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MODEL XP-100  
.221 Fireball  
PILOT LINE TEST

REMINGTON ARMS COMPANY, INC.  
Ilion Research Division

December 14, 1962

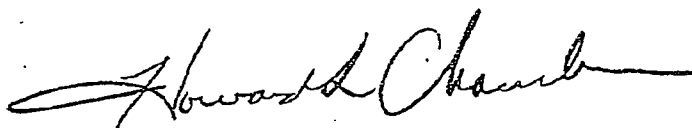
cc: S. M. Alvis  
H. J. Hackman  
N. S. Thompson  
C. D. Hunt

W. E. LEEK

MODEL XP-100 - TEST RESULTS  
Production Pilot Test

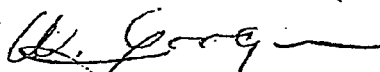
The production pilot test on the Model XP-100 Pistol consisted of eight individual tests. Each test was conducted separately with no bearing on any of the other investigations, and each will be covered independently in this report. Tests conducted were as follows:

1. Endurance and Function Test
2. Trigger Pull Test
3. Accuracy Test
4. Effect of Stock Interchangeability on Accuracy
5. Firing Pin Indent Test
6. Packaging Rust Test
7. Lock Time Test
8. Accuracy Comparison - 12" Twist vs. 14" Twist



H. L. Chambers, Research Engineer  
Firearms Design Section

HLC:T  
Attach.



W. R. Googin, Foreman  
Firearms Testing Unit

ENDURANCE AND FUNCTION TEST

During the week of October 14 thru 20, 1962, an endurance and function test was run on one Model XP-100, Caliber .221 Fireball. This test was conducted by personnel of the R&D Test Unit. All firing was conducted indoors from mechanical shooting devices.

The ammunition used in the test was loaded at Bridgeport earlier in the year for Ilion R&D testing. The loading specifications were 15.8 grains of 4227 powder with a 50 grain Remington bullet.

The test gun was assembled completely with production parts and no alterations of any kind were made on any of the components. The gun was assembled and adjusted by R&D personnel.

No cleaning of any kind was conducted throughout the test.

Prior to commencing the test, the gun was reviewed by the author and members of the R&D Test Unit. Function and operation of the gun were explained at that time, and a pre-fire check was conducted on the weapon.

At frequent intervals during the test a series of 11 - 5-round groups were fired at 100 yards in an experimental accuracy device. It was the purpose of this targeting to determine the effect of wear on the accuracy of the gun.

Data from these and other checks are indicated on the attached test form. Results of the test have been interpreted by the author as follows:

1. No major change in headspace.
2. Trigger pull increased slightly during test. Probably caused by foreign matter in fire control.
3. Group size decreased from zero to about 2500 rounds, where it commenced to open slightly.
4. No looseness of trigger housing throughout test.
5. Firing pin protrusion and indent constant.
6. No development of trigger creep.
7. Rib and sight screws have tendency to loosen slightly after prolonged shooting.
8. Receiver - Stock bedding OK.
9. Feeding OK with gun horizontal.

HLC:T

XP-100 FUNCTION AND ENDURANCE TEST  
TEST: GUN #5 - S.D. 1130 - STACK #8

[illegible]

TRIGGER PULL TEST

This investigation consisted of checking trigger pull weight on the first 84 completely assembled production guns to determine whether or not production specifications of 1.5# to 2.75# trigger pull could be met.

Results of the check are as follows:

a.	Total number of guns checked	84
b.	Average trigger pull	2.143 lbs.
c.	Max. trigger pull	3 lbs.
d.	Min. trigger pull	1.75 lbs.
e.	Number over 2 3/4 lb. limit	2
f.	Number under 1 1/2 lb. limit	0

HLC:T

ACCURACY TEST

This test consisted of firing from the XP-100 accuracy device two 5-shot groups at 100 yds. from each of 38 production guns. All ammunition used in the test was Rem. 50 grain factory loads. Groups were measured inside to inside, extreme spread.

