

REMINGTON ARMS COMPANY, INC.  
Firearms Research Division

April 13, 1982

TO: J.H. Hennings

FROM: F.L. Supry

REPORT TITLE: Evaluation of Lubricants on Firearms M700 Cock and Fire Simulation

ABSTRACT

C.E. Ritchie requested that the Test Lab conduct a cock and fire evaluation on five spray lubricants.

1. Du Pont - Synthetic Diester
2. Krylon - Ten - 4
3. Sprayon - 711
4. CRC - 3-36
5. Houghton - HLP

These five lubricants were selected for evaluation from the results of a preliminary evaluation conducted by A.B. Hughes, Senior Consultant, ESD Maintenance Engineering Group, Du Pont. A copy of his evaluation for each of the five lubricants is located in Appendix "C".

SCOPE OF TEST

To compare the five lubricants in a Model 700 cock and fire simulation test.

TEST RESULTS

In their order of finish, from the best performing lubricant to the poorest performing lubricant, the following results were obtained.

LUBRICANT

AVERAGE CYCLE LIFE (5 Samples)

- |                                |             |
|--------------------------------|-------------|
| 1. Du Pont - Synthetic Diester | 21,181 cys. |
| 2. Sprayon - 711               | 17,646 cys. |
| 3. CRC - 3-36                  | 14,382 cys. |
| 4. Houghton - HLP              | 8,333 cys.  |
| 5. Krylon - Ten-4              | 2,830 cys.  |

PLAINTIFF'S  
EXHIBIT

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REPORT TEXT

A. Trigger pull, sear lift, sear engagement, safe on, safe off, and bolt lift measurements were taken on each test vehicle at the start of the test, and at 5000 cycle intervals. Remington specifications for the M700 components used are:

- |                     |                   |
|---------------------|-------------------|
| • Trigger Pull      | 3½ lbs. - 6½ lbs. |
| • Sear Lift         | .005" - .018"     |
| • Sear Engagement   | .015" - .020"     |
| • Safe "On" - "Off" | None Established  |
| • Bolt Lift         | None Established  |

Refer to Appendix "A", data sheets No. 1 through No. 5, for individual results.

The Rc hardness was measured, at the cocking cam area, on each M700 bolt.

Refer to Appendix "A", data sheet No. 6, for individual hardness, lubricant used, simulator used and cycles completed.

A graphical analysis comparing the lubricants tested to their cycle life, and their cycle life to the simulator used is found in Appendix "B".

## TEST PROCEDURE

### A. Measurements

1. Trigger Pull  
Trigger Pull measurements were conducted using a Chatillon Model IN-10 pull scale.
2. Sear Lift and Sear Engagement  
Sear lift and sear engagement measurements were conducted using a Model FC-14 optical comparator and measuring machine.
3. Safe "ON" and "OFF" Forces.  
Safe On and Off forces were taken using a Chatillon Model DPP-25, push-pull scale.
4. Bolt Lift  
Bolt lift forces, both cocked and fired, were taken utilizing a Chatillon Model 80D pull scale mounted on a machine designed to be used for bolt lift measurements.
5. Rc Hardness  
The Rc hardness measurements were taken by George Catta, a production inspector, utilizing a Wilson Rockwell Hardness Tester.

### B. Lubrication - (Pictorial presentation - Appendix "D")

#### 1. Lubrication Points

- a. Receiver: Locking lug area.  
Track on receiver tang.
- b. Bolt: Cocking cam  
Locking lugs
- c. Firing Pin: Threads  
Striker radius and track.
- d. Trigger Assembly: Sear safety cam face.  
Interior of trigger assembly, through sear inspection hole.

#### 2. Lubrication procedure

- a. Components to be lubricated were completely degreased, using the solvent degreasing tanks located in our Heat Treat Department.
- b. The interior of the trigger assembly was lubricated by holding the spray can to direct the spray into the sear inspection hole. Duration of spray approximately 1 second.

NOTE: The two position nozzle on Du Pont aerosol can was more difficult to control for pin point application, than the standard plastic tubes on the other samples. (Pictorial example included.)

