

## Test Lab Request Form Instructions

- The TLW request form can be found on the second worksheet (tabs at bottom of the screen) of this file.
- Please fill in all required fields as noted in red. Please fill in all other fields if applicable / possible. Instructions for each field will appear when you click on the field. The procedure field is an embedded MS Word object which will allow you to use formatting features not possible in Excel (i.e. paragraphs, bullets, numbering, etc).
- If possible, create your desired data table and/or graph formats in the additional worksheets of this file. This is preferred over extensive written procedures.
- If the request is for High Speed Video, specify any desired parameters (i.e. frame rate, resolution, etc.) in the "HSV Setup" tab. If not specified, the videographer will document the parameters that they chose to use.
- Once the form is completed, save this file on your personal computer using the following format:  
*TLW#### - Brief Description*  
Try to keep the description as concise as possible. Your name in the filename is no longer necessary.
- Email the file to Phillip Reesor (primary) and Mark Hammond (secondary). Phillip will return your email with the assigned number and the assignee

Test Lab Work Request Form

Engineer: Vince Norton

Project #: 241493

Date Submitted: 8/27/2007

Test Description:

Perform  
DAT on 15  
Remington  
Model 770  
bolt action  
rifles.

Test Procedure:

Perform DAT per flow chart and instructions.

Test Lab Work Request Form

TLW #:

2355

Requested Completion Date:

9/21/2007

per flow chart and instructions.

TLW Form

<autofile>

Test Lab Work Request Form

Special Requirements:

Supplies Availability:

Results Required:

\*\*\*\*\*This section to be completed by Test Lab Manager\*\*\*\*\*

Assigned To:

Wade, Jeff

Start Date:

Assigned Date:

8/30/2007

Completion Date:

Comments:

<autofile>

TLW Form

Test Lab Work Request Form

Double click to edit.

Cont'd Procedure

<auto file>

Request Form

<autofill>

Cont'd Procedure

Canon 20D

|                               |  |
|-------------------------------|--|
| HIGH SPEED VIDEO SETUP RECORD |  |
| ARCHIVE:                      |  |
| TLW                           |  |

Camera Operator:

File Names:

Convention:

Purpose of Test:

|  |
|--|
|  |
|  |
|  |
|  |
|  |
|  |

|         |        |                           |
|---------|--------|---------------------------|
| Camera: | APX-RS | 1024PCI                   |
|         |        | Resolution (WxH, pixels): |

|       |
|-------|
| Lens: |
|-------|

Equipment Height (in. above or below subject, no entry = in-plane with subject)

|               |
|---------------|
| Equipment     |
| Camera        |
| L1 1000W      |
| L2 1000W      |
| L3 8-Bulb PAL |

Set-up Diagram (w/linear dimensions)

|               |
|---------------|
| not to scale. |
|---------------|

ALL FILES

REPRESENTATIVE FILE(S)

NO ARCHIVE

File Name:

2355

Date:

Project No.:

TLWNo Description.avi i.e. [TLW2162 Shot 1 18in bbl GB.avi], [TLW2162 Shot 2 18in bbl GB.avi]

|  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

1024PCI

Canon 20D

Shutter Speed:

Frame Rate (fps):

Type (C or F):

Focal Length (mm):

f-stop used:

zoom used (mm):

| Position | Target | Symbol | Equipment | Position | Target | Symbol |
|----------|--------|--------|-----------|----------|--------|--------|
|          |        | 1      |           |          |        |        |
|          |        | 14     |           |          |        |        |
|          |        | 12     |           |          |        |        |
|          |        | 13     |           |          |        |        |

TLW 2355 - A (Measurements)

Date: September 14, 2007  
Technician: Steve Wade  
Reference TLW 2370 thru 2374 for critical part inspection data

INITIAL SETUP

Date: October 24, 2007 (A11-A20), November 5, 2007 (A6-A10), November 9, 2007 (A1-A5)  
Technician: Jeff Wade/Vince Norton

|                        |
|------------------------|
| Gun I.D. #             |
| Gun Serial #           |
| Caliber                |
| Engagement             |
| Trigger Motion on Safe |
| Overtravel             |
| Trigger Pull           |

Notes:

TLW 2355 - B (Heaspace/Proof/Headspace)

Date: October 25, 2007 (A11-A20), November 7, 2007 (A6-A10)  
Technician: Jeff Wade

|            |
|------------|
| Gun I.D. # |
| Headspace  |
| Proof      |
| Headspace  |

Notes:

TLW 2355 - C (Measurements of Assemblies)

Date: October 26, 2007 (A11-A20), November 8, 2007 (A6-A10)  
Technician: Jeff Wade/Bob Lee

|                        |
|------------------------|
| Gun I.D. #             |
| Engagment 1            |
| Engagment 2            |
| Engagment 3            |
| Engagment Avg          |
| Trigger Motion on Safe |
| Overtravel             |
| Trigger Pull           |
| Safety On Force 1      |
| Safety On Force 2      |
| Safety On Force 3      |
| Safety On Force Avg    |
| Safety Off Force 1     |
| Safety Off Force 2     |
| Safety Off Force 3     |
| Safety Off Force Avg   |
| Safety Function Test   |

| A-1      | A-2      | A-3      | A-4      |
|----------|----------|----------|----------|
| 71378965 | 71378778 | 71378875 | 71378780 |
| 243 WIN  | 243 WIN  | 243 WIN  | 243 WIN  |
| 0.0255   | 0.0277   | 0.0252   | 0.0263   |
| 0.0037   | 0.0035   | 0.0054   | 0.0032   |
| 0.022    | 0.022    | 0.025    | 0.022    |
| 4.622    | 5.110    | 5.027    | 4.532    |

1. Bolts with new bolt head and firing pin were difficult to open after firing. Bolt for A-11 Bound up and had to be beat open twice.  
Bolt was replaces with a broken in bolt on the third try.

| A-1 | A-2 | A-3 | A-4 |
|-----|-----|-----|-----|
| 4   | 3   | 4   | 4   |
| x   | x   | x   | x   |
| 4   | 3   | 4   | 4   |

1. Headspace values are all MIN +

| A-1    | A-2    | A-3    | A-4    |
|--------|--------|--------|--------|
| 0.0254 | 0.0260 | 0.0301 | 0.0271 |
| 0.0257 | 0.0257 | 0.0300 | 0.0275 |
| 0.0255 | 0.0256 | 0.0300 | 0.0271 |
| 0.0255 | 0.0258 | 0.0300 | 0.0272 |
| 0.0022 | 0.0054 | 0.0045 | 0.0026 |
| 0.0238 | 0.0224 | 0.0243 | 0.0243 |
| 5.727  | 5.963  | 5.984  | 5.423  |
| 5.630  | 4.610  | 4.440  | 6.180  |
| 5.550  | 4.720  | 4.435  | 5.600  |
| 5.355  | 4.495  | 4.530  | 5.820  |
| 5.512  | 4.608  | 4.468  | 5.867  |
| 2.675  | 2.975  | 2.765  | 2.870  |
| 2.385  | 2.990  | 2.835  | 2.835  |
| 2.380  | 2.690  | 2.975  | 2.790  |
| 2.480  | 2.885  | 2.858  | 2.832  |
| x      | x      | x      | x      |

