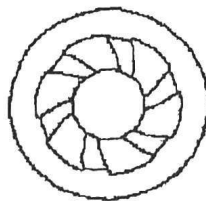


Reading: 'Groovy' Gun Barrels

In any criminal case where a firearm has been used, there are many clues that are left behind. A **piece of the bullet** (fragment), a **casing**, the **weapon** itself, **bullet holes** or **gunpowder residue**. All of these clues can be used to match a suspect weapon with the scene of a crime.

Bullets, casings, and bullet fragments left at a crime scene or within a victim all may have markings that were imprinted by passing through the gun they came from. Even though each barrel may be made the same way, differences in the metal and wear will result in unique patterns on a bullet and casing that passes through the barrel.

Every barrel of every gun has different **lands** and **grooves**. The "lands" are the raised parts inside the barrel, and the "grooves" are the recessed portion; known as 'rifling' these are cut into the bore of a barrel of a firearm during production to increase the accuracy of that firearm. These lands and grooves force the bullet to rotate as it travels along it. When the gun is discharged, these grooves cause the bullet to spin as it travels the length of the barrel and thus stabilize the bullet during flight. At the same time, the expansion of the fired cartridge and the high pressures propelling the bullet through the bore of the barrel press and scrape the bullet against the rifling as it heads toward the muzzle. The fired bullet, as a result, will bear the negative impressions of the grooves in a rifled barrel; these marks are described by firearms examiners as land and groove impressions. The number of lands and grooves, their size and shape, may assist in determining the make and the type of weapon that was used.



Above = lands & grooves inside of a gun barrel

When each barrel is produced, there are differences that are unnoticeable to the human eye which may only appear under a microscope. The marks left on the casing and/or the bullet are from the lands and grooves as well as finer scratches that have resulted from use or production.

No two barrels will give the exact same markings on a bullet (like a fingerprint). The Forensic Ballistics Expert may take the weapon in question and fire it into water and retrieve the test bullet. The test bullet is then compared to the fragment using a comparison microscope. If it is a match, a photograph may be taken for use as evidence in court.

Microscopic striations found on the surface of fired bullets are routinely used as a means to associate a questioned bullet with a suspect weapon. This is possible because the striations found on the surface of fired bullets are imprinted on them by microscopic imperfections and the lands & grooves found in the gun's barrel. Because these imperfections are randomly generated (during manufacture or due to wear), they are unique to each gun barrel. It is this uniqueness that enables the identification of bullets as having originated from a particular gun.

In addition to the gun barrel marks produced upon a bullet, a number of other impressions found on cartridge cases are crucial to firearms identification. Firing pin impressions, extractor marks, ejector marks, and chamber marks, when present and of sufficient in quality, are all features used by firearms examiners in their analysis. During the discharge of a firearm, the firing pin strikes the primer of a cartridge, creating microscopic contact marks and unique indentations.

Extractor and ejector marks are produced when the cartridge case is mechanically extracted from the chamber and ejected and are visible as fine striations and gouged impressions on the rim and head of the case. Chamber marks, parallel striations on the cartridge case caused by contact with the walls of the chamber of the firearm, also occur at this time. During discharge, these imperfections are transferred from the metal parts of the firearm to the bullet and cartridge case.

Casings contain information about the type of ammunition, stamped onto the base of the cartridge. But there is more information hidden on the casing. Parts of the firearm which come in contact with the casing may leave markings. Just like the marks left behind from the lands and grooves, these are unique and can be compared to the suspect weapon.



'Groovy' Gun Barrels Reading Analysis Questions

1. List the 5 possible pieces of firearm evidence that may be left at a crime scene.
2. Which of the 5 pieces that may be left at a crime scene may have unique markings that are acquired as the piece passes through the barrel?
3. What are lands?
4. What are grooves?
5. What is rifling? When does it occur?
6. What 3 characteristics of the lands and grooves help to identify the make and type of weapon used?
7. True/False: Two gun barrels can give the exact same markings on a bullet.
8. What are routinely used as a means to associate a questioned bullet with a suspect weapon?
9. Other than gun barrel impressions on a bullet, what other impressions can be found in firearms evidence?
10. List all the types of information that can be obtained from the casing.