2. Lubrication Procedure - continued

- c. All other lubrication points were lubricated by holding the aerosol can approximately six inches away from the area to be lubricated and covering the area until a thin layer of lubricant forms on the surface. Duration of spray; approximately 1 second.

C. Pictorial Presentation

1. Lubrication points and procedures.
2. Cocking cam, sear face, and striker radius and track areas were photographed at the start and completion of the test and are available on request.

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APPENDIX A  
(Data Sheets)

AL 0018676

5 of 38

## 3-E-22

TEST SAMPLE of GREEN LUBRICANT

|            |
|------------|
| DATA SHEET |
|------------|

## 5-8-82

SECOND SAMPLE OF EACH LUBRICANT

DATA SHEET 2

\_\_\_\_\_ HYDRO SAMPLE OF EACH HYDROGRAPH

EXHIBIT 10

20-0-0

M700 GOLF & FINE SIMULATION

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APPENDIX B  
(Graphic Presentation)

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# A L E K S I C H

APPENDIX C

(Previous Evaluation)

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Test # 20

Product: Du Pont - Synthetic Diaster - 20%

Function: Multipurpose, prevents rust  
Displaces moisture, dirt and lubricates

Evaluation Notes

1. Odor: Synthetic chemical oily smell, not lasting
2. Feel: Light oily feel
3. Drying Rate: Slow drying
4. Penetration: Rapid penetration and spreading, clear color
5. Surface Wetting: Local wetting, removes oxidation, good cleanup
6. Grease Displacement: Rapid spreading, no dissolving, good cleanup
7. Type Container: 4 oz aerosol, nozzle with straw
8. Liquid Appearance: Watery, light tan
9. Wood-Open Pore: Damp look, no damage
10. Metal Surface: Wet look, no rust within 24 hours
11. Rust Removal: Most rust removed
12. Displace Moisture: Excellent
13. Displace Solids: Excellent
14. Gun Barrel: Excellent
15. Wood Stock: Excellent
16. Rust Prevention:  
    Test 1 - 7  
    Test 2 - 7  
    Avg - 7.0
17. Reason for Elimination: Continue testing

A

Test # 14

Product: Syntron #711 Penetrant/Lube/Moisturize

Function: Multipurpose, prevents rust  
Displaces moisture and lubricates

Evaluation Notes

1. Odor: Strong fly spray, lasting
2. Feel: Very oily feel
3. Drying Rate: Medium drying rate
4. Penetration: Slow spreading, but continuous, clear color
5. Surface Wetting: Minimum spreading, removes oxidation, bright
6. Grease Displacement: Rapid spread, no dissolving, good cleanup
7. Type Container: 12 oz aerosol, nozzle with straw
8. Liquid Appearance: Very watery, light tan
9. Wood-Open Pore: Damp look, no damage
10. Metal Surface: Oily look, no rust within 24 hours
11. Rust Removal: Some rust removed
12. Displace Moisture: Excellent
13. Displace Solids: Good
14. Gun Barrel: Excellent
15. Wood Stock: Excellent
16. Rust Prevention:

Test 1 - 6

Test 2 - 5

Avg - 5.5

17. Reason for Elimination: Continue testing

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Test # 15

Product: CRC - 3-35

Function: Multipurpose, prevents rust  
Displaces moisture and lubricates

Evaluation Notes

1. Odor: Pleasant peppermint smell, lasting
2. Feel: Light oily feel
3. Drying Rate: Medium drying rate
4. Penetration: Medium penetrating and spreading, tan color
5. Surface Wetting: Slow spread, removes oxidation, good cleanup
6. Grease Displacement: Rapid spreading, some dissolving, easy cleanup
7. Type Container: 1 oz aerosol, nozzle
8. Liquid Appearance: Watery, light tan
9. Wood-Open Pore: Damp look, no damage
10. Metal Surface: Oily look, no rust within 24 hours
11. Rust Removal: Some rust removed
12. Displace Moisture: Excellent
13. Displace Solids: Good
14. Gun Barrel: Excellent
15. Wood Stock: Excellent
16. Rust Prevention:  
    Test 1 - 4  
    Test 2 - 5  
    Avg - 4.5
17. Reason for Elimination: Continue testing