Data and test results are as follows:

<u>Gun Serial No.</u>	<u>Group Size (in.)</u>	<u>Avg. Group Size</u>
1015	1.25 - 1.0	1.13
1018	3.0 - 1.0	2.0
1019	2.5 - 2.0	2.25
1024	2.8 - 1.0	1.9
1025	1.5 - 1.0	1.25
1028	1.0 - .75	.88
1029	3.5 - 3.0	3.25
1034	2.0 - 2.5	2.25
1043	1.5 - .75	1.13
1044	2.0 - 1.5	1.75
1050	3.5 - 3.0	3.25
1051	1.0 - 1.5	1.25
1052	2.0 - 1.8	1.9
1054	1.5 - 2.0	1.75
1065	3.5 - 3.0	3.25
1074	2.0 - 1.25	1.63
1082	1.0 - 1.2	1.1
1086	1.5 - 1.5	1.5
1089	1.0 - .75	.88
1091	2.5 - 3.0	2.75
1101	1.0 - .75	.88
1115	2.0 - 1.0	1.5
1119	2.0 - 2.5	2.25
1122	1.25 - 1.7	1.48
1125	1.5 - 1.0	1.25
1126	1.5 - 4.0	2.75
1132	2.5 - 3.0	2.75
1134	3.0 - 1.5	2.25
1136	2.0 - 1.5	1.75
1139	3.0 - 3.0	3.0
1140	1.0 - 1.3	1.15
1153	2.7 - 1.0	1.85
1155	1.5 - 1.0	1.25
1157	2.0 - 1.5	1.75
1162	1.8 - 1.0	1.4
1165	1.5 - 1.25	1.38
1171	1.8 - 1.0	1.4
1176	1.5 - 1.3	1.14

Model XP-100 Test Results  
December 14, 1962

Test No. 3  
Sheet 2

ACCURACY TEST

Total guns tested	38
Average Group Size	1.802
No. of Guns with over 3" Group	3
Percentage	7.9%
No. of Guns with Average over 3" Group	3
Percentage	7.9%

HLC:T

Model XP-100 Test Results  
December 14, 1962

Test No. 4

EFFECT OF STOCK INTERCHANBEABILITY  
ON  
ACCURACY and POINT OF IMPACT

Several guns were fired by W.E. Leek and H.L. Chambers to determine the effect of interchanging stocks on accuracy and point of impact.

All shooting in this test was done off hand, out of doors.

Guns were fired by both shooters with common stocks to determine shootability and point of impact. Stocks were then interchanged and the guns were refired. No change in grouping or point of impact was noted.

It should be brought out at this point that production guns are targeted without stocks, and the effect of stock interchangeability on accuracy and point of impact becomes extremely critical.

HLC:T



Model XP-100 Test Results  
December 14, 1962

Test No. 5

FIRING PIN INDENT

The purpose of this test was to determine the amount of firing pin indent attained with production guns. Indents were checked with standard copper crushers supported by a crusher holder. A total of 36 guns were tested, each gun being checked five times.

The following data indicate the average of the five readings for each gun. In no case was there a variation in crusher indents greater than .001 in. for one gun.

<u>Gun Serial No.</u>	<u>Avg. of 5 Indents</u>	<u>Gun Serial No.</u>	<u>Avg. of 5 Indents</u>
1065	.0183	1173	.0180
1028	.0186	1026	.0193
1138	.0186	1044	.0166
1074	.0186	1167	.0186
1038	.0193	1151	.0190
1155	.0186	1171	.0173
1018	.0180	1146	.0176
1057	.0173	1133	.0176
1129	.0170	1122	.0206
1086	.0180	1126	.0186
1183	.0190	1043	.0186
1141	.0213	1082	.0200
1090	.0206	1041	.0190
1050	.0180	1154	.0196
1176	.0176	1139	.0203
1019	.0200	1140	.0200
1162	.0183	1071	.0176
1056	.0186	1174	.0180

Total Guns Checked	36
Max. Avg. Indent for 1 Gun	.0213
Avg. Indent for 36 Guns	.0187
Min. Avg. Indent for 1 Gun	.0166

HLC:T

Model XP-100 Test Results  
December 14, 1962

Test No. 6

### PACKAGING RUST TEST

The purpose of this test was to determine whether or not the proposed plastic zipper case for the XP-100 would induce or retard rusting.

Sections of scrap barrels from the XP-100 were prepared for various treatments including color and no color, Steelgard, and also proprietary material called Rig, for the coating. These were sealed in a plastic zipper case and then the proposed paperboard outer wrap before being placed in the Research weatherometer. The equipment was cycled to provide some 90% humidity and also heated to prescribed temperatures. For control, a duplicate group of the same experimental barrel sections were packed in our regular paperboard gun box, sealed and submitted to the same test.

