**U.S. Department of Justice**
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# 12-Gauge Shotguns for Police Use

## NIJ Standard–0113.00

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**James K. Stewart**, Director
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**U.S. Department of Justice**
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# 12-Gauge Shotguns for Police Use

**NIJ Standard-0113.00**

March 1989

## U.S. DEPARTMENT OF JUSTICE
## National Institute of Justice

**James K. Stewart, Director**

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### ACKNOWLEDGMENTS

This standard was formulated by the Law Enforcement Standards Laboratory (LESL) of the National Institute of Standards and Technology (NIST) (formerly the National Bureau of Standards) under the direction of Daniel E. Frank, Program Manager, Protective Equipment and Weapons Program, and Lawrence K. Eliason, Chief of LESL. The technical research was performed by Nicholas J. Calvano of LESL. The standard has been reviewed and approved by the Technology Assessment Program Advisory Council.

## FOREWORD

This document, NIJ Standard-0113.00, 12-Gauge Shotguns for Police Use, is an equipment standard developed by the Law Enforcement Standards Laboratory of the National Institute of Standards and Technology (formerly the National Bureau of Standards). It is produced as part of the Technology Assessment Program of the National Institute of Justice. A brief description of the program appears on the inside front cover.

This standard is a technical document that specifies performance and other requirements equipment should meet to satisfy the needs of criminal justice agencies for high quality service. Purchasers can use the test methods described in this standard to determine whether a particular piece of equipment meets the essential requirements, or they may have the tests conducted on their behalf by a qualified testing laboratory. Procurement officials may also refer to this standard in their purchasing documents and require that equipment offered for purchase meet the requirements. Compliance with the requirements of the standard may be attested to by an independent laboratory or guaranteed by the vendor.

Because this NIJ standard is designed as a procurement aid, it is necessarily highly technical. For those who seek general guidance concerning the selection and application of law enforcement equipment, user guides have also been published. The guides explain in nontechnical language how to select equipment capable of the performance required by an agency.

NIJ standards are subjected to continuing review. Technical comments and recommended revisions are welcome. Please send suggestions to the Director, Science and Technology, National Institute of Justice, U.S. Department of Justice, Washington, DC 20531.

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# NIJ STANDARD
# FOR
# 12-GAUGE SHOTGUNS FOR POLICE USE

## CONTENTS

## COMMONLY USED SYMBOLS AND ABBREVIATIONS

| | | | | | |
|---|---|---|---|---|---|
| A | ampere | H | henry | nm | nanometer |
| ac | alternating current | h | hour | No. | number |
| AM | amplitude modulation | hf | high frequency | o.d. | outside diameter |
| cd | candela | Hz | hertz (c/s) | Ω | ohm |
| cm | centimeter | i.d. | inside diameter | p. | page |
| CP | chemically pure | in | inch | Pa | pascal |
| c/s | cycle per second | ir | infrared | pe | probable error |
| d | day | J | joule | pp. | pages |
| dB | decibel | L | lambert | ppm | part per million |
| dc | direct current | L | liter | qt | quart |
| °C | degree Celsius | lb | pound | rad | radian |
| °F | degree Fahrenheit | lbf | pound-force | rf | radio frequency |
| diam | diameter | lbf·in | pound-force inch | rh | relative humidity |
| emf | electromotive force | lm | lumen | s | second |
| | equation | ln | logarithm (natural) | SD | standard deviation |
| | farad | log | logarithm (common) | sec. | section |
| fc | footcandle | *M* | molar | SWR | standing wave radio |
| fig. | figure | m | meter | uhf | ultrahigh frequency |
| FM | frequency modulation | min | minute | uv | ultraviolet |
| ft | foot | mm | millimeter | V | volt |
| ft/s | foot per second | mph | mile per hour | vhf | very high frequency |
| *g* | acceleration | m/s | meter per second | W | watt |
| g | gram | N | newton | λ | wavelength |
| gr | grain | N·m | newton meter | wt | weight |

area = unit$^2$ (e.g., ft$^2$, in$^2$, etc.); volume = unit$^3$ (e.g., ft$^3$, m$^3$, etc.)

