Franz, Scott

From:
Sent:
To:
Cc:
Subject:

Test Summary w/ Supporting e-mails

Ed / Mike,
Etown Test supports th[illegible] nt on a process review by
Mayfield to bring a dim[illegible] ength of the 2deg30min ground
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Mayfield further reque[illegible] an eight gun / 100 round test
Etown Test believes th[illegible]

It should further be no[illegible] unction performance was flawless
!!!!
Dale

-----Original Message-----
From: Franz[illegible]
Sent: Thurs[illegible]
To: Danne[illegible]
Subject: M/71[illegible]

710Report-TLW082 2.doc

Dale,
Summary a[illegible] ions/comments!!!

Thanks,
Scott

Franz, Scott

From: Danner, Dale
Sent: Thursday, April 11, 2002 10:43 AM
To: Thweatt, Ed T.; Keeney, Mike
Cc: Golemboski, Matt R.; Trull, John; Diaz, Danny; Franz, Scott
Subject: M/710 "Holeless" Connector Test

Ed / Mike,
Etown Test supports the change to a "holeless" connector design for the M/710 contingent on a process review by Mayfield to bring a dimensional issue on the connector back to model dimensions. The length of the 2deg30min ground surface is specified to be 0.075+/-0.025 while one of two measured connectors was outside the specification at 0.118. While the specification is not believed to have a material effect on the performance of the firecontrol as a whole it is none-the-less an out of tolerance dimension which should be addressed via process or re-specification.

Mayfield further requested an audit of a tempered scope rail mounting screw. Based on an eight gun / 100 round test Etown Test believes there to be no issue with the use of this tempered screw.

It should further be noted that through 100 rounds each on nine different guns feed malfunction performance was flawless !!!!
Dale

-----Original Message-----
From: Franz, Scott
Sent: Thursday, April 11, 2002 9:21 AM
To: Danner, Dale
Subject: M/710 "Holeless" Connector Test

710Report-TLW082
2.doc

Dale,
Summary attached for recent 710 testing. Let me know if you have any questions/comments!!!

Thanks,
Scott

Remington Arms Company Inc.
Research & Development Technical Center
315 West Ring Road
Elizabethtown, KY 42701

M/710 Testing
"Holeless" Connector and Tempered Scope Mount Screw Test

Description:

Mayfield and E-town Firearm Design personnel proposed eliminating the hole in the connector for the M/710 since it serves no function in this model. This simplifies manufacture and results in a less expensive part. Mayfield and E-town Test jointly agreed on a 15 gun test where 8 rifles would be built in .30-06 caliber and 7 in .270 Win. Caliber. About this same time Mayfield had a need to test a heat treat change to the scope mount screws also used on the 710. It was decided to test both of these changes concurrently.

A test outline was agreed to that consisted of the following measurements and tests:

- **Measurements as Rec'd (All 15 guns)**
  - **Trigger Pull (spec. is 4.0 – 5.5 lbs.)**
  - **Engagement (spec. is .020 - .025 in.)**
  - **Over travel (spec. is .20 - .025 in.)**
  - **Headspace**
- **Proof and Re-measure Headspace (All 15 guns)**
- **SAAMI Jar-Off, Drop Rotation (6 guns: 3 of each cal. chosen at random)**
  - **Drop with scopes mounted (Use std. Screws)**
  - **Set fire controls to process minimums**
    TRIGGER PULL: 4.0 lbs.
    ENGAGEMENT: 0.020 in.
- **Extended SAAMI Jar-Off Only (same 6 guns) – <u>For Information Only</u>**
  - **Drop with scopes mounted (Use std. Screws)**
  - **Set fire controls to process minimums**
    TRIGGER PULL: 4.0 lbs.
    ENGAGEMENT: 0.020 in.
- **100 Rd. Jack Fcn. Test (9 guns)**
  - Shoot with scopes mounted on 8 guns, 9th gun has no scope mounted
    - Use special mount screws provided (tempered screws)
    - Use Loctite 222MS and torque screws to 15 – 20 in. lb.
  - Fire 100 rds/gun, heavy shooting jacks (any ammo-note what's used)
  - Track malfunctions
  - Pay special attention to fire control function and feel
  - Cycle Safety from Fire to Safe every feeding cycle
  - Check Scope mount screws for tightness after firing 100 rds
  - Remove and inspect screws for cracks after firing

Remington Arms Company Inc.
Research & Development Technical Center
315 West Ring Road
Elizabethtown, KY 42701

Test Summary:

All required phases of testing were completed successfully, with no issues or problems encountered. A summary of results follows for each measurement and test. These results are average or overall numbers for all guns combined. Individual gun results and measurements are available upon request. This data will be stored in the Test Lab Central Files under TLW 0822.

A number of individual gun measurements were measured as Out of Specification for Trigger Pull, Engagement and Over Travel. The actual values noted for these guns are included below for reference purposes. One gun was out on Trigger Pull (under 4.0 lbs.) as measured with E-town's Spring Scale. The value noted is within a range that can be considered measurement error or site to site variation as determined by a recent study on Trigger Pull done by Brian Rages. This further emphasizes the need to refine Trigger Pull measurement methods at the manufacturing sites. The two guns measured out for Engagement were less than .001" over the Max. specification, again arguably within the range of measurement error. This same comment holds for the guns just out for Over Travel.

After testing two guns fire controls were disassembled so that critical dimensions could be checked on the Connectors. All dimensions checked were within specification on these two parts except for the .075" +/-.025" characteristic on one part. This was measured as .118". The angle that corresponds to this surface (2° 30' +/-30') was within specification on both parts. This measurement was checked on E-towns MicroVu system. Since this is a difficult measurement to make and it is not consistent with Mayfield's inspection method E-town encourages Mayfield to check this operation for conformance to specification.