| A-5      | A-6      | A-7      | A-8      | A-9      | A-10     | A-11     | A-12     | A-13     | A-14     | A-15     | A-16     | A-17     | A-18     | A-19     |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 71378750 | 71401901 | 71402850 | 71403009 | 71403014 | 71403158 | 71288216 | 71388277 | 71389036 | 71389063 | 71392364 | 71397532 | 71398288 | 71398292 | 71398631 |
| 243 WIN  | 7mm RM   | 7mm RM   | 7mm RM   | 7mm RM   | 7mm RM   | 30-06    | 30-06    | 30-06    | 30-06    | 30-06    | 30-06    | 30-06    | 30-06    | 30-06    |
| 0.0268   | 0.0251   | 0.0260   | 0.0257   | 0.0268   | 0.0253   | 0.0275   | 0.0279   | 0.0278   | 0.0254   | 0.0277   | 0.0273   | 0.0267   | 0.0270   | 0.0261   |
| 0.0044   | 0.0040   | 0.0048   | 0.0041   | 0.0026   | 0.0036   | 0.0050   | 0.0023   | 0.0054   | 0.0049   | 0.0026   | 0.0062   | 0.0031   | 0.0067   | 0.0052   |
| 0.021    | 0.024    | 0.023    | 0.026    | 0.021    | 0.017    | 0.019    | 0.021    | 0.024    | 0.024    | 0.022    | 0.025    | 0.025    | 0.025    | 0.022    |
| 5.055    | 4.699    | 4.532    | 4.464    | 4.537    | 4.836    | 5.201    | 4.271    | 3.710    | 3.761    | 4.584    | 4.676    | 4.670    | 4.650    | 4.671    |

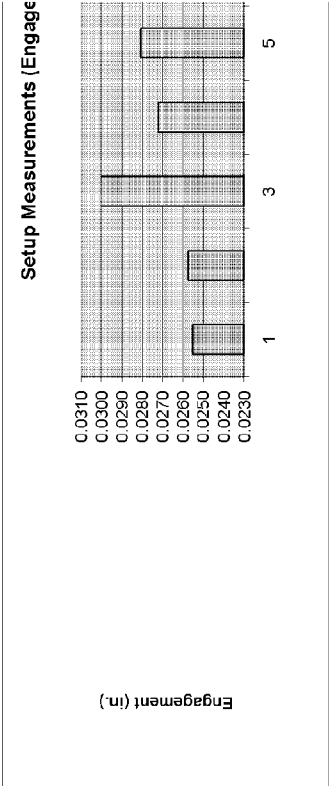
| A-5 | A-6 | A-7 | A-8 | A-9 | A-10 | A-11 | A-12 | A-13 | A-14 | A-15 | A-16 | A-17 | A-18 | A-19 |
|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|
| 4   | 4   | 4   | 4   | 4   | 4    | 4    | 5    | 3    | 5    | 5    | 4    | 3    | 3    | 3    |
| x   | x   | x   | x   | x   | x    | x    | x    | x    | x    | x    | x    | x    | x    | x    |
| 4   | 5   | 4   | 5   | 4   | 4    | 5    | 5    | 4    | 5    | 6    | 4    | 4    | 3    | 4    |

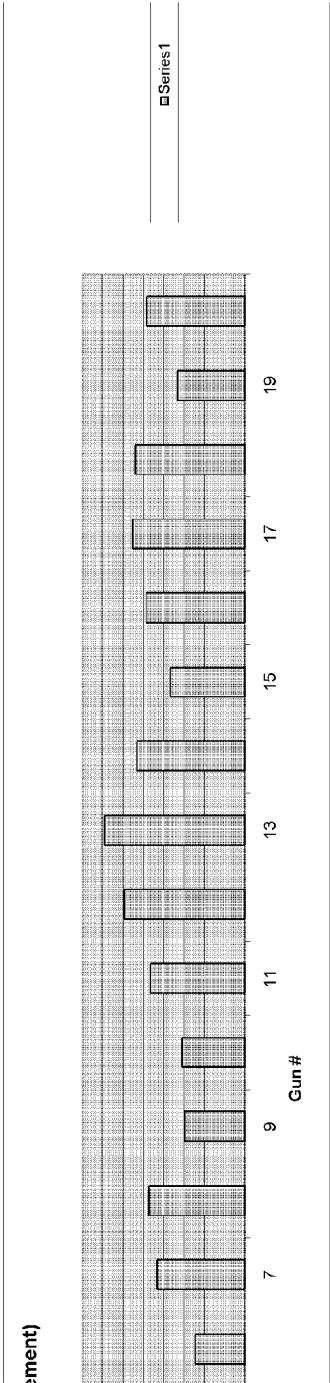
| A-5    | A-6    | A-7    | A-8    | A-9    | A-10   | A-11   | A-12   | A-13   | A-14   | A-15   | A-16   | A-17   | A-18   | A-19   |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0.0281 | 0.0256 | 0.0271 | 0.0275 | 0.0259 | 0.0260 | 0.0282 | 0.0289 | 0.0297 | 0.0282 | 0.0268 | 0.0279 | 0.0287 | 0.0282 | 0.0261 |
| 0.0282 | 0.0253 | 0.0273 | 0.0279 | 0.0260 | 0.0264 | 0.0275 | 0.0288 | 0.0299 | 0.0282 | 0.0267 | 0.0282 | 0.0283 | 0.0286 | 0.0263 |
| 0.028  | 0.0255 | 0.0276 | 0.0278 | 0.0260 | 0.0259 | 0.0273 | 0.0291 | 0.0301 | 0.0286 | 0.0266 | 0.0275 | 0.0286 | 0.0284 | 0.0266 |
| 0.0281 | 0.0255 | 0.0273 | 0.0277 | 0.0260 | 0.0261 | 0.0277 | 0.0289 | 0.0299 | 0.0283 | 0.0267 | 0.0279 | 0.0285 | 0.0284 | 0.0263 |
| 0.0026 | 0.0034 | 0.0058 | 0.0053 | 0.0071 | 0.0025 | 0.0048 | 0.0041 | 0.0067 | 0.0066 | 0.0022 | 0.0075 | 0.006  | 0.0081 | 0.0073 |
| 0.0224 | 0.0267 | 0.0221 | 0.0256 | 0.0218 | 0.0173 | 0.0175 | 0.0204 | 0.0225 | 0.0247 | 0.0228 | 0.0245 | 0.0224 | 0.018  | 0.0219 |
| 5.817  | 4.597  | 4.687  | 4.682  | 4.586  | 4.564  | 5.377  | 4.647  | 5.583  | 5.253  | 5.024  | 5.842  | 4.568  | 5.162  | 5.065  |
| 5.775  | 4.590  | 4.335  | 4.900  | 4.845  | 4.630  | 3.135  | 3.400  | 3.250  | 3.590  | 2.925  | 3.000  | 3.275  | 3.210  | 2.955  |
| 5.190  | 4.650  | 4.290  | 4.990  | 4.875  | 4.580  | 3.135  | 3.390  | 3.290  | 3.655  | 3.170  | 3.205  | 3.250  | 3.315  | 2.950  |
| 5.840  | 4.405  | 4.215  | 4.980  | 4.815  | 4.470  | 3.145  | 3.410  | 3.270  | 3.540  | 3.360  | 3.175  | 3.285  | 3.300  | 2.975  |
| 5.602  | 4.548  | 4.280  | 4.957  | 4.845  | 4.560  | 3.138  | 3.400  | 3.270  | 3.595  | 3.152  | 3.127  | 3.270  | 3.275  | 2.960  |
| 3.085  | 3.330  | 3.180  | 3.380  | 3.125  | 2.905  | 3.630  | 3.715  | 4.105  | 3.615  | 4.085  | 4.400  | 4.970  | 5.005  | 3.665  |
| 3.130  | 3.290  | 3.210  | 3.665  | 3.065  | 2.880  | 3.620  | 3.725  | 4.125  | 3.625  | 3.975  | 4.225  | 4.995  | 5.450  | 3.800  |
| 3.145  | 3.525  | 3.450  | 3.360  | 3.050  | 2.845  | 3.635  | 3.690  | 4.100  | 3.555  | 3.990  | 4.010  | 5.015  | 5.380  | 3.735  |
| 3.120  | 3.382  | 3.280  | 3.468  | 3.080  | 2.877  | 3.628  | 3.710  | 4.110  | 3.598  | 4.017  | 4.212  | 4.993  | 5.278  | 3.733  |
| x      | x      | x      | x      | x      | x      | x      | x      | x      | x      | x      | x      | x      | x      | x      |