AL 0018689  
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Test # 11

Product: E. F. Houghton - ELP All Purpose

Function: Multipurpose, prevents rust  
Displaces moisture, dirt and lubricates

Evaluation Notes

1. Odor: Fly spray smell, not lasting
2. Feel: Oily feel
3. Drying Rate: Rapid drying
4. Penetration: Rapid spreading, med. spreading, tan stain
5. Surface Wetting: Slow spreading, rapid dry to oily film, hard to clean
6. Grease Displacement: Rapid spread, no dissolving, good cleanup
7. Type Container: 12 oz aerosol, nozzle with straw
8. Liquid Appearance: Waxy, dark tan
9. Wood-Open Pore: Damp look, no damage
10. Metal Surface: Oil look, no rust within 24 hours
11. Rust Removal: No rust removal
12. Displace Moisture: Poor
13. Displace Solids: Fair
14. Gun Barrel: Good
15. Wood Stock: Good
16. Rust Prevention:
  - Test 1 - 8
  - Test 2 - 5
  - Avg - 6.5
17. Reason for Elimination: Continue testing

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Test # 13

Product: Krylon - Ten 4

Function: Multipurpose, prevents rust  
Displaces moisture, gums, dirt and lubricates

Evaluation Notes

1. Odor: Strong fly spray, lasting
2. Feel: Light oily feel
3. Drying Rate: Medium drying rate
4. Penetration: Rapid absorption and spreading, dark tan stain
5. Surface Wetting: Slow spreading, oily appearance, good cleanup
6. Grease Displacement: Rapid spread, no dissolving, good cleanup
7. Type Container: 11 oz aerosol, nozzle with spray
8. Liquid Appearance: Dark tan, watery
9. Wood-Open Pore: Damp look, no damage
10. Metal Surface: Damp look, no rust within 24 hours
11. Rust Removal: Most rust removed
12. Displace Moisture: Good
13. Displace Solids: Good
14. Gun Barrel: Good
15. Wood Stock: Good
16. Rust Prevention:

Test 1 - 8

Test 2 - 5

Avg - 6.5

17. Reason for Elimination: Continuous testing

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APPENDIX D  
(Pictorial Presentation)

1. Lubrication procedures.
2. Individual components at the start and completion of test.  
(Available upon request.)

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RESEARCH TEST and MEASUREMENT REPORT - Report No. 82 0331 - Supplement No. 2

Evaluation of Lubricants on Firearms  
Environmental / Cold Tests (M/700 and M/1100)

Prepared by: (E.L. Supry)

Date Prepared: 5/2/82

Proofread and Cleared By:

J.H. Hennings, / R.E. Nightingale,  
Foreman-Test Lab / Foreman-Measurement Lab

Signature

Date

C.E. Ritchie,  
Sr. Supervisor - Testing,  
Meas. & Mech. Analysis Lab

Signature

Date

AL 0018693

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TEST & MEASUREMENT LAB REPORT

REPORT NUMBER: 82 0331 - Supplement No. 2  
REPORT TITLE: Evaluation of Lubricants on Firearms  
MODEL(S): Environmental / Cold Tests (M700 and M1100)  
M/700 and M/1100  
GAUGE OR CALIBER:

DATE: 5-2-82

WORK ORDER NO.:

PART NAME:

DESIGNER/ENGINEER:

TEST TYPE:

1. PHOTO LAB
2. STRENGTH TEST - NO. OF GUNS TESTED \_\_\_\_\_
3. FUNCTION TEST - NO. OF GUNS TESTED \_\_\_\_\_
4. ACCURACY TEST - NO. OF GUNS TESTED \_\_\_\_\_
5. MEASUREMENTS - TYPE: \_\_\_\_\_
6. ENVIRONMENTAL TEST \_\_\_\_\_
7. AMMUNITION TESTING & EVALUATION - TYPE: \_\_\_\_\_
8. VISUAL EVALUATION - \_\_\_\_\_ OUT OF \_\_\_\_\_ GUN SAMPLE
9. ENDURANCE - NO. OF GUNS TESTED: \_\_\_\_\_

NO. OF ROUNDS PER GUN: \_\_\_\_\_

TOTAL ROUNDS FIRED IN TEST: \_\_\_\_\_

AMMO TYPE: MAGS. \_\_\_\_\_; TARGET: \_\_\_\_\_

RIM FIRE \_\_\_\_\_ CENTER FIRE \_\_\_\_\_

AL 0018694

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REMINGTON ARMS COMPANY, INC.  
Firearms Research Division

May 25, 1982

TO: J.H. Hennings

FROM: F.L. Supry

REPORT TITLE: Evaluation of Lubricants on Firearms  
Environmental/Cold Tests (M/700 and M/1100)

### ABSTRACT

C.E. Ritchie requested that the Test Lab conduct Environment/Cold Tests on three spray lubricants.