The packages were opened after 23 days in the weatherometer and conclusions were significantly favorable towards the plastic zipper case. Parts, which included one powder metal component, were very well preserved when colored to provide at least normal treatment. Those in the standard paperboard carton were considerably more rusted. The "Rig" was observed to be better than any other coating used. The samples which were treated with another proprietary oil marketed by Stoeger seemed to give little, if any, protection.

These results relieve any immediate concern; however, arrangements are being made to store one of the XP-100 Pistols in a case for long time exposure under natural conditions.

HLC:T

Model XP-100 Test Results  
December 14, 1962

Test No. 7

LOCK TIME

One production Model XP-100 was checked by the Research Measurements Lab to determine lock time. A series of thirty readings was made. Results of the test are as follows:

Max. Lock Time	3.56 milliseconds
Avg. Lock Time (30 readings)	3.505 "
Min. Lock Time	3.45 "

An investigation is being carried on at the present time to determine an economical way to decrease lock time without weakening the firing system.

HLC:T

GROUP SIZE COMPARISON  
12" Twist vs. 14" Twist

On recommendation of the Ammunition Research Department at Bridgeport, the bore twist of the XP-100 was changed from 1 turn in 14 inches to 1 turn in 12 inches. The purpose of this change was to provide proper stability for a faster, lighter weight bullet. Until now, all XP-100 barrels have been made with the 14 inch twist. Recently, however, a limited number of barrels with 12 inch twist have been made, and it was the purpose of this test to compare group sizes fired in the two barrel types with various bullet weights.

Test data and results are shown below:

1. Group Measurement --  
5 shot groups - 100 yds. - measured inside to inside.
2. All shooting done in accuracy device.
3. Ammunition Data  
50 gr. - Rem. Factory Ammo. - 15.8 gr. 4227  
35 gr. - Handloads - Rem. Bullets - 16.6 gr. 4227  
60 gr. - Handloads - Morse-Watkins Bullets - 15.0 gr. 4227
4. Guns - XP-100 Production Models

Twist - 1 Turn in 12 in.			
Gun Serial No.	Group Size		
	35 gr.	50 gr.	60 gr.
1200	2.25	2.25	2.25
1219	1.75	2.25	2.25
1226	3	2.25	1
1197	3	1.5	1.5
1199	1.9	2.25	1.25
1217	2.13	1.75	1
1177	4.5	2.75	1.75
Average Group Size	2.647	2.143	1.571
No. of Groups Over 3 in.	1	0	0

Model XP-100 Test Results  
December 14, 1962

Test No. 8  
Sheet 2

Twist - 1 Turn in 14 in			
Gun Serial No.	Group Size		
	35 gr.	50 gr.	60 gr.
1192	2.75	1.25	2.25
1185	3	1.75	3
1072	2.25	2.75	2.75
1206	1.75	2.5	2
1201	3.25	2	3.13
1220	2	2.75	2.25
1180	2.75	2	2.25
Average Group Size	2.536	2.143	2.519
No. of Groups Over 3 in.	1	0	1

# RESULTS

## Average Group Sizes

	12" Twist	14" Twist
35 gr.	2.647	2.536
50 gr.	2.143	2.143
60 gr.	1.571	2.519
Overall Avg. Group Size	2.120	2.399

HLC:T

REMINGTON ARMS COMPANY, INC.  
Ilion Research Division

December 14, 1962

*Chron*

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N. S. Thompson  
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MODEL XP-100 - TEST RESULTS  
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*Howard Chambers*

H. L. Chambers, Research Engineer  
Firearms Design Section

HLC:T  
Attach.

*W. R. Googlin*  
W. R. Googlin, Foreman  
Firearms Testing Unit

ENDURANCE AND FUNCTION TEST

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The test gun was assembled completely with production parts and no alterations of any kind were made on any of the components. The gun was assembled and adjusted by R&D personnel.

No cleaning of any kind was conducted throughout the test.

Prior to commencing the test, the gun was reviewed by the author and members of the R&D Test Unit. Function and operation of the gun were explained at that time, and a pre-fire check was conducted on the weapon.

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6. No development of trigger creep.
7. Rib and sight screws have tendency to loosen slightly after prolonged shooting.
8. Receiver - Stock bedding OK.
9. Feeding OK with gun horizontal.

