

FBI Laboratory Firearms/Toolmarks Unit Firearm Barrel and Overall Length Measurements

1 Scope

This procedure is designed to provide a technique for the measurement of a barrel and the overall length of a firearm in the Firearms/Toolmarks Unit (FTU). This procedure is necessary when a measurement is reported as requested by a contributor or is probative to a case.

2 Equipment/Materials/Reagents

National Institute of Standards and Technology (NIST) traceable steel rulers, Hott Rods[®] (measuring rod), measuring platform, and square.

3 Standards and Controls

Steel ruler(s) and measuring rod(s) that are calibrated to a National Institute of Standards and Technology (NIST) standard.

4 Calibrations

Not applicable.

5 Sampling

Not applicable.

6 Procedures

6.1 Safety

6.1.1 When handling a firearm for the purpose of measuring, safety is the first concern. Make sure the firearm is unloaded before conducting measurements. If there is any doubt about the operability of a firearm, consult with a qualified firearms instructor (if available), protocols or manufacturers' literature before handling a firearm for measuring.

6.2 Measuring

6.2.1 When measuring barrel or overall length the following should be considered before measuring: ensure the firearm/barrel is free from movement and stable for measuring, measure in an area with proper lighting, and the proper calibration certificates are current and traceable to a National Institute Standards and Technology (NIST) standard. When a measurement is made where the uncertainty of that measurement will be reported, the calibration date and unique identifier for the ruler being used will be recorded in the examination notes.

6.3 Barrel Length Measurements

6.3.1 Revolvers

6.3.1.1 When measuring a revolver barrel, the distance parallel to the bore axis from the muzzle end to the end of the forcing cone represents the length of the barrel.

6.3.1.2 A steel ruler or measuring rod will be used to measure the length of a revolver barrel. When using a steel ruler, the ruler is placed on the exterior of the barrel parallel to the bore axis for measuring. A measuring rod can be used to measure barrel length, however it may be difficult to determine the start point for the measuring rod. Consideration must be taken to determine how the starting point can be accurately achieved. A block at the muzzle or forcing cone end of the firearm, which is perpendicular to the axis of the bore can represent the starting point for the measuring rod to determine barrel length.

6.3.2 Integral Chamber Barrels

6.3.2.1 When measuring the barrel of a firearm that has an integral chamber, the distance parallel to the bore axis from the muzzle end to the breechface (with the action closed) represents the length of a barrel.

6.3.2.2 Before measuring an integral chamber barrel, ensure that the firing pin is not impeding the measuring rod from making contact with the breechface. It may be necessary to cock the firearm to remove a protruding firing pin. In the case of a fixed firing pin, be certain it is not reducing the barrel length measurement. Ensure that the measuring rod, when inserted in the barrel, is parallel to the bore axis.

6.3.2.3 When using a measuring rod to determine the barrel length measurement, read the increments perpendicular to the bore axis at the furthest point of the barrel.

6.3.2.4 Barrel length will be measured to the nearest sixteenth of an inch.

6.3.2.5 When a barrel length measurement is being reported, the serial number of the measuring rod used will be recorded in the examination notes.

6.4 Overall Length Measurements

6.4.1 The overall firearm length is measured using the measuring platform located in the water tank room.

6.4.2 When measuring the overall length of a firearm, the measurement is taken along a line which is parallel to the axis of the bore from a perpendicular tangential line which touches the rearmost point of the firearm to the muzzle.

6.4.2.1 With the firearm positioned in the measuring platform, a square is placed at a right angle to the measuring platform touching the muzzle to determine the overall length.

6.4.3 Overall lengths will be measured to the nearest sixteenth of an inch.

6.4.4 When an overall length measurement is being reported, the serial number of the ruler used will be recorded in the examination notes.

7 Calculations

Not applicable.

8 Uncertainty of Measurement

If a quantitative numerical measurement result is included in an FBI Laboratory *Report of Examination* (7-1), the uncertainty of measurement must be reported. The method used to determine the estimation of uncertainty can be found in the FTU Quality Assurance Manual – *Procedure for Estimating Uncertainty for Reported Quantitative Measurements*. The uncertainty budget for barrel length and overall length measurements for the FTU is located in the Estimating Uncertainty of Overall and Barrel Length Measurements for Firearms binder located in the FTU library.

9 Limitations

Barrel length measurements are dependent on the straightness of the measuring device and the assessment of the muzzle end in relation to the measuring device. Overall length measurements are dependent on proper alignment of the firearm in the measuring platform.

10 Safety

For the proper handling of firearms, consult the Safety Protocols for Handling of Firearms and Ammunition located in the FTU range, bullet recovery tank room and reloading room.

11 References

SWGGUN.org

FBI Laboratory Quality Assurance Manual

FBI Laboratory Operations Manual

FTU Quality Assurance Manual

FBI Laboratory Safety Manual

Firearms/Toolmarks Unit, FBI Laboratory, Controlled Document FTU 007, “Safety Protocol for Handling of Firearms and Ammunition”, August 8, 2004.

Department of the Treasury Bureau of Alcohol, Tobacco and Firearms, Federal Regulations Reference Guide

Sporting Arms and Ammunition Manufacturers’ Institute Inc., Glossary of Terms

Rev. #	Issue Date	History
0	05/07/08	Original issue for ASCLD/LAB- <i>International</i> accreditation.
1	07/14/10	Added "with action closed" to section 6.1.3. Updated references.
2	02/23/11	Added sections 6.1.5 and 6.2.4.
3	08/19/11	Updated section 8 for consistency with QAM.
4	12/19/12	Revised for the introduction of new measuring rods and measuring platform. Updated references.
5	05/02/13	Section 1 added more guidance when this procedure will be used. Section 2 deleted "ruler." Updated Section 6.3.1.2 and included the use of measuring rod. Section 6.3.2.2 changed "perpendicular" to "parallel." Section 6.3.2.3 gave more guidance on where to measure. Section 6.3.2.5 deleted "ruler" and added "measuring rod." Section 6.4.2 defined the process of overall length measurement and section 6.4.2.1 outlines how measuring is performed in the FTU. Section 6.4.4 deleted "barrel" and added "overall." Section 8 added location of FTU uncertainty budget. Section 11 added reference.

Approval

Redacted - Signatures on File