1. Du Pont - Synthetic Diester
2. Sprayon - 711
3. CRC - 3-36

NOTE: Krylon Ten-4 and Houghton HLP were eliminated from further testing due to their poor performance in the M700 cock and fire simulation test.

### SCOPE OF TEST

To compare the three lubricants in an environmental/cold test.

### TEST RESULTS

In their order of finish, from the best performing to the poorest performing lubricant, the following results were obtained: Du Pont - Synthetic Diester

CRC - 3-36

Sprayon - 711

The following is a brief synopsis of each phase of the environmental/cold test.

1. Firearm function as removed from freezer after 3 hours at  $-20^{\circ}$  F.

|         |                                   |
|---------|-----------------------------------|
| Du Pont | No failures to function occurred. |
| CRC     | 1 failure to function occurred.   |
| 711     | 2 failures to function occurred.  |

2. Rust inspection at completion of test.

|                 |                        |
|-----------------|------------------------|
| Du Pont and CRC | Very little rust.      |
| 711             | Greater amount of rust |

TEST RESULTS - continued

3. Firearms function during firing of 100 rounds per day.

There were no malfunctions or failures during this phase of the test. All lubricants were equal.

4. Belt Velocity Measurements

Measurements indicate that the lubricants all performed equal during this phase of the test.

5. Firearm function as removed from roof after 3 hours exposure to environment.

Lubricants all performed equal during this phase of the test.

6. Firearm function as removed from roof after 64 consecutive hours of exposure to environment.

Du Pont and CRC - No failures to function occurred.

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Actions frozen.

REPORT TEXT

- A. Bolt velocity measurements were taken at the start of the test and each morning during the test. Refer to Data Sheet No. 1 in Appendix A for individual results.
- B. Trigger pull, firing pin indent, sear engagement, sear lift, safe on, safe off, and bolt lift measurements were taken at the start and completion of the test. Refer to Data Sheet 2 in Appendix A for individual results.
- C. Trigger pull and firing pin indents were taken each day after the guns had remained in the freezer at  $-20^{\circ}\text{F}$ . for three hours. Refer to Data Sheet 3, Appendix A, for individual results.

D. Weather conditions during test:

|      |                                                                      |                            |
|------|----------------------------------------------------------------------|----------------------------|
| 3/29 | Sunny $45^{\circ}\text{F}$ .                                         |                            |
| 3/30 | Sunny $55^{\circ}\text{F}$ .                                         |                            |
| 3/31 | Rain $50^{\circ}\text{F}$ .                                          |                            |
| 4/1  | Flurries $30^{\circ}\text{F}$ .                                      |                            |
| 4/2  | Sunny, windy $35^{\circ}\text{F}$ .                                  | 3 hours exposure each day. |
| 4/3  | Rain, freezing rain $38^{\circ}\text{F}$ . to $20^{\circ}\text{F}$ . | } Week-and exposure        |
| 4/4  | Snow $20^{\circ}\text{F}$ . to $15^{\circ}\text{F}$ .                |                            |

TEST PROCEDURE

- A. All rifles and shotguns selected to be used in the test were disassembled and degreased, using the solvent degreasing tanks located in our Heat Treat Department.

Each gun was lubricated with the assigned lubricant and reassembled.

1. At 8:00 A.M. each day bolt velocity measurements were taken by the Measurements Lab, utilizing the photo-diode transducer system.
2. 100 rounds were fired through each gun.
3. All guns were exposed to the environment by being placed on the roof for 3 hours each day.
4. They were then placed in a freezer at  $-20^{\circ}\text{F}$ . for 3 hours. Trigger pull and firing pin indents were taken as guns were removed from the freezer.
5. The guns were placed in a stress coat oven at  $120^{\circ}\text{F}$ . overnight (16 hours).

