



CHAMBER PRESSURE & THE MODERN 45-70 LEVER-GUN

We are often asked how performance/pressure parameters were established for our 45-70  Hammerhead Ammo. These are important matters as they involve issues of firearm reliability and safety, as well as questions regarding impact-effect.

Given the selection of an efficient powder, the speed to which a bullet of a given weight can be propelled is determined primarily by the seating depth of the bullet and the chamber pressure limit the builder has imposed upon the load. There are many opinions regarding prudent pressure limits for the 45-70 lever-gun. They range from those advocating 28,000-cup/28,000-psi load levels, to those advocating 42,000-cup/45,000-psi load levels. It is our view that given the mechanical characteristics of the modern 45-70 lever-gun, and the enormous amount of power that can be achieved within modest chamber pressure levels, the prudent course leads to a point somewhere in between. We have chosen to impose a maximum average chamber pressure limit for our 45-70  Hammerhead Ammo of 33,000-cup/35,000-psi. It is often claimed that the Marlin 1895 is completely safe with load levels up to 43,000-PSI, and that the modern Winchester 1886 is safe to 50,000-psi. This analysis is based on the strength of the respective lockups. We do not take exception with these claims. However, it must be accepted that the 45-70 lever-action rifle is a mechanical device that, by its very nature, is far less capable of handling high pressure and its effects than bolt-action rifles. Assuming the selection of an efficient powder, 45-70 pressure levels in the high range, especially those utilizing heavy bullets, generate an extremely severe recoil pulse, which can wreak havoc with certain design characteristics of the modern lever-action rifle. The most common among these involves magazine problems and difficult case ejection. The stacking of cartridges in the tubular magazine amplifies the effects of recoil battering in the magazine. When this causes trouble, it generally takes the form of a magazine failure in which the magazine opens at the end or separates from the gun, precluding any further shooting. In a worse case scenario, magazine detonations can occur. Difficult case ejection can also result from high working pressures, and can effectively put the lever-gun out of commission. A gun that has to be dropped from the shoulder in order to force the lever open, is a gun that is worthless should a fast second shot be required. It is our view that any cartridge built for use against heavy and potentially dangerous game must first and foremost reliably function in the gun. Mechanical failures are not an option. The gun must fire each and every time it is called upon. Therefore, our over-riding performance criteria is the production of the most powerful, deepest penetrating, and most lethal big game loads possible within strict parameters of absolute firearm reliability.

Determination of meplat diameter is a compelling issue. Since wound channel diameter is far more a product of meplat diameter than actual bullet diameter, impact-effect can be considerably enhanced through the use of bullets with wider than normal meplats. Our 45-70 bullets are the bluntest in the industry, and provide superior impact-effect as a result. It is our

view that proper hard-cast bullets must have wide meplats in order to quickly dispatch big game. Meplat diameter is also relevant to the issue of magazine safety. Recoil battering of the cartridges in the tubular magazine mandates the use of blunt flatnose bullets. The greater the recoil pulse, the greater the recoil battering of the cartridges in the tubular magazine. It is our opinion that when firing heavy recoiling loads, safety from a catastrophic magazine ignition is increased with bullets possessing wider than normal meplats. Our bullets have meplat diameters of .330-inch on the 420-grainer, and .360-inch on the 540-grainer. They dwarf the all too common .300-inch meplat.

Although blunt, our Super Hard Cast Hammerhead bullets provide a very usable 200-yard trajectory in the case of our 420-grainer, and 150-yards with our 540-grainer. Also, to the full extent of their range, they are both capable of shooting lengthwise through the heaviest game, while providing rapid incapacitation. Interestingly, both our 45-70 loads generate as big a Taylor Knockout Value at 130-yards as does the 375 Holland & Holland with 300-grain bullets measured at the muzzle.

The velocity achieved by a hunting bullet determines how strong the bullet must be. If the bullet lacks sufficient strength to survive impact with heavy bone at close quarters, all can be lost as a result of simply achieving too much velocity. Bullet impact stress is the product of the toughness of the target and the speed of impact. Any time velocity is increased or decreased, it has a direct effect on the practical strength of the bullet. Consequently, it is essential for the bullet to possess the strength required to survive close quarters impact with the heaviest game without bullet expansion or fragmentation. This is a serious challenge for ammo builders as it is easy to overpower bullets in the pursuit of more power, and, consequently, seriously compromise their effectiveness on really tough game.

Extensive impact testing and pressure/load evaluation has led us to our current performance levels. This reflects our view of the proper chamber-pressure level for the modern 45-70 lever-gun, and the maximum velocity appropriate with high performance alloy without concerns of bullet failure when impacting the toughest targets at close-quarters. Our bullet designs incorporate the best in meplat diameters, penetration, and accuracy. They are also hand-cast by us using a special low antimony alloy with superior hardening characteristics. These are the most highly evolved, power efficient, and safest high performance 45-70 loads on the market. We are very proud of our perfect safety record and will continue to put safety first in our pursuit of maximum power and impact-effect in the 45-70.

- Randy Garrett