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Bridgeport, Connecticut  
 October 8, 1956

TO: C. S. CUMMINGS  
 FROM: J. J. O'CONNOR  
 SUBJECT: 4OX DIMENSIONS

Two barrels were received from Ilion which were described as being within the proposed new specifications. Absolute measurements on our air gages have been found to be not sufficiently reliable to give precise numbers, but the two barrels in agreement with the proposed specifications had bore diameters about .0005" less than other 4OX's we have. However, the throats were very rough in both barrels with a deep groove in one of them. The chamber in one barrel was noticeably not concentric with the bore. Extensive shooting of these barrels by R & D and by DB showed accuracy very inferior to regular 4OX's with several codes of our ammunition and with competition. DB emphasized the hard chambering in the new barrels. It is difficult to attach any meaning to the results of this test.

It has been found possible to alleviate the trouble associated with 4OX's and our ammunition by significantly reducing the lubricant on the cartridge and by minor dimensional changes. This presumably builds up effective pressure and reduces the incidence of drop shots. No further reduction in lubricant can be tolerated. As a result the control barrel accuracy has been quite excellent and equivalent to M52 control barrel accuracy. However, our M4OX control barrel was selected with minimum specs.

In order to determine whether drop shots might still occur in some 4OX's, DB offered to shoot five different M4OX's from bench. Code K10B Remington and Code 83A Western were used. One 40 shot group with each code was fired over 100 yards in each rifle. Composites were fired so that the ten shot group averages were available also. In four of the rifles K10B gave .84" ES average for 10 shot groups and 1.13" ES average for 40 shot groups.

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Code 83A gave corresponding averages of .93" and 1.20". However in the fifth rifle K10B gave a shot which dropped 1-1/2" from center of the group. Code 83A showed no drop shot. Thousands of rounds of K10B have been fired in the control rifle without a single drop shot and so it appears that even though only one drop shot was observed in this test it was probably associated with the particular gun characteristics. Subsequent air gaging showed this particular barrel has the largest bore and groove dimensions. The control barrel has the smallest bore and groove dimensions.

Therefore it must be presumed that present 4OX design permits occasional barrels which will give drop shots with our best ammunition. (K10B was our Camp Perry code which won the iron sight aggregate.) Furthermore the Process Engineer on the match job emphasizes that if the 4OX is modified as proposed he should be able to improve the performance of our ammunition in both the 4OX and M52.

JJC:jd