The procedure was repeated each day for 5 consecutive days.

The guns were then placed on the roof over the week-end. At 8:00 A.M. Monday they were removed and bolt velocity measurements were taken.

The guns were then placed in a dry cabinet for 24 hours.

The guns were removed from the dry cabinet and bolt velocity measurements were taken.

At the completion of the test all the guns were disassembled and examined for rust.

ILLUSTRATION - ENVIRONMENTAL/COLD TEST  
1. 700-55-30-06 COLIBERA

THE JOURNAL OF THE

MODEL 1100 - LT-20

EL 700-5-30-06-6010EN

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4-1-82

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Only 1 Effect!

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RESEARCH TEST and MEASUREMENT REPORT - Report No. 82 0331

Supplement No. 4

LUBRICATION EVALUATION: ILION FISH AND GAME CLUB  
CLEANING AND FIELD TESTING  
EVALUATION

Prepared by: C. E. Ritchie

Date Prepared: 6-10-82

Proofread and Cleared By:

J.H. Hennings, / R.E. Nightingale,  
Foreman-Test Lab / Foreman-Measurement Lab

Signature

Date

C.E. Ritchie,  
Sr. Supervisor - Testing,  
Meas. & Mech. Analysis Lab

Signature

Date

H

AL 0018702

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A

TEST & MEASUREMENT LAB REPORT

REPORT NUMBER: 82 0331 Supplement No. 4

REPORT TITLE: LUBRICATION EVALUATION: Lion Fish and Game Club  
Cleaning & Field Testing  
Evaluation

MODEL(S): 1100

GAUGE OR CALIBER:

DATE: 6-10-82

WORK ORDER NO.:

PART NAME:

DESIGNER/ENGINEER:

TEST TYPE:

1. PHOTO LAB
2. STRENGTH TEST - NO. OF GUNS TESTED \_\_\_\_\_
3. FUNCTION TEST - NO. OF GUNS TESTED \_\_\_\_\_
4. ACCURACY TEST - NO. OF GUNS TESTED \_\_\_\_\_
5. MEASUREMENTS - TYPE: \_\_\_\_\_
6. ENVIRONMENTAL TEST
7. AMMUNITION TESTING & EVALUATION - TYPE: \_\_\_\_\_
8. VISUAL EVALUATION - \_\_\_\_\_ OUT OF \_\_\_\_\_ GUN SAMPLE
9. X ENDURANCE - NO. OF GUNS TESTED: 16

NO. OF ROUNDS PER GUN: \_\_\_\_\_

TOTAL ROUNDS FIRED IN TEST: \_\_\_\_\_

AMMO TYPE: MAGS. \_\_\_\_\_; TARGET: \_\_\_\_\_

RIM FIRE \_\_\_\_\_ CENTER FIRE \_\_\_\_\_

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## TEST PROCEDURE

- A. On March 12, 1982, sixteen M/1100 shotguns were selected from the Ilion Fish and Game Club to be used in this evaluation. These guns are:

| <u>Labeled<br/>No.</u> | <u>Serial No.</u> | <u>Gauge</u> |
|------------------------|-------------------|--------------|
| 1                      | N032715X          | 20           |
| 2                      | N098963H          | 410          |
| 3                      | N120547V          | 12           |
| 4                      | N122845V          | 12           |
| 5                      | N072571V          | 12           |
| 6                      | N098241H          | 410          |
| 7                      | N112195J          | 28           |
| 8                      | N120637V          | 12           |
| 9                      | N071849V          | 12           |
| 10                     | N067179V          | 12           |
| 11                     | N111015J          | 28           |
| 12                     | N032199X          | 20           |
| 13                     | N066916V          | 12           |
| 14                     | N120545V          | 12           |
| 15                     | N061062V          | 12           |
| 16                     | N067268V          | 12           |

The guns were delivered to the Ilion Research Test Lab where they were individually disassembled to be cleaned. The shotguns were cleaned using only the lubricant as the cleaning agent. Results were based on the Test Lab personnel's opinion on how well each lubricant performed.