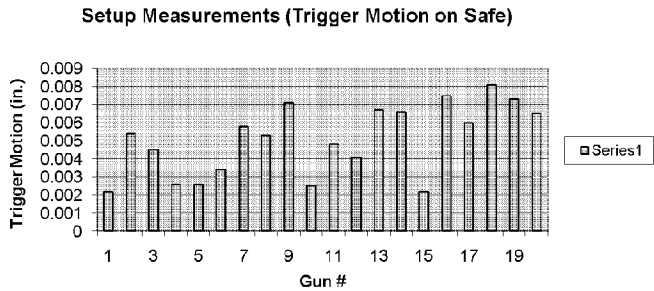
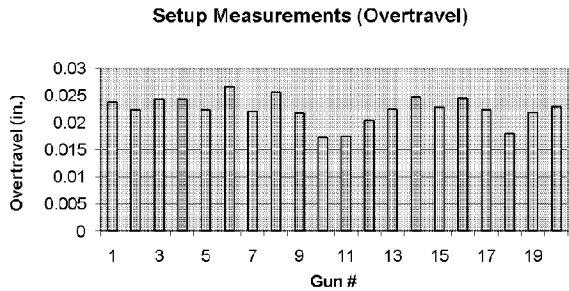
|          |
|----------|
| A-20     |
| 71398641 |
| 30.06    |
| 0.0271   |
| 0.0061   |
| 0.022    |
| 4.317    |

|      |
|------|
| A-20 |
| 3    |
| x    |
| 4    |

|        |
|--------|
| A-20   |
| 0.0281 |
| 0.0276 |
| 0.0278 |
| 0.0278 |
| 0.0065 |
| 0.0229 |
| 5.566  |
| 3.135  |
| 3.145  |
| 3.140  |
| 3.140  |
| 4.005  |
| 4.150  |
| 4.110  |
| 4.088  |
| x      |









TLW 2355 - F (Function & Endurance)

Date: 11/13/07

Technician: Jeff Wade & Bob Lee

|                   |      |      |      |      |      |      |      |
|-------------------|------|------|------|------|------|------|------|
| Gun I.D. #        | A-11 | A-12 | A-13 | A-14 | A-15 | A-16 | A-17 |
| Total Round Level | 2000 | 2000 | 2000 | 1000 | 1000 | 1000 | 500  |
| Malfunctions      | 0    | 2    | 2    | 0    | 0    | 0    | 2    |

NOTES:

All guns - Locking lug hitting tip of round in magazine during ejection

A-12 - 2 Missfires

A-13 - Sear did not fall on two occasions. SLS receiver inserts could "pinch" sear and cause it to not fall.

OD of the receiver insert was sanded to eliminate binding. Problem went away.

A-15 - Engagement went high out of viewing window and had to be reset.

Trigger pull went low out of spec and trigger motion on safe went out of spec.

A-16 - Magazine release lever broke at 720 rounds.

A-17 - 2 Missfires

A-20 - 1 Missfire

|      |      |      |
|------|------|------|
| A-18 | A-19 | A-20 |
| 500  | 500  | 500  |
| 0    | 0    | 1    |

## TLW 2355 - G (Inspection)

Initial measurements for reference

| Gun I.D. #             | A-11   | A-12   | A-13   | A-14   | A-15   | A-16   |
|------------------------|--------|--------|--------|--------|--------|--------|
| Round Level            | 0      | 0      | 0      | 0      | 0      | 0      |
| Engagment 1            | 0.0282 | 0.0289 | 0.0297 | 0.0282 | 0.0268 | 0.0279 |
| Engagment 2            | 0.0275 | 0.0288 | 0.0299 | 0.0282 | 0.0267 | 0.0282 |
| Engagment 3            | 0.0273 | 0.0291 | 0.0301 | 0.0286 | 0.0266 | 0.0275 |
| Engagment Avg          | 0.0277 | 0.0289 | 0.0299 | 0.0283 | 0.0267 | 0.0279 |
| Trigger Motion on Safe | 0.0048 | 0.0041 | 0.0067 | 0.0066 | 0.0022 | 0.0075 |
| Overtravel             | 0.0175 | 0.0204 | 0.0225 | 0.0247 | 0.0228 | 0.0245 |
| Trigger Pull           | 5.377  | 4.647  | 5.583  | 5.253  | 5.024  | 5.842  |

\*Torque takedown screws to 50 in\*lbs

Date: 10/31/07

Technician: Bob Lee/Jeff Wade

| Gun I.D. #             | A-11   | A-12   | A-13   | A-14   | A-15   | A-16   |
|------------------------|--------|--------|--------|--------|--------|--------|
| Round Level            | 500    | 500    | 500    | 500    | 500    | 500    |
| Headspace              | 0.005  | 0.005  | 0.005  | 0.005  | 0.006  | 0.005  |
| Engagement 1           | 0.0288 | 0.0290 | 0.0302 | 0.0287 | 0.0290 | 0.0288 |
| Engagement 2           | 0.0292 | 0.0287 | 0.0301 | 0.0293 | 0.0290 | 0.0284 |
| Engagement 3           | 0.0288 | 0.0288 | 0.0300 | 0.0287 | 0.0283 | 0.0286 |
| Engagement Avg         | 0.0289 | 0.0288 | 0.0301 | 0.0289 | 0.0288 | 0.0286 |
| Trigger Motion on Safe | 0.0080 | 0.0039 | 0.0082 | 0.0082 | 0.0052 | 0.0081 |
| Overtravel             | 0.0204 | 0.0209 | 0.0227 | 0.0272 | 0.0230 | 0.0267 |
| Trigger Pull           | 4.512  | 4.431  | 5.377  | 4.840  | 4.592  | 4.726  |

\*All headspace dimensions are MIN +

Date: 11/9/07

Technician: Bob Lee/Jeff Wade

| Gun I.D. #             | A-11   | A-12        | A-13        | A-14        | A-15   | A-16        |
|------------------------|--------|-------------|-------------|-------------|--------|-------------|
| Round Level            | 1000   | 1000        | 1000        | 1000        | 1000   | 1000        |
| Headspace              | 0.005  | 0.005       | 0.005       | 0.005       | 0.006  | 0.005       |
| Engagement 1           | 0.0299 | 0.0292      | 0.0304      | 0.0289      | *OW    | 0.0289      |
| Engagement 2           | 0.0300 | 0.0290      | 0.0302      | 0.0289      | *OW    | 0.0286      |
| Engagement 3           | 0.0298 | 0.0290      | 0.0304      | 0.0288      | *OW    | 0.0287      |
| Engagement Avg         | 0.0299 | 0.029066667 | 0.030333333 | 0.028866667 |        | 0.028733333 |
| Trigger Motion on Safe | 0.0088 | 0.0053      | 0.0060      | 0.0092      | 0.0349 | 0.0106      |
| Overtravel             | 0.0221 | 0.0211      | 0.0237      | 0.0275      | *OS    | 0.0281      |
| Trigger Pull           | 4.600  | 4.190       | 4.670       | 4.868       | 3.802  | 4.670       |