HLC:T

Model XP-100 Test Results  
December 14, 1962

Test No. 2

TRIGGER PULL TEST

This investigation consisted of checking trigger pull weight on the first 84 completely assembled production guns to determine whether or not production specifications of 1.5# to 2.75# trigger pull could be met.

Results of the check are as follows:

a.	Total number of guns checked	84
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c.	Max. trigger pull	3 lbs.
d.	Min. trigger pull	1.75 lbs.
e.	Number over 2 3/4 lb. limit	2
f.	Number under 1 1/2 lb. limit	0

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Model XP-100 Test Results  
December 14, 1962

Test No. 3

ACCURACY TEST

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Model XP-100 Test Results  
December 14, 1962

Test No. 3  
Sheet 2

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Model XP-100 Test Results  
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Test No. 4

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Model XP-100 Test Results  
December 14, 1962

Test No. 5

FIRING PIN INDENT

The purpose of this test was to determine the amount of firing pin indent attained with production guns. Indents were checked with standard copper crushers supported by a crusher holder. A total of 36 guns were tested, each gun being checked five times.

The following data indicate the average of the five readings for each gun. In no case was there a variation in crusher indents greater than .001 in. for one gun.

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1057	.0173	1133	.0176
1129	.0170	1122	.0206
1086	.0180	1126	.0186
1183	.0190	1043	.0186
1141	.0213	1082	.0200
1090	.0206	1041	.0190
1050	.0180	1154	.0196
1176	.0176	1139	.0203
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Total Guns Checked	36
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Avg. Indent for 36 Guns	.0187
Min. Avg. Indent for 1 Gun	.0166

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Model XP-100 Test Results  
December 14, 1962

Test No. 6

PACKAGING RUST TEST

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Model XP-100 Test Results  
December 14, 1962

Test No. 7

LOCK TIME

One production Model XP-100 was checked by the Research Measurements Lab to determine lock time. A series of thirty readings was made. Results of the test are as follows:

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Avg. Lock Time (30 readings)	3.505 "
Min. Lock Time	3.45 "

An investigation is being carried on at the present time to determine an economical way to decrease lock time without weakening the firing system.

HLC:T

Model XP-100 Test Results  
December 14, 1962

Test No. 8

**GROUP SIZE COMPARISON**  
**12" Twist vs. 14" Twist**

On recommendation of the Ammunition Research Department at Bridgeport, the bore twist of the XP-100 was changed from 1 turn in 14 inches to 1 turn in 12 inches. The purpose of this change was to provide proper stability for a faster, lighter weight bullet. Until now, all XP-100 barrels have been made with the 14 inch twist. Recently, however, a limited number of barrels with 12 inch twist have been made, and it was the purpose of this test to compare group sizes fired in the two barrel types with various bullet weights.

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35 gr. - Handloads - Rem. Bullets - 16.6 gr. 4227  
60 gr. - Handloads - Morse-Watkins Bullets - 15.0 gr. 4227
4. Guns - XP-100 Production Models

Twist - 1 Turn in 12 in.			
Gun Serial No.	Group Size		
	35 gr.	50 gr.	60 gr.
1200	2.25	2.25	2.25
1219	1.75	2.25	2.25
1226	3	2.25	1
1197	3	1.5	1.5
1199	1.9	2.25	1.25
1217	2.13	1.75	1
1177	4.5	2.75	1.75
Average Group Size	2.647	2.143	1.571
No. of Groups Over 3 in.	1	0	0

Model XP-100 Test Results  
December 14, 1962

Test No. 8  
Sheet 2

Gun Serial No.	Twist - 1 Turn in 14 in		
	Group Size		
	35 gr.	50 gr.	60 gr.
1192	2.75	1.25	2.25
1185	3	1.75	3
1072	2.25	2.75	2.75
1206	1.75	2.5	2
1201	3.25	2	3.13
1220	2	2.75	2.25
1180	2.75	2	2.25
Average Group Size	2.536	2.143	2.519
No. of Groups Over 3 in.	1	0	1

# RESULTS

## Average Group Sizes

	12" Twist	14" Twist
35 gr.	2.647	2.536
50 gr.	2.143	2.143
60 gr.	1.571	2.519
Overall Avg. Group Size	2.120	2.399

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