### PREFIXES

| | | | |
|---|---|---|---|
| d | deci ($10^{-1}$) | da | deka (10) |
| c | centi ($10^{-2}$) | h | hecto ($10^2$) |
| m | milli ($10^{-3}$) | k | kilo ($10^3$) |
| μ | micro ($10^{-6}$) | M | mega ($10^6$) |
| n | nano ($10^{-9}$) | G | giga ($10^9$) |
| p | pico ($10^{-12}$) | T | tera ($10^{12}$) |

### COMMON CONVERSIONS
**(See ASTM E380)**

| | |
|---|---|
| ft/s × 0.3048000 = m/s | lb × 0.4535924 = kg |
| ft × 0.3048 = m | lbf × 4.448222 = N |
| ft·lbf × 1.355818 = J | lbf/ft × 14.59390 = N/m |
| gr × 0.06479891 = g | lbf·in × 0.1129848 = N·m |
| in × 2.54 = cm | lbf/in$^2$ × 6894.757 = Pa |
| kWh × 3 600 000 = J | mph × 1.609344 = km/h |
| | qt × 0.9463529 = L |

Temperature: $(T_{\cdot F} - 32) \times 5/9 = T_{\cdot C}$

Temperature: $(T_{\cdot C} \times 9/5) + 32 = T_{\cdot F}$

# NIJ STANDARD FOR 12-GAUGE SHOTGUNS FOR POLICE USE

## 1. PURPOSE AND SCOPE

This standard establishes criteria and test methods for shotguns to be used by law enforcement officers. It addresses 12-gauge shotguns only. While the standard is intended for new weapons, it may also be used to assess the acceptability of shotguns that have been reconditioned for reissue.[1] This standard does not address accuracy or sights (see app. A for a discussion of these topics).

## 2. CLASSIFICATION

The shotguns covered by this standard are considered to be of a single classification.

## 3. DEFINITIONS

### 3.1 Barrel Bore

The interior diameter of the barrel forward of the chamber but before the choke if there is one.

### 3.2 Dummy Round

A cartridge that has no active elements (primer, propellant) and all other components such as bullets/ shot or filler shall be inert.

### 3.3 Headspace

The space between the breech face and the part of the chamber that prevents forward movement of the cartridge.

### 3.4 Malfunction

Failure to feed, fire, or eject a round, or firing of a round without pulling the trigger (see slam fire). In autoloading shotguns, failure of the bolt to remain open after the last round has been fired is an additional type of failure.

### 3.5 Misfire

Failure of a round to fire.

### 3.6 Safety Device

Any safety item that is operated manually to render the shotgun safe or ready-to-fire.

[1] All shotguns must be examined and reconditioned as necessary by a trained armorer or gunsmith prior to reissue.

## 3.7 Slam Fire

A condition in which the shotgun fires as the action closes. This may occur with the trigger pulled or not pulled. In an autoloading shotgun this condition will usually cause the shotgun to continue to fire in a full automatic mode where such a mode was not intended.

## 3.8 Trigger Pull

The force that must be applied to the trigger to fire the shotgun.

# 4. REQUIREMENTS

## 4.1 Acceptance Criteria

To satisfy the requirements of this standard, the user information must meet the requirements of section 4.2 and the sample shotgun (see sec. 5.1) must pass all of the requirements and tests specified in this standard except the folding stock requirement (see sec. 4.10). If the shotgun is supplied with a folding stock, then a second shotgun must pass the requirements and tests for the folding stock (secs. 4.10 and 5.10) only.

To be suitable for reissue, a shotgun model that has previously met the requirements of this standard must be reconditioned by an armorer or gunsmith and then as a minimum meet the visual inspection requirements (sec. 4.3), the dimensional requirements (sec. 4.4), the functional requirements (sec. 4.5), the safety features (sec. 4.6), and the reissue firing requirement (sec. 4.7.2).

## 4.2 Required User Information

The following information must be supplied with the shotgun by the manufacturer:

a. Diagrams identifying all parts
b. Field assembly and disassembly instructions
c. Cleaning instructions
d. A statement of ammunition known to be unacceptable
e. A parts list and ordering instructions
f. Certification of compliance with this standard.

## 4.3 Visual Inspection

### 4.3.1 Particles

There shall be no loose shavings or fillings in the shotguns.