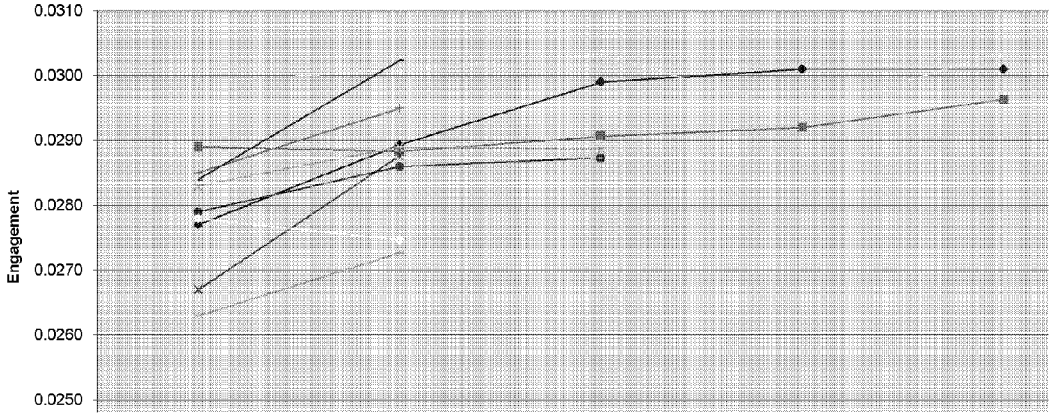
\*OW - Out of viewing window

\*OS - Off screen

Engagement on A-15 was reset to .0254

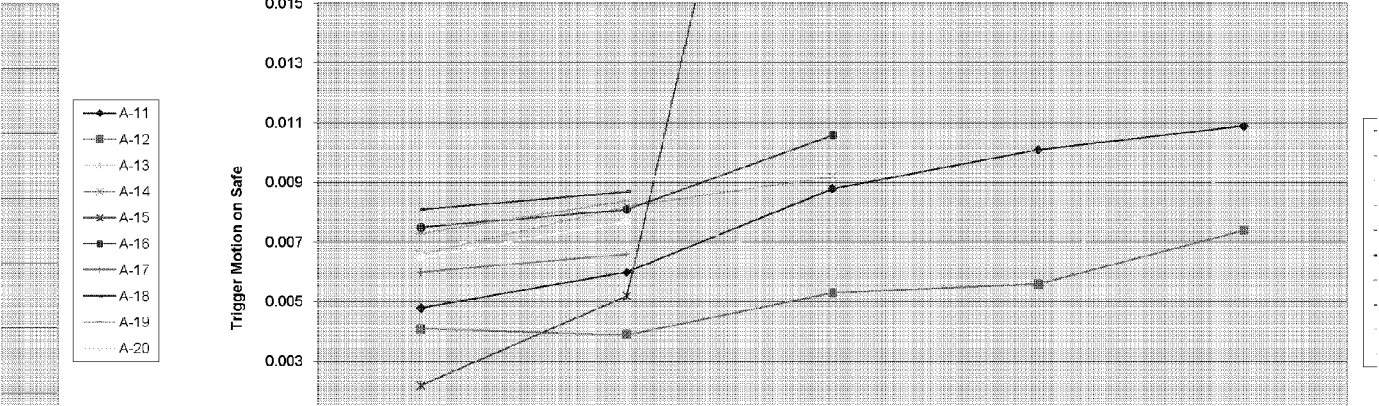
| Data Summary         |        |        |        |                        |             |        |        |        |        |        |        |        |        |  |
|----------------------|--------|--------|--------|------------------------|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--|
| A-17                 | A-18   | A-19   | A-20   | Gun I.D. #             | Round Level | A-11   | A-12   | A-13   | A-14   | A-15   | A-16   | A-17   | A-18   |  |
| 0                    | 0      | 0      | 0      | Engagment              | 0           | 0.0277 | 0.0289 | 0.0299 | 0.0283 | 0.0267 | 0.0279 | 0.0285 | 0.0284 |  |
| 0.0287               | 0.0282 | 0.0261 | 0.0281 |                        | 500         | 0.0289 | 0.0288 | 0.0301 | 0.0289 | 0.0288 | 0.0286 | 0.0295 | 0.0302 |  |
| 0.0283               | 0.0286 | 0.0263 | 0.0276 |                        | 1000        | 0.0299 | 0.0291 | 0.0303 | 0.0289 |        | 0.0287 |        |        |  |
| 0.0286               | 0.0284 | 0.0266 | 0.0278 |                        | 1500        | 0.0301 | 0.0292 | 0.0294 |        |        |        |        |        |  |
| 0.0285               | 0.0284 | 0.0263 | 0.0278 |                        | 2000        | 0.0301 | 0.0296 | 0.0304 |        |        |        |        |        |  |
| 0.0060               | 0.0081 | 0.0073 | 0.0065 | Trigger Motion on Safe | 0           | 0.0048 | 0.0041 | 0.0067 | 0.0066 | 0.0022 | 0.0075 | 0.0060 | 0.0081 |  |
| 0.0224               | 0.018  | 0.0219 | 0.0229 |                        | 500         | 0.0060 | 0.0039 | 0.0082 | 0.0082 | 0.0052 | 0.0081 | 0.0066 | 0.0087 |  |
| 4.568                | 5.162  | 5.065  | 5.566  |                        | 1000        | 0.0088 | 0.0053 | 0.0060 | 0.0092 | 0.0349 | 0.0106 |        |        |  |
|                      |        |        |        |                        | 1500        | 0.0101 | 0.0056 | 0.0063 |        |        |        |        |        |  |
|                      |        |        |        |                        | 2000        | 0.0109 | 0.0074 | 0.0095 |        |        |        |        |        |  |
|                      |        |        |        | Overtravel             | 0           | 0.0175 | 0.0204 | 0.0225 | 0.0247 | 0.0228 | 0.0245 | 0.0224 | 0.018  |  |
|                      |        |        |        |                        | 500         | 0.0204 | 0.0209 | 0.0227 | 0.0272 | 0.0230 | 0.0267 | 0.0264 | 0.0229 |  |
|                      |        |        |        |                        | 1000        | 0.0221 | 0.0211 | 0.0237 | 0.0275 |        | 0.0281 |        |        |  |
|                      |        |        |        |                        | 1500        | 0.0212 | 0.0229 | 0.0245 |        |        |        |        |        |  |
| A-17                 | A-18   | A-19   | A-20   |                        | 2000        | 0.022  | 0.0227 | 0.0234 |        |        |        |        |        |  |
| 500                  | 500    | 500    | 500    | Trigger Pull           | 0           | 5.377  | 4.647  | 5.583  | 5.253  | 5.024  | 5.842  | 4.568  | 5.182  |  |
| 0.006                | 0.004  | 0.005  | 0.004  |                        | 500         | 4.512  | 4.431  | 5.377  | 4.840  | 4.592  | 4.726  | 4.422  | 4.579  |  |
| 0.0296               | 0.0309 | 0.0271 | 0.0276 |                        | 1000        | 4.600  | 4.190  | 4.670  | 4.868  | 3.802  | 4.670  |        |        |  |
| 0.0294               | 0.0301 | 0.0275 | 0.0271 |                        | 1500        | 4.791  | 4.726  | 5.361  |        |        |        |        |        |  |
| 0.0295               | 0.0297 | 0.0272 | 0.0277 |                        | 2000        | 4.450  | 4.346  | 5.416  |        |        |        |        |        |  |
| 0.0295               | 0.0302 | 0.0273 | 0.0275 |                        |             |        |        |        |        |        |        |        |        |  |
| 0.0036               | 0.0087 | 0.0084 | 0.0077 |                        |             |        |        |        |        |        |        |        |        |  |
| 0.0264               | 0.0229 | 0.0229 | 0.0185 |                        |             |        |        |        |        |        |        |        |        |  |
| 4.422                | 4.579  | 4.579  | 5.001  |                        |             |        |        |        |        |        |        |        |        |  |
| Function & Endurance |        |        |        |                        |             |        |        |        |        |        |        |        |        |  |

