:

The Test and Measurement Laboratory evaluated Model 700 long stocks made of Polypropolene and Noryl. The testing consisted of 100 yard accuracy, proof strength and drop testing.

After 12 hours at 250 degrees Fahrenheit the Noryl stocks deformed so severely that testing was discontinued.

The accuracy of the Polypropolene Stocks was not affected by temperature changes. The Polypropolene Stocks also passed the drop test and the extended proof test.

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MODEL 700 SYNTHETIC LONG STOCK EVALUATION

To: J.R. Snedeker
From: D.R. Thomas

INTRODUCTION:

A request was received from F.H. Smith on January 8, 1990 to evaluate Polypropolene and Noryl synthetic long stocks assembled on the Model 700, 300 Weatherby Mag. caliber rifles. The testing consisted of 100 yard accuracy, proof strength and drop testing.

SCOPE OF TEST:

To determine if the Model 700 rifles assembled in the experimental stocks would meet the Remington specifications of 3.5 inches for 100 yard accuracy and SAAMI drop testing. Also, to compare the affects of extreme heat and cold on 100 yard accuracy and to compare the strength of the internal bearing surfaces of each stock material.

TEST RESULTS:

The Noryl stocks were severely deformed during the 250 degree Fahrenheit phase of the test and could not be tested further. All of the Polypropolene stocked rifles tested were within Remington specifications of 3.5 inches for the 100 yard accuracy in each phase of the accuracy test. The following average group sizes were established:

	ACCURACY RESULTS		
STOCK TYPE	AMBIENT (in.)	+250 degrees F. (in.)	-40 degrees F. (in.)
Noryl	2.03	***	***
Polypropolene	2.27	2.03	2.32
*** NORYL STOCKS WERE NOT SHOT AFTER EXTREME TEMPERATURE TEST			
* RYNITE	1.77	2.23	2.00
* Arylon	2.38	2.03	1.98
* FIBERGLAS	1.98	1.83	2.22
* RESULTS FROM TEST # 880181			

There was no deformation of the internal bearing surfaces on any of the stocks tested.

All of the rifles tested passed the SAAMI and extended drop tests.

MODEL 700 SYNTHETIC STOCK EVALUATION

REPORT TEXT:
GENERAL:

The following Model 700 rifles were used throughout the evaluation:

POLYPROPOLENE	C6472861	C6474116	C6473023
	C6474175	C6474123	C6474032
NORYL	C6474033	C6472868	C6474105
	C6474117	C6474109	C6474030

ACCURACY:

Twelve rifles were shot three, five shot groups per rifle.(six of the rifles with Noryl stocks and six with Polypropolene stocks)

Remington 220 grain Soft Point Core-Lokt ammunition (R300WB2 code M08 Y8909) was used throughout the test.

All accuracy testing was done on the Research 100 yard range, located north of building 52-1-A.

Individual accuracy results are listed in the appendix of this report.

PROOF STRENGTH:

Two Polypropolene stocks were used to test the deformation of the internal bearing surfaces when the rifle was subjected to the loading and firing of 300 Weatherby Magnum ammunition. 25 standard and 75 proof rounds were shot through each rifle. There was no deformation on the bearing surfaces of neither of the stocks tested.

Guns C6473023 and C6474032 were used for this phase of testing.

DROP TEST:

The drop test was conducted, per SAAMI specifications, on three Model 700 rifles with Polypropolene Stocks. Then each rifle was dropped at heights above the SAAMI specifications for additional information. All the rifles tested passed the SAAMI and extended drop tests.

MODEL 700 SYNTHETIC STOCK EVALUATION

TEST PROCEDURE:

ACCURACY:

The accuracy was shot by C.S. Stephens and J.E. Selan in the R&D 100 yard range located in building 52-1.

Standard long action Leupold bases and Leupold rings were used, in conjunction with a 20X All-American scope.