- B. For the next portion of the test, the entire firearm was dipped in Stoddard Solvent and thoroughly cleaned, degreased and allowed to dip dry. Each lubricant was assigned a firearm and then lubricated. The following firearm components were sprayed:

- o piston, piston seal, magazine tube - Spray, let stand for 5 minutes, lightly wipe off all excess.
- o receiver - Saturate, let stand for 5 minutes, lightly wipe off excess.
- o fire control - light spray.

The firearms were reassembled and then each were wiped down with a clean cloth dampened with the corresponding lubricant. The sixteen shotguns were returned to the Ilion Fish and Game Club the week of 3/15/82 and placed in their metal storage cabinet. (Note: These storage cabinets are located in an unheated area on an earth floor. The room is also un-insulated. The room experiences temperature extremes and maintains a relatively high level of humidity).

TEST PROCEDURE - continued

The guns were used by the Remington Arms Employees at the Lion Fish & Game Club for a period of approximately 3 months.

On June 10, 1982, R. E. Nightingale ( Measurement Lab Foreman ) and C. E. Ritchie ( Test & Measurement Lab Supervisor ) made a visual inspection of the operation and appearance of those same sixteen shotguns. Items noted were:

- o any visible rusting
- o condition of lubricant ( still wet, dry, sticky, etc. )
- o appraisal of rounds on gun

Results of the inspection can be found in Appendix A.

# A L E K S I C H

APPENDIX "A"  
(Data Sheets)

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Lubrication Evaluation: Ilion Fish & Game Club  
Cleaning and Field Testing Evaluation

Report No. 82 0331 Supplement No. 4  
Page 5

Ilion Fish & Game Club Results:

DATA SHEET

| Label No. | Gauge | Lubricant | Results                                                                                                                                                                                                                      |
|-----------|-------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1         | 20    | Du Pont   | Still well lubricated - no rust evident.                                                                                                                                                                                     |
| 2         | 410   | "         | Still well lubricated - no rust evident.                                                                                                                                                                                     |
| 3         | 12    | "         | New rust spots on receiver (it appears someone wiped the outside of the receiver dry). Still well lubricated - light film on magazine tube by gas cylinder. High number of rounds on this gun.                               |
| 4         | 12    | "         | Still well lubricated - no rust evident. High number of rounds on this gun.                                                                                                                                                  |
| 5         | 12    | "         | Still well lubricated - no rust evident. High number of rounds on this gun.                                                                                                                                                  |
| 6         | 410   | 711       | Still well lubricated - no rust evident.                                                                                                                                                                                     |
| 7         | 28    | "         | Lubricant is starting to dry out on magazine tube - gas cylinder and piston seal are lightly rusted (worst sample of rust - interior).                                                                                       |
| 8         | 12    | "         | Rust on front area of magazine tube ahead of gas cylinder and on outside of gas cylinder - magazine tube has a very sticky film by gas cylinder area. High number of rounds on gun (worst sample of sticky film - interior). |
| 9         | 12    | "         | Still well lubricated - no rust evident.                                                                                                                                                                                     |
| 10        | 12    | "         | Still well lubricated - no rust evident.<br>(A spot of rust on barrel at vent rib.)                                                                                                                                          |
| 11        | 28    | CRC       | Still well lubricated - no rust evident.                                                                                                                                                                                     |
| 12        | 20    | "         | Still well lubricated but somewhat drier in appearance - no rust evident - gun is very dry but still functional.                                                                                                             |
| 13        | 12    | "         | Still well lubricated - no rust evident. Moderate number of rounds on gun.                                                                                                                                                   |
| 14        | 12    | "         | Lubrication starting to dry out on magazine tube at gas cylinder area. - some light rust inside gas cylinder. moderate number of rounds on gun.                                                                              |
| 15        | 12    | "         | Still well lubricated - no rust evident. High number of rounds on gun.                                                                                                                                                       |
| 16        | 12    | Du Pont   | Still well lubricated - no rust evident. Starting to dry out a little - high number of rounds on gun (it appeared this gun had been shot the most).                                                                          |

AL 0018709

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# A

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RESEARCH TEST and MEASUREMENT REPORT - Report No. 82 0331 Supplement No. 3

