



Standard Operating Procedure: SOP-BALL-OC

**Hardness of a Bowling Ball (Open  
Championships 2023 Field Research)**

<u>Rev</u>	<u>Date</u>	<u>Staff Member</u>	<u>Purpose</u>
	Origination date: 3-21-23	Originator: J. Milligan	



**Purpose:** To determine the average hardness of a bowling ball in the field

**Materials:**

- REX Model DD-3 Digital Durometer or newer version
- REX Model OS-1 Operating Stand (With bowling ball cup base and two weights totaling 4.5 -5 kilograms)
- ETEKCITY Lasergrip 800 Infrared Thermometer
- Feeler gauges

**Set Up Procedure:**

1. Using the allen wrench, loosen the two screws on the gauge clamp, and carefully place the Rex durometer in the clamp. It is recommended that the clamp be secured on the large diameter section of your Rex durometer called the connector. To prevent damage to the gauge, take care not to over-tighten the screws- only use enough force to secure the gauge.
2. To set the durometer height, first loosen the column lock knob and raise the arm assembly high enough so that a ball can be placed under the indenter of the gauge, onto the ball cup. Place a ball in ball cup on stand. Then lower the arm assembly until the foot of the gauge is approximately 3/8” above the ball. At this point, re-tighten the column lock knob. (NOTE: Durometer should be high enough for the ball to easily clear without touching it when placing the ball in or taking the ball out of the ball cup, but it needs to be low enough that you can depress the durometer to the breakaway when taking your sample).
3. To ensure the durometer is aligned with the center of the top of the ball, pull the handle down to depress the indenter into the bowling ball. Then use a feeler gauge to slide between the ball and the foot of the indenter. Do this on the left and right side of the durometer along with the front and back. If properly aligned, the feeler gauge should slide between the ball and durometer foot the same amount for all four locations. If they are not the same, then the durometer location needs to be adjusted using the column lock knob on the back of the stand that holds the durometer frame in place.
4. To perform a test, fully depress the lever. The foot of the gauge should be in full contact with the ball and the weight shaft assembly should have moved upward in the arm assembly. If the durometer has been properly set, it will not be possible to obtain different readings by pressing harder on the lever once the foot of the gauge contacts the ball.



### **Test Procedure:**

1. Upon arrival to the Squad Room, bowlers will take out all their bowling balls for inspection.
2. Once inspection is complete and hardness staff is ready for a ball sample, the ball inspection staff will pick a ball to continue to the hardness testing station. **NOTE:** If bowler refuses to allow hardness testing, the ball will be impounded.
3. Hardness staff will record ball name, serial number, surface preparation, and coverstock type in the data collection sheet.
4. Push the “ON/CLR” button on the durometer.
5. Push the “HOLD” button on the durometer once so the displayed reading will be the maximum value. (NOTE: Readout should now indicate “MAX”.)
6. Place the bowling ball to be measured in the ball cup of the operating stand under the durometer.
7. Using the infrared thermometer, measure the temperature of the ball’s surface on 4 different locations around the ball, and record on the test form.
8. Press “ON/CLR” key to zero the durometer.
9. Using even pressure and a slow pace, pull down the handle on the right side of the durometer stand until the durometer hits the bowling ball and you cannot push the handle down anymore. Then allow the handle to return to the starting position. Be sure that any logos, serial numbers, or other identification markings are avoided when taking a hardness reading.
10. Record the hardness reading from the digital display.
11. Rotate the bowling ball in the ball cup under the durometer, so the next reading can be taken on another random location on the bowling ball. Again, be sure to avoid any logos, serial numbers, or other identification markings on the bowling ball.
12. Repeat Test Procedure steps 8-11 until 10 different locations on the bowling ball have been tested. A good sample of the bowling ball should include a wide range of locations around the bowling ball that includes all the colors on the bowling ball. For multi-color balls, multiple measurements should be taken in each designed color.
13. The overall hardness of the bowling ball will be displayed as an average of the 10 readings taken on the ball.



14. Hardness staff will return ball sample to the bowler and let Ball Inspection staff know they are available for another sample.
15. Repeat from Test Procedure Step 2 for duration of testing.
16. The average will be given verbally if requested by bowler.
17. Balls will not be removed from competition based on this hardness test.
18. Balls may be removed in accordance with Rule 17a, tampering with equipment so it no longer meets USBC specifications. Evidence of tampering includes, but is not limited to:
  - a. Strong chemical odor.
  - b. Surface can be damaged by finger/thumb nail, brittle to the touch.
  - c. Surface orange peeled or badly deformed/cracked.
  - d. Severe discoloration beyond normal phasing.

**Monitoring:**

1. For each squad, the 4-ball monitoring set will be measured prior to the start of squad testing and after testing has concluded for that squad.
2. Each sample will be tested utilizing the standard operating procedure listed above.
3. Monitoring data will be reviewed after each squad to identify any possible changes in the tools.