### 4.3.2 Surface

The shotgun shall have no scratches, burrs, or rust spots. The surface shall be corrosion resistant.

## 4.4 Dimensional Requirements

### 4.4.1 Barrel Bore

The barrel bore diameter when measured in accordance with section 5.4.1 shall be not less than 1.842 cm (0.725 in) nor more than 1.892 cm (0.745 in).

### 4.4.2 Headspace

The headspace when measured in accordance with section 5.4.2 shall be not less than 0.146 cm (0.0575 in) nor more than 0.182 cm (0.0717 in).

## 4.5 Functional Requirements

### 4.5.1 Action

The slide or bolt, when tested in accordance with sec. 5.5.1, shall operate without binding or sticking, also during firing tests (sec. 5.7) and after the drop function tests (sec. 5.9).

### 4.5.2 Capacity

The shotgun when tested in accordance with section 5.5.2 shall have a capacity of five rounds, minimum (one in the chamber plus four or more in the magazine), of the longest cartridge for which the shotgun is chambered (3 in or 2 3/4 in).

### 4.5.3 Ejection

The ejection mechanism when tested in accordance with section 5.5.3 shall eject cases without hangup, also during the firing tests (sec. 5.7) and during the drop function test (sec. 5.9).

### 4.5.4 Trigger

The trigger pull when tested in accordance with section 5.5.4 shall be not less than 13.5 N (3 lbf) nor more than 36 N (8.1 lbf).

## 4.6 Safety Features

The shotgun shall have design features to prevent inadvertent firing. As a minimum the shotgun shall be designed such that the trigger must be pulled for each shot (holding the trigger back and operating the action, slam firing, shall be precluded), the shotgun shall not fire unless the action is fully closed, and there shall be at least one active safety (a device under the control of the shooter) to prevent the firing of the shotgun even though it is loaded and cocked. Active safety devices shall be designed so that the shotgun can be made ready-to-fire without removing either hand from the weapon.

## 4.7 Firing Requirements

### 4.7.1 Model Qualification Firing Requirement

When tested in accordance with section 5.7.1 the shotgun shall fire 400 rounds of ammunition with no structural or mechanical failures, and no more than four malfunctions. Only one of the allowable malfunctions may be a misfire.

### 4.7.2 Reissue Firing Requirement

When tested in accordance with section 5.7.2 the shotgun shall fire 20 rounds of departmental issue ammunition with no structural or mechanical failures, and no more than one malfunction of any type.

## 4.8 Drop-Safety Requirement

The shotgun shall not fire when subjected to the drop test described in section 5.8.

## 4.9 Drop-Function Requirement

The shotgun when tested in accordance with section 5.9 shall fire 20 rounds of ammunition without slam firing and with not more than one malfunction of any other type.

## 4.10 Folding Stock Requirement (Optional)

There shall be no breaks, bends, or separation of the stock from the receiver when tested in accordance with section 5.10. The stock shall lock in each position and move freely between the folded and extended positions after being dropped in accordance with the test.

# 5. TEST METHODS

## 5.1 Sampling

A representative sample of the shotgun model is required. The test gun may be selected at random from the current purchase lot for acceptance testing, recognizing that the shotgun probably will not be suitable for field issue after testing. NOTE: The tested shotgun must be examined by a trained armorer or gunsmith and reconditioned as necessary if issue of the shotgun is contemplated. Alternatively, the test piece can be supplied by the manufacturer for qualification compliance testing separately from the purchase lot, in which case it shall be selected randomly from the current production.

If a folding stock is an option for the shotgun model, a second shotgun with the folding stock attached will be required for the folding stock test (sec. 5.10). It is permissible to test to this standard with a fixed stock on the test weapon and then install a folding stock on the same shotgun for the folding stock test (sec. 5.10) provided it is still possible to properly install the folding stock to the previously tested shotgun.

## 5.2 Special Test Equipment

### 5.2.1 GO, NO-GO Headspace Gauges

These headspace gauges are hardened steel rods, precision ground to the dimensions shown in figure 1.

## 5.3 Visual Inspection

### 5.3.1 Particles

Examine the barrel and receiver for loose shavings or particles.