Test Results:

- **Measurements as Rec'd (All 15 guns)**
  - **Trigger Pull (spec. is 4.0 – 5.5 lbs.)**
    - **Avg. = 4.82 lbs.**
    - **Std. Dev. = .41 lbs.**
    - **One gun Measured out of Spec. – Was 3.67 lbs.**
  - **Engagement (spec. is .020 - .025 in.)**
    - **Avg. = .024 in.**
    - **Std. Dev. = .001 in.**
    - **2 guns Measured Out of Spec. – Both at .0258 in.**

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- **Over travel (spec. is .20 - .025 in.)**
  - **Avg. = .021 in.**
  - **Std. Dev. = .002**
  - **6 Guns Measured Out of Spec. – All .001" or less under Min. Spec.**
- **Headspace**
  - **As Rec'd – Avg. = Min. +.002"**
  - **After 1 Proof Rd. – Avg. = Min. + .003"**
  - **Growth = .001"**

- **SAAMI Jar-Off, Drop Rotation (6 guns: 3 of each cal. chosen at random)**
  - **All 6 Guns Passed**
    - **Dropped with scopes mounted (Used std. Screws)**
    - **Set fire controls to process minimums**
      - TRIGGER PULL: 4.0 lbs.
      - ENGAGEMENT: 0.020 in.
- **Extended SAAMI Jar-Off (same 6 guns) – For Information Only**
  - **3 Guns Passed all Drops**
  - **3 guns fired at 48" – Bbl. horizontal with barrel down**
    - **Dropped with scopes mounted (Used std. Screws)**
    - **Set fire controls to process minimums**
      - TRIGGER PULL: 4.0 lbs.
      - ENGAGEMENT: 0.020 in.
- **100 Rd. Jack Fcn. Test (9 guns)**
  - Shot with scopes mounted on 8 guns, 9th gun had no scope mounted
    - Used special mount screws provided (tempered screws)
    - Used Loctite 222MS and torqued screws to 15 – 20 in. lb.
  - Fired 100 rds/gun, heavy shooting jacks (ammo types noted on sheets)
    - Fired five .30-06 Cal. and four .270 Win. Cal. guns
    - **No Malfunctions – 0 % in 900 rds. of shooting**
  - Paid special attention to fire control function and feel – **No Issues**
  - Cycled Safety from Fire to Safe every feeding cycle - **No Issues**
  - Checked Scope mount screws for tightness after firing 100 rds/gun
    - **No Loosening of screws**
  - Removed and inspected screws after firing
    - **No Issues**

Franz, Scott

From: Danner, Dale
Sent: Monday, April 29, 2002 8:25 AM
To: Franz, Scott
Subject: RE: M/710 "Holeless" Connector Test

Not to my knowledge. . . Dale

-----Original Message-----
From: Franz, Scott
Sent: Friday, April 26, 2002 2:37 PM
To: Danner, Dale; Thweatt, Ed T.; Keeney, Mike
Cc: Golemboski, Matt R.; Trull, John; Diaz, Danny
Subject: RE: M/710 "Holeless" Connector Test

Matt/Ed,
I know Mike wants to transmit this along with some other changes. Has the process review/control of the angle dimension been completed??

-----Original Message-----
From: Danner, Dale
Sent: Thursday, April 11, 2002 10:43 AM
To: Thweatt, Ed T.; Keeney, Mike
Cc: Golemboski, Matt R.; Trull, John; Diaz, Danny; Franz, Scott
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Mayfield further requested an audit of a tempered scope rail mounting screw. Based on an eight gun / 100 round test Etown Test believes there to be no issue with the use of this tempered screw.

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From: Franz, Scott
Sent: Thursday, April 11, 2002 9:21 AM
To: Danner, Dale
Subject: M/710 "Holeless" Connector Test

<< File: 710Report-TLW0822.doc >>
Dale,
Summary attached for recent 710 testing. Let me know if you have any questions/comments!!!

Thanks,
Scott

Franz, Scott

From: Danner, Dale
Sent: Thursday, May 02, 2002 10:29 AM
To: Thweatt, Ed T.
Cc: Franz, Scott; Davidson, Harold E.
Subject: RE: M/710 "Holeless" Connector Test

Great Ed -- Thks for the review. . . . We will forward the DCR on the connector immediately. . . Thks, Dale

-----Original Message-----
From: Thweatt, Ed T.
Sent: Wednesday, May 01, 2002 10:18 AM
To: Franz, Scott; Danner, Dale; Keeney, Mike
Cc: Golemboski, Matt R.; Trull, John; Diaz, Danny
Subject: RE: M/710 "Holeless" Connector Test

The process review of the "no hole" connector issue indicates we completed about 20 pieces as specials for testing. The parts you received were not processed with normal production practices and a failure to gauge this feature did occur. We do have procedures for specials to be followed within our facility and this feature should have been gauged.

Further investigation of the production process, showed all connectors to have a grind mark with a slight angle. When measured, one side of the grind could fall within the tolerance of .075 +/-.025 and the other side could fall outside of the tolerance. Our findings indicate the operators were checking one in twenty creating the potential for a part to exceed the .100 maximum tolerance on one side. A realignment on the grinding fixture was completed and the operators were retrained to 100% inspect connectors on both sides of the grind mark. This eliminates the potential for an out of tolerance grind on this feature.

This process is capable and in control. If there are any remaining issues, please let me know.

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From: Franz, Scott
Sent: Friday, April 26, 2002 1:37 PM
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Cc: Golemboski, Matt R.; Trull, John; Diaz, Danny
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