Function & Endurance



| A-19   | A-20   |
|--------|--------|
| 0.0263 | 0.0278 |
| 0.0273 | 0.0275 |
|        |        |
|        |        |
| 0.0073 | 0.0065 |
| 0.0084 | 0.0077 |
|        |        |
|        |        |
| 0.0219 | 0.0229 |
| 0.0229 | 0.0185 |
|        |        |
|        |        |
| 5.065  | 5.566  |
| 4.579  | 5.001  |
|        |        |
|        |        |

Function & Endurance



---

|   |      |
|---|------|
| ◆ | A-11 |
| ■ | A-12 |
| □ | A-13 |
| ✱ | A-14 |
| ✱ | A-15 |
| ● | A-16 |
| + | A-17 |
| — | A-18 |
| — | A-19 |
| — | A-20 |

Date: 11/12/07

Technician: Bob Lee/Jeff Wade

| Gun I.D. #             | A-11   | A-12   | A-13        |
|------------------------|--------|--------|-------------|
| Round Level            | 1500   | 1500   | 1500        |
| Headspace              | 0.006  | 0.005  | 0.005       |
| Engagement 1           | 0.0302 | 0.0293 | 0.0293      |
| Engagement 2           | 0.0301 | 0.0292 | 0.0295      |
| Engagement 3           | 0.0300 | 0.0291 | 0.0295      |
| Engagement Avg         | 0.0301 | 0.0292 | 0.029433333 |
| Trigger Motion on Safe | 0.0101 | 0.0056 | 0.0063      |
| Overtravel             | 0.0212 | 0.0229 | 0.0245      |
| Trigger Pull           | 4.791  | 4.726  | 5.361       |

Notes: Side plate screw loose on A-12. Retightened

Date: 11/14/07

Technician: Bob Lee/Jeff Wade

| Gun I.D. #             | A-11   | A-12        | A-13        |
|------------------------|--------|-------------|-------------|
| Round Level            | 2000   | 2000        | 2000        |
| Headspace              | 0.006  | 0.005       | 0.005       |
| Engagement 1           | 0.0301 | 0.0296      | 0.0303      |
| Engagement 2           | 0.0302 | 0.0297      | 0.0303      |
| Engagement 3           | 0.0300 | 0.0296      | 0.0305      |
| Engagement Avg         | 0.0301 | 0.029633333 | 0.030366667 |
| Trigger Motion on Safe | 0.0109 | 0.0074      | 0.0095      |
| Overtravel             | 0.022  | 0.0227      | 0.0234      |
| Trigger Pull           | 4.450  | 4.346       | 5.416       |

**RETEST OF A-15**

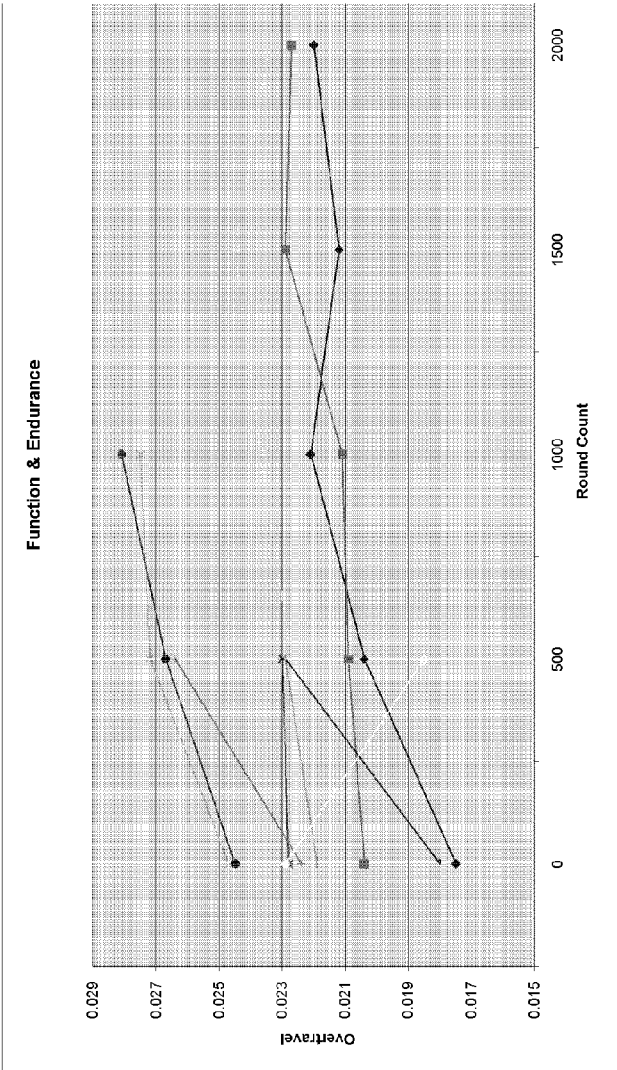
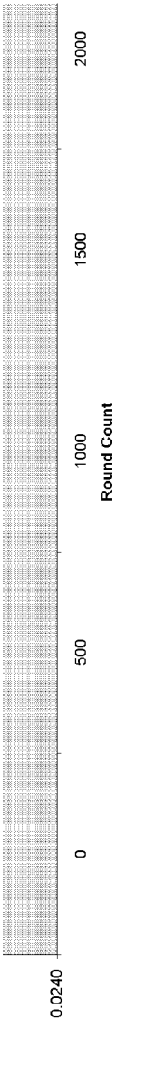
Date: 11/16/07