### 5.3.2 Surface

Examine the surface of the shotgun for scratches, rust, or burrs. Verify that the shotgun is protected from rusting.

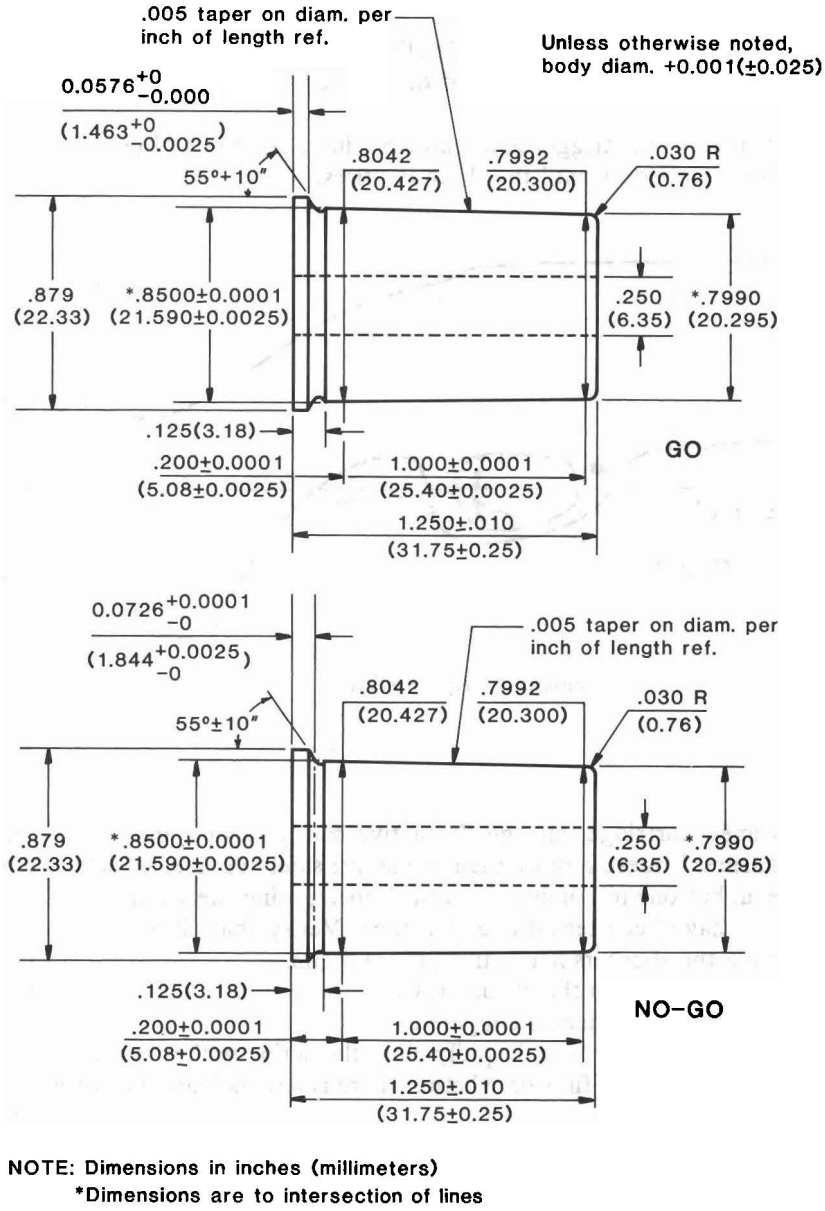
## 5.4 Dimensional Measurements

### 5.4.1 Barrel Bore

Measure the barrel bore diameter just forward of the forcing cone at the front of the chamber.

### 5.4.2 Headspace

Determine whether the headspace is within acceptable limits by using the two headspace gauges (GO, NO-GO) machined to the dimensions shown in figure 1. The slide must close completely over the GO gauge and must not close over the NO-GO gauge.




NOTE: Dimensions in inches (millimeters)
*Dimensions are to intersection of lines

FIGURE 1. *Headspace gauges.*

## 5.5 Functional Tests

### 5.5.1 Action

Open the action slowly. Note any binding or sticking. Repeat this test five times.