Evaluation of Lubricants on Firearms  
Rust Prevention Test

Prepared by: F.L. Supry

Date Prepared: 5-6-82

Proofread and Cleared By:

J.H. Hemmings, / R.E. Nightingale,  
Foreman-Test Lab / Foreman-Measurement Lab

Signature

Date

C.E. Ritchie,  
Sr. Supervisor - Testing,  
Mesa. & Mech. Analysis Lab

Signature

Date

AL 0018710

32738

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TEST & MEASUREMENT LAB REPORT

REPORT NUMBER: 82 0331 - Supplement No. 3  
REPORT TITLE: Evaluation of Lubricants on Firearms  
Rust Prevention Test  
MODEL(S): M/1100  
GAUGE OR CALIBER:  
DATE: 5-6-82  
WORK ORDER NO.:  
PART NAME:  
DESIGNER/ENGINEER:

TEST TYPE:

1. PHOTO LAB
2. STRENGTH TEST - NO. OF GUNS TESTED \_\_\_\_\_
3. FUNCTION TEST - NO. OF GUNS TESTED \_\_\_\_\_
4. ACCURACY TEST - NO. OF GUNS TESTED \_\_\_\_\_
5. MEASUREMENTS - TYPE: \_\_\_\_\_
6. ENVIRONMENTAL TEST
7. AMMUNITION TESTING & EVALUATION - TYPE: \_\_\_\_\_
8. VISUAL EVALUATION - \_\_\_\_\_ OUT OF \_\_\_\_\_ GUN SAMPLE
9. ENDURANCE - NO. OF GUNS TESTED: \_\_\_\_\_

NO. OF ROUNDS PER GUN: \_\_\_\_\_

TOTAL ROUNDS FIRED IN TEST: \_\_\_\_\_

AMMO TYPE: MAGS. \_\_\_\_\_; TARGET: \_\_\_\_\_

RDA FIRE \_\_\_\_\_ CENTER FIRE \_\_\_\_\_

AL 0018711

33038

REMINGTON ARMS COMPANY, INC.  
Firearms Research Division

May 6, 1982

TO: J.H. Hennings  
FROM: F.L. Supry  
REPORT TITLE: Evaluation of Lubricants on Firearms  
Rust Prevention Test

ABSTRACT

C.E. Ritchie requested that the Test Lab conduct a rust prevention test on the three lubricants still under evaluation:

1. Du Pont -- Synthetic Diester
2. Sprayon -- 711
3. CRC -- 3-36

SCOPE OF TEST

To observe the differences in rust prevention of the three lubricants.

TEST RESULTS

In their order of finish, from the best performing lubricant to the poorest performing lubricant evaluating rust prevention, the following results were obtained:

1. CRC 3-36
2. Du Pont and 711

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REPORT TEXT

Eight M/1100 shotguns were selected for the test by J.H. Hennings (Test Lab).

For daily weather conditions during this test refer to Data Sheet No. 1.

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TEST PROCEDURE

The stocks and fore-ends were removed from the shotguns. The shotguns were then degreased, using the solvent degreasing tanks located in our Heat Treat Department.

All metal parts of the shotguns were then saturated with the assigned lubricant.

The guns were then placed horizontally in a rack on the roof of Bldg. 52.

The guns were left untouched in the environment for one month. They were then removed and inspected for rust.

Photographs were taken after two weeks on the roof and individual photographs were taken at the completion of the test.

The shotguns were disassembled and stored in boxes in the machine room at the completion of the test.

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APPENDIX "A"

(Data Sheets)

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WEATHER CONDITIONS DURING TEST

| <u>Date</u> | <u>Condition</u>    | <u>Degree</u>    |                              |
|-------------|---------------------|------------------|------------------------------|
| 3/29        | Sunny               | 45° F.           | } 3 Hours Exposure Each Day. |
| 3/30        | Sunny               | 55° F.           |                              |
| 3/31        | Rain                | 50° F.           |                              |
| 4/1         | Flurries            | 30° F.           |                              |
| 4/2         | Sunny, windy        | 35° F.           | } Week-end Exposure          |
| 4/3         | Rain, freezing rain | 38° F. to 20° F. |                              |
| 4/4         | Snow                | 20° F. to 15° F. |                              |

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