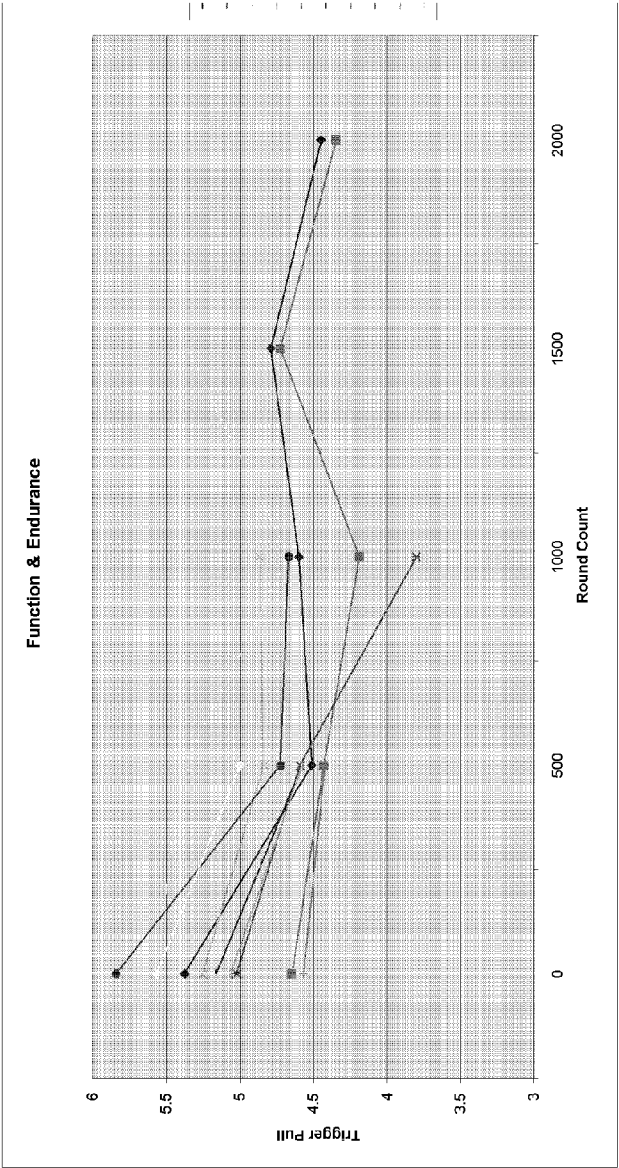
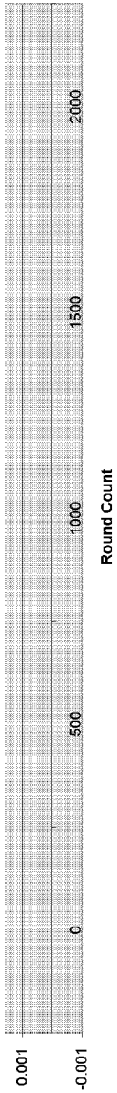
Technician: Jeff Wade

| Gun I.D. #             | A-15   | A-15   | A-15   | A-15  |
|------------------------|--------|--------|--------|-------|
| Round Level            | start  | 1100   | reset  | 1200  |
| Engagement             | 0.0286 | 0.0351 | 0.0273 | *OW   |
| Trigger Motion on Safe | 0.0078 | 0.0128 | 0.0078 | N/A   |
| Overtravel             | 0.0276 | 0.0253 | 0.0253 | N/A   |
| Trigger Pull           | 4.548  | 4.179  | 4.594  | 3.601 |

\*OW - Out of viewing window

11/19/07 - fire control was disassembled and inspected. No black max loctite was on the adjustment screws. Lack of black max loctite was the likely contributor to the adjustment screws moving during function & endurance. VBN





- A-11
- A-12
- A-13
- A-14
- A-15
- A-16
- A-17
- A-18
- A-19
- A-20

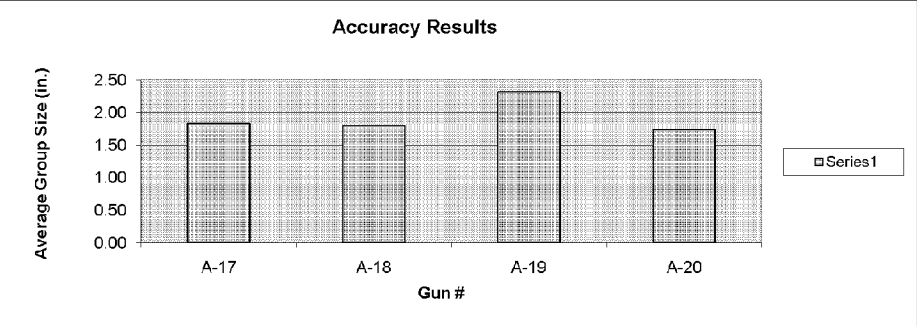
A-11  
A-12  
A-13  
A-14  
A-15  
A-16  
A-17  
A-18  
A-19  
A-20

TLW 2355 - E (Accuracy)

Date: 11/15/07  
Technician: Jonathan Sims

|               |       |       |       |       |
|---------------|-------|-------|-------|-------|
| Gun I.D. #    | A-17  | A-18  | A-19  | A-20  |
| Caliber       | 30-06 | 30-06 | 30-06 | 30-06 |
| Group #1      | 1.60  | 1.45  | 2.45  | 2.20  |
| Group #2      | 2.10  | 1.70  | 2.10  | 2.00  |
| Group #3      | 1.80  | 2.25  | 2.40  | 1.00  |
| Group Average | 1.83  | 1.80  | 2.32  | 1.73  |

Three - Five shot groups per gun  
\*All guns were shot using Remington Express Core-Lokt, 180 GR R30065  
Lot #D29 HB1

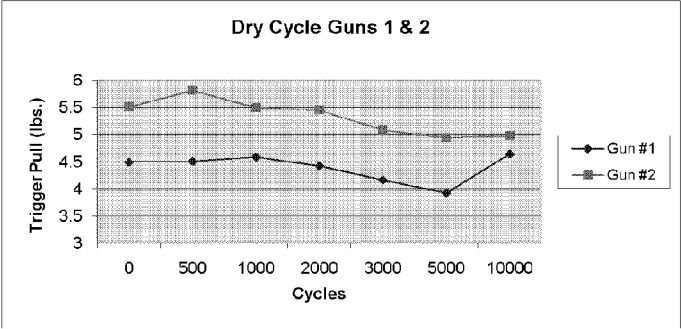
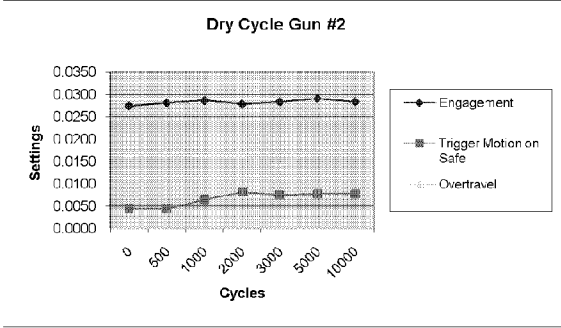
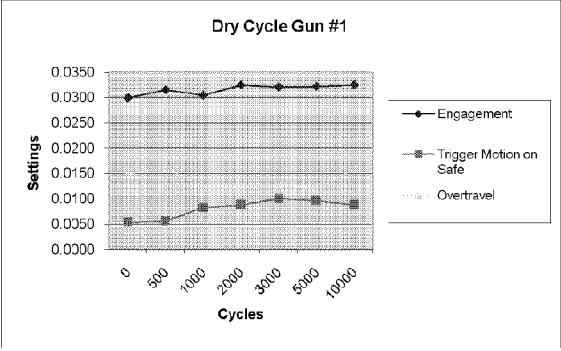


TLW 2355 - Q (Dry Cycle)

