



February 7, 2003

TECHNICAL NOTE 55: RECEIVER TIGHTNESS

Background:

ArmaLite occasionally receives questions from customers about the tightness of the fit between the upper and lower receivers of ArmaLite's M-15, AR-10, and AR-180B rifles.

There is an intuitive belief that a tight fit between the upper and lower receivers is essential to accuracy, and that loose fit is bad. Oddly enough, this is untrue.

Facts:

The upper and lower receivers of ArmaLite self-loading rifles, and all other similar rifles based on the AR-10 or AR-15 design, are held together by two pins. Unlike rifles that are cammed or screwed together and can be tightened, the pins allow for slight movement between the receivers.

It is possible to selectively fit pins and receivers, or to custom ream the pin holes while the receivers are held together, so that movement is minimized. Doing so reduces the interchangeability of the receivers, and normal wear results in looseness over time anyway. ArmaLite uses the reaming process on its National Match M-15 rifles.

It is also possible to reduce movement by inserting materials such as paper, rubber, or epoxy somewhere between the receivers and creating a tight fit or bind. Many commercial customers use a common rubbery device claimed to improve accuracy, and the Army Marksmanship Unit often uses a bit of epoxy. The AMU Armorers advise that this procedure doesn't improve accuracy, but it makes the shooter feel more confident about their rifle.

The AMU Armorers are correct. Formal testing conducted at Rodman Laboratories in the 1970s verified that accuracy wasn't affected by normal receiver tolerances. The fact is that the bullet exits the bore before movement of the receivers produces a measurable effect.

Modern manufacturing processes are unable to produce to dimensions that both allow full interchangeability AND prevent all movement in all cases.

ArmaLite's rifles, except for some of the National Match rifles referred to above, are produced to military standards of interchangeability to allow full interchange of components. Tolerances have been deliberately tightened to reduce the movement between the receivers, but remain open enough to assure interchangeability. ArmaLite gets a close fit between the receivers, but normal forging and machining variations may result in a small amount of play between the receivers or slight side to side receiver mismatch. This is not a manufacturing defect and has no effect on accuracy.

Conclusion. ArmaLite rifles are produced to tighter-than-normal tolerances. Receivers will normally exhibit a certain amount of looseness. This is normal and will not affect accuracy. Shooters may reduce the movement by insertion of a small amount of material between the receivers to improve the feel of the rifle, but it won't improve accuracy.