### 5.5.2 Capacity Test

Open the action. Chamber a dummy round by loading it through the ejection port. Close the action and load the magazine with as many dummy rounds as will fit. Note the total number of rounds loaded.

### 5.5.3 Ejection Test

At the completion of the capacity test, pull the trigger, cycle the gun to eject the "fired" dummy round and chamber a new one from the magazine. Repeat, until all of the dummy rounds have been ejected. Note any binding, sticking or hesitation.

### 5.5.4 Trigger Pull Test

Open the action and chamber a dummy round by loading it through the ejection port. The test load is to be applied to the rearmost part of the front surface of the trigger so that the load is parallel to the barrel within 5° (fig. 2).

Apply an 11 N (2.5 lbf) load to the trigger and uniformly increase it in 1 N (1/4 lbf) increments until a load of 36 N (8.1 lbf) has been applied or until the shotgun "fires."

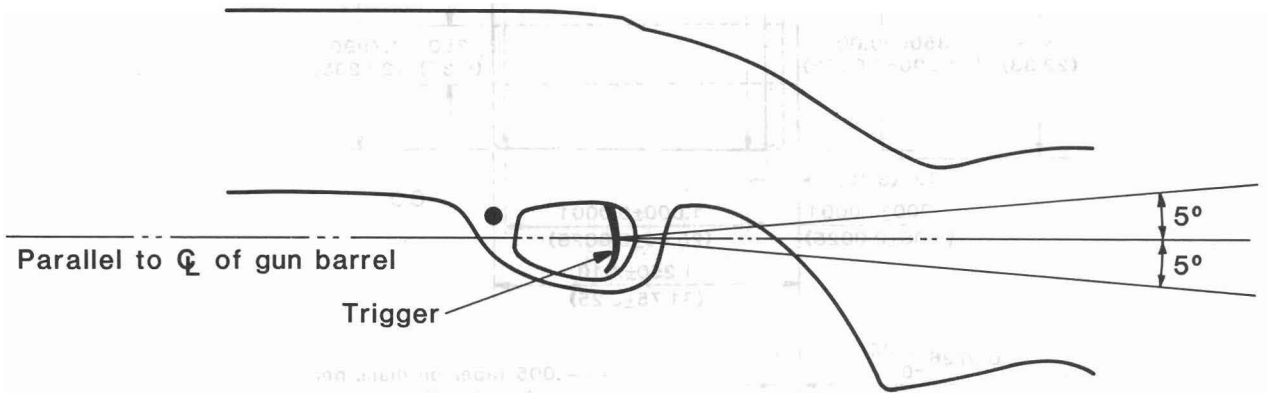



FIGURE 2. *Trigger pull test.*

## 5.6 Safety Tests

Chamber an empty primed cartridge, engage the active safety device and attempt to fire. Observe whether the cartridge discharges. If there is more than one active safety device, as indicated by the manufacturer's literature, disengage all but one to conduct the test. Repeat, using the second safety device. Continue until all active safety devices have been tested one at a time. Verify that all active safety devices can be manipulated without removing the shooters hands from the shotgun.

Place the NO-GO headspace gauge in the chamber. Close the action as far as it will go. Attempt to fire the shotgun. Note whether the firing element is triggered.

Place a primed empty case in the chamber. Rapidly close the action without touching the trigger. Open the action. Note whether the primed case fires or whether there is any indication of firing pin indent on the primer.

Place a dummy round in the chamber and close the action. Place an empty primed case in the magazine of the shotgun. "Fire" the shotgun on the dummy round and while holding the trigger to the rear operate the action. Release the trigger and open the action. Verify that the primed case has not fired and that the primer is free of any indication of firing pin indent.

## 5.7 Firing Tests

### 5.7.1 Model Qualification Firing Test

Examine the gun for defects such as loose screws, cracks, etc. Engage the safety, chamber a round and load the magazine to capacity. Release the safety and fire into a safe area. The first five rounds and the last five rounds of the 400 round test must be fired in 5 s or less for each group of five rounds. The remaining rounds shall be fired at a rate between one round per 5 s and one round per 30 s. Increments of 100 rounds must be fired with no delays except to reload, to determine causes of malfunctions, or to clean the shotgun as required by the manufacturer (see manufacturer's cleaning schedule if one is provided).

