

TEST AND MEASUREMENT LAB

TEST REPORT

REPORT # 893111
REQUESTER: F.E. Schmidt & G.Hill
WRITTEN BY: D. Thomas
TEST TYPE: Accelerated endurance/ strength

W.O.# 481152
DATE: 12/6/89

FIREARM STAT'S: MODEL: 700 CAL: 416

REASON FOR TEST:

- 1) To determine the ultimate strength of the non-heat treated 416 cal. barrels.
- 2) To perform an accelerated endurance test on heat treated and non-heat treated barrels to determine if a fatigue failure would occur.

EQUIPMENT REQUIRED:

Three Model 700's with non-heat treated barrels for destructive test.
Serial #'s C6446367, C6446970, and C6446907
Four Model 700's barrels with a "flaw" intentionally machined into the chamber with the wire EDM.
400 rounds of 416 cal. field ammunition.
50 rounds of 416 cal proof ammunition.

TEST PROCEDURE:

- 1) The barrels of the three standard guns were each plugged with four bullets just in front of the chamber. The guns, one at a time, were fixtured in the iron lung and subjected to the following high pressure load.

90 gns. of Winchester 296 powder
400 gn. bullet with a Remington case and primer
Estimated pressure in excess of 150000 psi

- 2)A) The four Model 700's with the manufactured "flaw" in the chamber were each subjected to 100 rounds of standard ammunition. Two of these guns were heat treated (C6446378 & C6446364) and two were non-heat treated (C6445138 & C6445222).

- 2)B) After the 100 round test each gun was subjected to 10 proof rounds.

- 2)C) Next two guns (C6445138 no heat treat & C6446378 heat treated) were selected from the four to be shot at -20 deg. F. Each gun in turn was placed in the freezer at -20 deg.F for a period of four hours. The proof ammunition to be shot was also placed in the freezer. After four hours each gun, in turn, was removed from the freezer along with one proof round. Before the gun can warm the proof round was fired through it. This procedure was repeated until each gun was fired five times.

NOTE: All of the shooting in 2A,B & C was done in the 52-1-A shooting room using the protective shield and a lanyard.

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TEST PROCEDURE: (cont.)

2)D) The two guns not used in test 2C (C6445222 no heat treat and C6446364 heat treated) were subjected to the same ultimate strength test as the guns in test 1. The barrels were plugged with four 416 cal. bullets just ahead of the chamber and the destructive load listed above was used. This test was done in the iron lung .

TEST RESULTS:

1) The barrels of the three standard production guns with no heat treat (Serial #'s C6446367, C6446970, and C6446907) did not fail. The damage to each gun is listed below.

C6446367 Bolt locked up due to the expansion of the brass shell into the Bolt shroud.
There was a one inch split in the top of the Receiver through the scope mount holes.

C6446970 Same as C6446367

C6446907 Bolt locked up due to the expansion of the brass shell into the Bolt shroud.

2) A,B,C) All four guns with the "flaw " machined into the chamber had 100 standard and 10 proof rounds shot through them with no failure. Guns C6445138 and C6446378 were shot five times each at extreme cold with cold ammunition and there were no failures.

2)D) Both guns (C6445222 no heat treat & C6446364 with heat treat) with the "flaw" machined into the chamber failed when subjected to a high pressure load with the barrel plugged. Both barrels experienced similar barrel bursts in the chamber area. These two barrels were turned over to F.E. Schmidt for analysis.