Date: October 26, 2007  
Technician: Cody Greenwell/Vince Norton

|                        |          |        |        |        |        |        |        |
|------------------------|----------|--------|--------|--------|--------|--------|--------|
| Gun I.D. #             | 1        |        |        |        |        |        |        |
| Serial #               | 71250971 |        |        |        |        |        |        |
| Cycles                 | 0        | 500    | 1000   | 2000   | 3000   | 5000   | 10000  |
| Engagment              | 0.0300   | 0.0315 | 0.0305 | 0.0325 | 0.0321 | 0.0322 | 0.0325 |
| Trigger Motion on Safe | 0.0054   | 0.0057 | 0.0063 | 0.0089 | 0.0101 | 0.0097 | 0.0089 |
| Overtravel             | 0.015    | 0.0161 | 0.0124 | 0.0122 | 0.013  | 0.012  | 0.016  |
| Trigger Pull           | 4.498    | 4.511  | 4.589  | 4.429  | 4.165  | 3.929  | 4.647  |

|                        |          |        |        |        |        |        |        |
|------------------------|----------|--------|--------|--------|--------|--------|--------|
| Gun I.D. #             | 2        |        |        |        |        |        |        |
| Serial #               | 71250948 |        |        |        |        |        |        |
| Cycles                 | 0        | 500    | 1000   | 2000   | 3000   | 5000   | 10000  |
| Engagment              | 0.0275   | 0.0282 | 0.0287 | 0.0279 | 0.0284 | 0.0291 | 0.0284 |
| Trigger Motion on Safe | 0.0045   | 0.0045 | 0.0066 | 0.0082 | 0.0076 | 0.0078 | 0.0078 |
| Overtravel             | 0.0165   | 0.017  | 0.016  | 0.016  | 0.014  | 0.018  | 0.018  |
| Trigger Pull           | 5.509    | 5.814  | 5.499  | 5.454  | 5.084  | 4.943  | 4.981  |



TLW 2355 - M (Jar-Off)

Date: November 9, 2007  
Technician: Jeff Wade

|                        |          |          |          |          |          |          |          |
|------------------------|----------|----------|----------|----------|----------|----------|----------|
| Gun I.D. #             | A-1      | A-2      | A-3      | A-4      | A-5      | A-6      | A-7      |
| Gun Serial #           | 71378965 | 71378778 | 71378875 | 71378780 | 71378750 | 71401901 | 71402850 |
| Caliber                | 243 WIN  | 243 WIN  | 243 WIN  | 243 WIN  | 243 WIN  | 7mm RM   | 7mm RM   |
| Engagement at start    | 0.0255   | 0.0258   | 0.0259   | 0.0259   | 0.026    | 0.0255   | 0.0273   |
| Engagement at end      | 0.0253   | 0.0256   | 0.0256   | 0.0259   | N/A      | 0.0253   | 0.0280   |
| Trigger Pull at start  | 4.552    | 4.58     | 4.591    | 4.582    | 4.582    | 4.597    | 4.584    |
| Trigger Pull at end    | 4.586    | 5.289    | 4.570    | 4.572    | 4.16     | 4.610    | 3.710    |
| SAAMI Jar-Off (2355-M) | Pass     | Pass     | Pass     | Pass     | *Fail    | Pass     | *Fail    |

\*A-5, A-7 & A-10 - Failed Barrel Horizontal, Bottom of Stock Down because of trigger pull out of spec low  
Trigger pull was reset to specification and retested

RETEST

Date: November 9, 2007  
Technician: Jeff Wade

|                        |          |          |          |
|------------------------|----------|----------|----------|
| Gun I.D. #             | A-5      | A-7      | A-10     |
| Gun Serial #           | 71378750 | 71402850 | 71403158 |
| Caliber                | 243 WIN  | 7mm RM   | 7mm RM   |
| Engagement at start    | 0.0258   | 0.0280   | 0.0287   |
| Engagement at end      | 0.0256   | 0.0281   | 0.0283   |
| Trigger Pull at start  | 4.589    | 4.636    | 4.806    |
| Trigger Pull at end    | 4.291    | 4.401    | 4.645    |
| SAAMI Jar-Off (2355-M) | Pass     | Pass     | Pass     |

TLW 2355 - N (Rotation)

Date: November 9, 2007  
Technician: Jeff Wade

|                         |          |          |          |          |          |          |          |
|-------------------------|----------|----------|----------|----------|----------|----------|----------|
| Gun I.D. #              | A-1      | A-2      | A-3      | A-4      | A-5      | A-6      | A-7      |
| Gun Serial #            | 71378965 | 71378778 | 71378875 | 71378780 | 71378750 | 71401901 | 71402850 |
| Caliber                 | 243 WIN  | 243 WIN  | 243 WIN  | 243 WIN  | 243 WIN  | 7mm RM   | 7mm RM   |
| Engagement at start     | 0.0253   | 0.0256   | 0.0256   | 0.0259   | 0.0256   | 0.0253   | 0.0281   |
| Engagement at end       | 0.0252   | 0.0253   | 0.0256   | 0.0266   | 0.0255   | 0.0253   | 0.0282   |
| Trigger Pull at start   | 4.586    | 4.659    | 4.57     | 4.572    | 4.593    | 4.610    | 4.748    |
| Trigger Pull at end     | 4.889    | 4.558    | 4.406    | 4.564    | 4.805    | 4.660    | 4.652    |
| SAAMI Rotation (2355-N) | Pass     | Pass     | Pass     | Pass     | Pass     | Pass     | Pass     |

TLW 2355 - O (Drop)

Date: November 9, 2007  
Technician: Jeff Wade

|                     |          |          |          |          |          |          |          |
|---------------------|----------|----------|----------|----------|----------|----------|----------|
| Gun I.D. #          | A-1      | A-2      | A-3      | A-4      | A-5      | A-6      | A-7      |
| Gun Serial #        | 71378965 | 71378778 | 71378875 | 71378780 | 71378750 | 71401901 | 71402850 |
| Caliber             | 243 WIN  | 243 WIN  | 243 WIN  | 243 WIN  | 243 WIN  | 7mm RM   | 7mm RM   |
| Engagement at start | 0.0252   | 0.0253   | 0.0256   | 0.0255   | 0.0255   | 0.0253   | 0.0282   |
| Engagement at end   | 0.0253   | 0.0252   | 0.0259   | 0.0256   | 0.0257   | N/A      | 0.0281   |

| A-8      | A-9      | A-10     |
|----------|----------|----------|
| 71403009 | 71403014 | 71403158 |
| 7mm RM   | 7mm RM   | 7mm RM   |
| 0.0277   | 0.0260   | 0.0261   |
| 0.0280   | 0.0263   | 0.0287   |
| 4.682    | 4.586    | 4.564    |
| 4.609    | 4.557    | 3.086    |
| Pass     | Pass     | *Fail    |

| A-8      | A-9      | A-10     |
|----------|----------|----------|
| 71403009 | 71403014 | 71403158 |
| 7mm RM   | 7mm RM   | 7mm RM   |
| 0.026    | 0.0263   | 0.0283   |
| 0.0281   | 0.0263   | 0.0277   |
| 4.609    | 4.557    | 4.645    |
| 4.691    | 4.615    | 4.973    |
| Pass     | Pass     | Pass     |

| A-8      | A-9      | A-10     |
|----------|----------|----------|
| 71403009 | 71403014 | 71403158 |
| 7mm RM   | 7mm RM   | 7mm RM   |
| 0.0281   | 0.0263   | 0.0277   |
| 0.0280   | 0.0262   | N/A      |

|                          |       |       |       |       |       |       |       |
|--------------------------|-------|-------|-------|-------|-------|-------|-------|
| Trigger Pull at start    | 4.571 | 4.558 | 4.553 | 4.564 | 4.605 | 4.660 | 4.652 |
| Trigger Pull at end      | 5.172 | 3.794 | 4.404 | 4.255 | 4.803 | 4.660 | 4.807 |
| SAAMI Drop Test (2355-O) | Pass  | Pass  | Pass  | *Fail | Pass  | *Fail | Pass  |