Note all misfires and whether the shotgun ejects and feeds properly. With autoloading shotguns note whether the bolt remains open after the last round has been fired.

During reloading always load the magazine to full capacity as determined in section 5.5.2, further, note whether all cartridges can be inserted into the magazine easily and whether the magazine shell latch allows any cartridge to slip out of the magazine after that cartridge has been pushed fully forward of the latch.

If the manufacturer provides a required cleaning schedule (e.g., after "X" number of rounds), follow the manufacturers schedule. If no schedule is provided, do not clean the shotgun during the 400 round firing test.

While conducting the 400 round firing test, examine the primers in any misfired cartridges. If it is obvious that the misfires are the fault of the shotgun (i.e., very shallow or no indentation of the primer), they will be considered shotgun failures. If there are too many misfires and it is not obvious that the misfires are the fault of the shotgun, repeat the firing test. If the shotgun passes the second 400 round test it meets the requirements. If more than one misfire occurs during the second 400 rounds, and again it is not clearly the fault of the shotgun, the ammunition manufacturer should be consulted to determine the condition of the ammunition.

### 5.7.2 Reissue Firing Requirement

Perform the firing test of section 5.7.1 using 20 rounds of the Department's standard issue ammunition. Should there be more than one weapon malfunction or misfire proceed as in section 5.7.1 to determine if the ammunition is at fault. Note all malfunctions.

## 5.8 Drop Safety Test

Insert a primed empty cartridge in the chamber and with the safety off drop the shotgun from a height of 1 m (39.4 in) onto a slab of solid concrete having minimum dimensions 7.5 cm thick × 1 × 1 m distance is measured from the lowermost portion of the shotgun to the top surface of the slab.

The following drops are required:

1. Normal firing position; barrel horizontal trigger pointed down
2. On butt[2]; barrel vertical
3. On muzzle; barrel vertical
4. On side; barrel horizontal
5. On opposite side; barrel horizontal

## 5.9 Drop-Function Test

After completing the drops specified in the drop-safety test (sec. 5.8) examine the shotgun for damage and note any cracks or other visible damage. For those shotguns that passed the drop-safety test without structural damage that would make them unsafe to fire (e.g., stock damage not affecting the ability to fire the shotgun is not cause for rejection), eject the primed cartridge, engage the safety, chamber a round and fully load the magazine. Release the safety and fire into a safe area until the ammunition has been expended. Reload and repeat until 20 rounds have been fired. Note any misfires or malfunctions. If misfires appear to be caused by the ammunition repeat the firing portion of the test. If the shotgun passes the repeat test it meets the requirements. Should there be too many malfunctions proceed as in section 5.7.1 to determine if the ammunition is at fault.

## 5.10 Folding Stock Test (Optional)

The following tests are required for shotguns equipped with folding stocks:

Using a folding stock that has not been subjected to the drop-safety test (sec. 5.8) extend the stock to the full open position and back to the folded position. Repeat and note whether it operates smoothly without sticking or binding.

With stock extended drop the unloaded shotgun from a height of 1 m (39.4 in) measured from the lowermost portion of the shotgun onto a solid block of concrete at least 7.5 cm thick × 1 × 1 cm (3 × 39.4 × 39.4 in) in the following attitudes:

1. Barrel 45° above horizontal; trigger down.
2. Barrel 45° above horizontal; trigger up.
3. Barrel 45° above horizontal; on side.

Note any permanent deflection of breakage or separation of the stock. Fold and re-extend the stock observing whether it moves freely between the folded and extended positions. Note also whether the stock locks in each position.

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[2] Shotguns with no stocks are to be dropped on the rearmost point of the gun; those only supplied with folding stocks are to be dropped with the stocks fully extended.

# APPENDIX A

## Accuracy and Sights

Accuracy is defined as the ability of the shotgun to impact the target at the aim point. Of course this will depend on the ammunition and the shooter as well as the shotgun. But even if we ignore the shooter and ammunition for the moment, the shotgun presents problems not found in handguns and rifles. Normally, the shotgun is equipped with a front bead sight only, making it more difficult to precisely align the weapon with the target. Yet, some shotguns will be more accurate than others and some may be considered unacceptable because of poor accuracy.

