

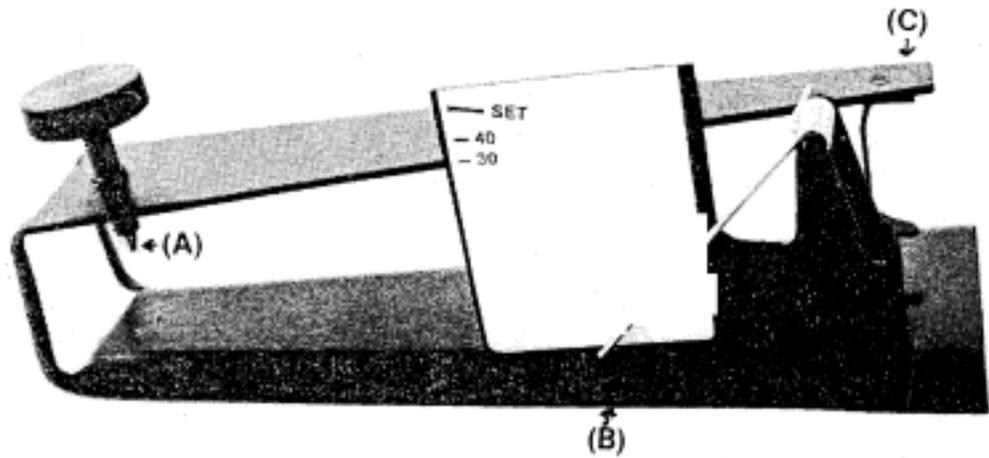
LBT

HARDNESS

TESTER

OPERATING

INSTRUCTIONS



The LBT Hardness Tester is a precision measuring instrument that will give a lifetime of service if properly used and maintained. Each unit is completely assembled, individually function tested, and calibrated before leaving the factory, so be assured, it WORKS, and IS accurately calibrated. It WILL work properly for you if the instructions are followed EXACTLY, conversely, IT WON'T IF YOU DON'T!

TESTING PROCEDURE

1. The test bullet must have a small flat on the nose, at least 1/16 inch wide if hardness is 16 bhn or higher, 1/8 inch or wider for softer alloys down to about 8 bhn, and 1/4 inch or more for softer alloys. The flat may be filed on for testing pointed or round nose bullets. A 'coarse' file cuts fast and gives an adequately smooth finish for: a. making the flat; b. removing penetrator indents to allow more testing on the specimen; and, c. for step 2.
2. THE BULLET BASE MUST BE FLAT AND SMOOTH. ALWAYS smooth bases of bullets with the file before testing to remove any projections.. Slight, even invisible projections, or foreign material such as tiny dust particles, will compress when pressure is applied and cause low readings.
3. Place bullet under penetrator (A) and:
 - A. Rub base of bullet firmly against tester base while sliding under penetrator. (To flatten any contamination or small burrs left from filing.)
 - B. Be sure penetrator is placed well away from the edge. If placed too close to an edge, metal will bulge to the side without giving proper support, causing a too soft reading. If using minimum diameter flats as prescribed in step one, center penetrator on the flat and don't attempt more than one reading per specimen without first filing indent away.
4. Screw penetrator down on the bullet until pointer (B) rises to align with SET line. NOTICE: If pointer passes the line, turn it back down and readjust so the pointer is aligned while traveling upwards. Do not align with SET mark while pointer is traveling downwards.
5. Press pressure bar (C) down slowly and gently until you feel it come to a positive stop and hold there for about two seconds, then release pressure slowly. (Pointer will fall to bottom of scale when pressure bar is depressed.) When pressure is released the pointer will rise, indicating BHN of your test specimen.
6. For maximum accuracy, calculate the average for at least three readings. BE SURE TO MOVE PENETRATOR TO A DIFFERENT SPOT FOR EACH TEST, KEEP INDENTS SPACED FAR ENOUGH APART THAT COLD WORKING OF FIRST INDENT DOES NOT INFLUENCE SUBSEQUENT READINGS. Space 1/16 inch apart for hard alloys, 118 or more for softer alloys.- If the first reading is lower than subsequent readings, disregard it. Even with extreme care in flattening bullet bases and hand crushing any remaining small flaws (per 3. A. above) the first reading is normally lower than average.

Hardness testing of ingots is not recommended because their cooling rate after casting is much different than that of bullets, therefore, hardness will not be the same as that obtained with bullets cast from the same alloy.

Lead alloy hardness is determined more by cooling rate and ageing temperature and time, than by alloy content, consequently, hardness readings cannot be used to determine alloy content.

Lead alloy hardness constantly fluctuates with temperature, approximately 4 bhn within the temperature range of 0 to 100 deg F, softening at higher temperatures, and hardening at lower temperatures. (Softening is partly to blame when alloys that shoot well in cool temperatures fail at high temperatures.)

Regardless of alloy type, bullet hardness is virtually identical all the way through. No alloy or method of hardening will produce a hard 'skin', and softer core, as many believe.

Hardness of air cooled, large diameter bullets can vary up to 2 bhn from side to side due to uneven cooling. We have never encountered hardness variations within individual bullets that had been cooled by water quenching, whether quenched after casting or heat treatment.

BHN is a measure of compressive strength, and compressive strength of the alloy effects maximum working pressure at which a bullet can be fired accurately without bore leading or bullet deformation severe enough to damage accuracy.

To better understand lead alloying and how to economically make high quality bullets of a desired hardness, we recommend that you obtain our book *'Jacketed Performance with Cast Bullets.'*

Occasionally, the pointer and pivot pin gets knocked loose in shipment. If yours is found loose in the box, reinstall as follows: Slide the brass pivot pin through the coil in the bright stainless steel pointer, then insert the pin into the sockets on the pointer bracket with the long pointer arm in front of the gauge and the short lift arm over the pressure bar. The brass pin must be held tightly in place by spring tension and the pointer must be free to pivot without resistance. If the brass pin is loose, obtain spring tension by squeezing pointer support arms together before installing pin, if pointer drags on the dial face, bend the long pointer arm out slightly for proper function~. **DO NOT BEND THE POINTERS SHORT LIFT ARM, OR THE PRESSURE BAR STOP;** dimensions of both are extremely critical.

TESTER MAINTENANCE requires only the application of oil on the penetrator threads, and a dry lubricant such as WD 40 on the pointer pivot and lift arm where it contacts the pressure bar, whenever operation becomes erratic or stiff. Don't attempt to test hardness of metals other than lead alloys, as damage to the penetrator ball can result.

GUARANTEE - Should the LBT Hardness Tester fail to function within one year of purchase date due to manufacturing defects, LBT will repair or replace it at no charge if returned to the factory by the owner.

NOTICE: IF YOU HAVE TROUBLE LEARNING TO OPERATE YOUR NEW TESTER, DO NOT RETURN IT TO FACTORY FOR REPAIR UNLESS ABSOLUTELY CERTAIN THE TESTER IS FAULTY! We frequently have perfectly healthy testers returned because the new owner couldn't make it work because of overlooking something in the instructions. If you fail to get results, have a friend go over the instructions and operation with you.-

MANUFACTURED BY

LEAD BULLET TECHNOLOGY OF F.E.G. ENTERPRISES INC.

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