\*A-4, A-6 & A-10 - Failed Barrel Horizontal, Bottom of Stock Up because of broken insert  
Broken inserts were replaced and retested

RETEST

Date: November 9, 2007

Technician: Jeff Wade

|                          |          |          |          |
|--------------------------|----------|----------|----------|
| Gun I.D. #               | A-4      | A-6      | A-10     |
| Gun Serial #             | 71378780 | 71401901 | 71403158 |
| Caliber                  | 243 WIN  | 7mm RM   | 7mm RM   |
| Engagement at start      | 0.0251   | 0.0259   | 0.0254   |
| Engagement at end        | 0.025    | 0.0282   | 0.0255   |
| Trigger Pull at start    | 4.616    | 4.575    | 4.563    |
| Trigger Pull at end      | 5.338    | 4.608    | 4.714    |
| SAAMI Drop Test (2355-O) | Pass     | Pass     | Pass     |

|       |       |       |
|-------|-------|-------|
| 4.691 | 4.615 | 4.579 |
| 4.208 | 4.408 | 4.621 |
| Pass  | Pass  | *Fail |

TLW 2355 - P (SAAMI Safety Operation Test - 40 lb. Trigger Pull Test)

Date: 11/15/07

Technician: Jeff Wade

|                          |          |          |          |
|--------------------------|----------|----------|----------|
| Gun I.D. #               | A-11     | A-12     | A-13     |
| Gun Serial #             | 71288216 | 71388277 | 71389036 |
| Caliber                  | 30-06    | 30-06    | 30-06    |
| 40 lb. Trigger Pull Test | Pass     | Pass     | Pass     |

TLW 2355 - H (Dynamic Sand and Dust Test)

Date: 11/15/07

Technician: Jeff Wade

|                  |      |      |
|------------------|------|------|
| Gun I.D. #       | A-14 | A-16 |
| Dust/Debris Test | Pass | Pass |

500 ml, 75 PSI

15 live rounds per gun, 3 magazines

1 in chamber & 4 in magazine

TLW 2355 - I (Hot Test)

Date: 11/16/07

Technician: Bob Lee

|            |      |      |
|------------|------|------|
| Gun I.D. # | A-17 | A-18 |
| Hot Test   | Pass | Pass |

TLW 2355 - J (Cold Test)

Date: 11/16/07

Technician: Bob Lee

|            |      |      |
|------------|------|------|
| Gun I.D. # | A-19 | A-20 |
| Cold Test  | Pass | Pass |

TLW 2355 - K (Salt Fog Test)

Date: 11/26/07

Technician: Jeff Wade

|                      |           |             |
|----------------------|-----------|-------------|
| Gun I.D. #           | A-17      | A-18        |
| Salt Fog Test        | Complete  | Complete    |
| Hours in Chamber     | 22        | 24          |
| Condition in Chamber | Bolt Open | Bolt Closed |



TLW 2355 - L (Metallurgical Check of Triggers)

Date: 12/2/07

Engineer: Jim Urbon

|            |      |
|------------|------|
| Gun I.D. # | A-15 |
|------------|------|

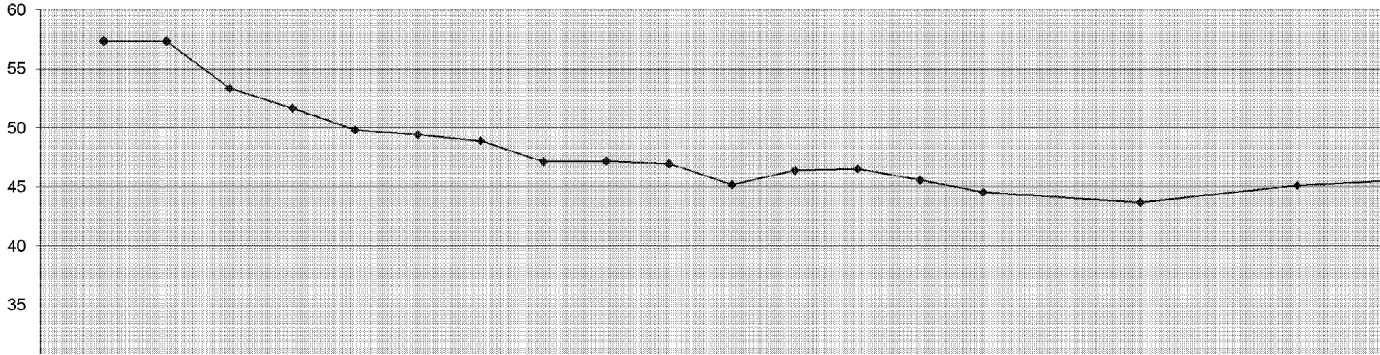
|                               |  |
|-------------------------------|--|
| Microhardness                 |  |
| Sample Prep                   |  |
| Distance from surface, inches |  |
| 0.002                         |  |
| 0.004                         |  |
| 0.006                         |  |
| 0.008                         |  |
| 0.010                         |  |
| 0.012                         |  |
| 0.014                         |  |
| 0.016                         |  |
| 0.018                         |  |
| 0.020                         |  |
| 0.022                         |  |
| 0.024                         |  |
| 0.026                         |  |
| 0.028                         |  |
| 0.030                         |  |
| 0.035                         |  |
| 0.040                         |  |
| 0.045                         |  |
| 0.050                         |  |

Hardness, HRC

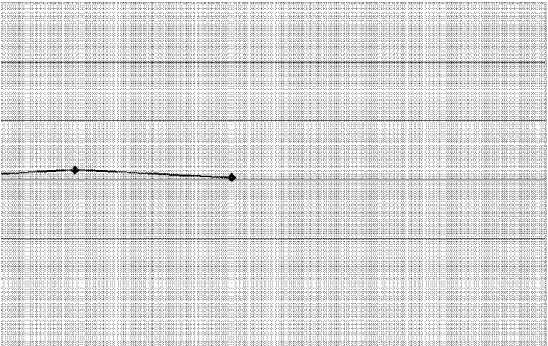
The trigger from gun A15 was sectioned, mounted, and polished for case depth analysis. The sear engagement end of the trigger was sectioned off and mounted laying on its side. This section was then ground to mid plane. A series for microhardness indents were ran from the top of the trigger 0.050" back from the front corner of the trigger.

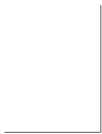
Hardness, HV

640  
640  
566  
539  
511  
505  
497  
473  
474  
471  
448  
463  
465  
453  
441  
431  
448  
456  
449



Hardness,  
HRc  
57.36136246  
57.3546524  
53.38171005  
51.69266129  
49.85006332  
49.45893097  
48.93291092  
47.17050552  
47.21231842  
46.96577454  
45.20535278  
46.40042114  
46.54471207  
45.59615326  
44.56656647  
43.7048912  
45.14130402  
45.8584404  
45.23184967





Observations



The HRc 50 case depth is about 0.010" at the location measured.  
The core hardness at a depth of 0.050" is about HRc 45.  
The vendor clames that the triggers were made from low carbon steel.  
Remington had the triggers carburized.  
I checked the hardness on the side of the trigger. The hardness was HRc 48.1 and HR15n 89.3.  
The high core hardness is more like that of a medium carbon alloy steel like AISI 4140.