Because of the interdependence of the three variables affecting accuracy (gun, shooter, and ammunition) coupled with the added uncertainty inherent in shotguns—no rear sight—it is advisable that the user conduct his own tests to satisfy himself that the weapon meets his accuracy requirements. To do this, the weapon would be supported on sand bags or some other suitable device approximately 40 or more yards from the target (8–12 in diameter). Using rifled slugs, fire three shots and measure the distance of the group, from the aim point. Figure 3 is an example of how to make this measurement. Repeat the test five times to obtain an average. If performance is considered unacceptable, use a different brand of ammunition and repeat the test. If results are still unsatisfactory the manufacturer should be consulted.

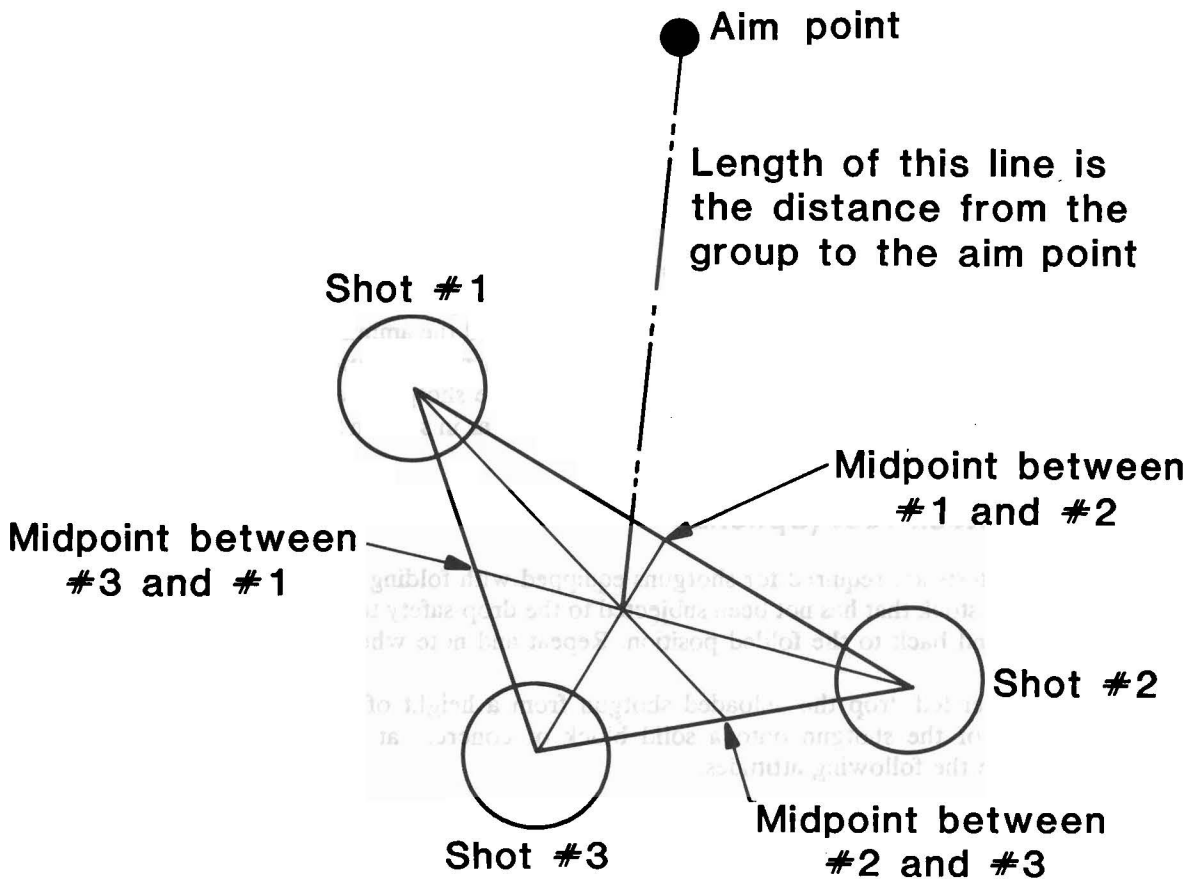


FIGURE 3. *Example of group distance to aim point.*