Three, five shot groups, were shot for each rifle at ambient temperature. The rifles were cooled and cleaned after each group, and one fouling shot was fired before the next group was shot. The procedure was repeated for the Polypropolene stocks after the rifles were placed in an industrial oven at 250 degrees Fahrenheit for 12 hours and then allowed to return to room temperature. The procedure was repeated a third time for the Polypropolene stocks after the rifles were placed in an industrial freezer at -40 degrees Fahrenheit for 24 hours and then allowed to return to room temperature. The testing was discontinued on the Noryl Stocks after they were severely deformed by the 250 degree Fahrenheit temperature.

The targets were analyzed for group size, using the HP 9000 computer and digitizing tablet.

PROOF STRENGTH:

The proof strength test was conducted by C.J. Stephens in the R&D shooting room located in building 52-1A.

Two Model 700 rifles with Polypropolene stocks were randomly selected for the proof strength test. Each rifle was placed in a shooting jack and 25 standard factory rounds were fired through them. Then, using a lanyard and the portable shield, 75 hand loaded proof rounds were fired. Finally, the actions were removed and the internal bearing surfaces examined.

The proof handloads were loaded with a 220 gn. bullet and 70 gns. of 4320 to yield an average pressure of 72,000 psi.

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TEST PROCEDURE: (cont.)
DROP TEST:

The drop test was conducted by D.R. Thomas and H.E. Weaver in the R&D drop test area located in building 52-1A.

The following SAAMI specifications were used:

All drops were on an one inch 85 Durometer Shore A rubber mat backed by concrete.

POSITIONS OF DROP:

1. Vertical	- muzzle up	4. Horizontal	- bottom down
2. Vertical	- muzzle down	5. Horizontal	- left side up
3. Horizontal	- bottom up	6. Horizontal	- right side up

JAR OFF:

SAAMI specification - 12 inch drop in all six positions with the safety in the off position.

DROP:

SAAMI specification - 48 inch (from the center of gravity of the firearm) drop in all six positions with safety in the on position.

Extended Test- 48 inches to the lowest point of the firearm for vertical drops and 72 inches to the lowest point for horizontal drops.

The following three Model 700 rifles with Polypropolene Stocks were used in the drop test:

C6474116 C6472861 C6474123

Then, for additional information, each was rifle was dropped at heights above the SAAMI specifications. All the rifles tested passed the SAAMI and extended drop test. The only damage to the stocks during the drop testing was that two Butt Pads broke off during the 48 inch drop.

MODEL 700 SYNTHETIC STOCK EVALUATION

APPENDIX

MODEL 700 SYNTHETIC LONG STOCK EVALUATION
INDIVIDUAL RIFLE ACCURACY RESULTS

SERIAL NUMBER	TYPE OF STOCK	TEMP. (°F)	GROUP 1 (in.)	GROUP 2 (in.)	GROUP 3 (in.)	AVERAGE (in.)
C6474033	N	A	1.12	1.82	1.81	1.58
C6472868	N	A	2.20	2.04	3.20	2.48
C6474105	N	A	2.48	1.20	2.26	1.97
C6474117	N	A	2.71	1.35	2.61	2.22
C6474109	N	A	1.75	1.18	1.58	1.49
C6474030	N	A	2.89	2.16	2.41	2.47
C6472861	P	A	3.21	1.50	3.13	2.61
		250	2.86	2.18	1.50	2.18
		-40	1.32	2.36	2.43	2.04
C6474116	P	A	2.02	2.18	1.73	2.02
		250	2.40	2.18	2.32	2.30
		-40	2.11	2.59	1.88	2.19
C6473023	P	A	2.24	2.05	3.05	2.24
		250	1.51	1.38	1.77	1.55
		-40	2.33	1.23	1.78	1.78
C6474175	P	A	2.06	1.46	2.38	2.06
		250	2.76	1.95	1.86	2.19
		-40	2.21	2.72	2.30	2.41
C6474123	P	A	3.73	2.40	2.52	2.89
		250	1.62	1.77	2.49	1.96
		-40	2.31	2.06	2.58	2.32
C6474032	P	A	1.88	1.72	1.69	1.77
		250	1.93	1.82	2.35	2.03
		-40	4.42	2.59	2.52	3.18

STOCK TYPES N NORYL
P POLYPROPOLENE