Standard Operating Procedure: SOP-LAB-7

Ball Cleaner Hardness Testing

Rev	Date	Reviser	Purpose
4	11/13/2019	A. Stanton	Add calibration/verification procedure
3	10/13/2017	A. Stanton, D Speranza	Change in soak and dry times
2	7/18/2017	A. Stanton	Change in soak time.
1	4/20/2017	A. Stanton	Clarification and detail
Origination date:02/1/2017		Originator: Tom Frenzel	

EQUIPMENT SPECIFICATIONS

Purpose: To determine whether a ball cleaner will affect the hardness of a bowling ball.

Materials:

- Cleaner for testing
- REX Model DD-3 Digital Durometer
- REX TBK-D Type D Test Block Kit
- REX Model OS-1 Operating Stand (With bowling ball cup base and two weights totaling 4.5 -5 kilograms)
- Grease pencil
- Clarisse Cotton Rounds (round cotton pads)
- Designated test ball (for hardness)
- Isopropyl alcohol (IPA)
- Disposable pipette

Procedure:

1. Ensure sample has been entered in LabLog and given a printed label
    a. Locate the "LabLog" internet shortcut.
    b. Select "Log Entry"
    c. Make sure to fill in all the fields possible using the cleaner and application:
        - Sample Number – 7-digit number, the first two numbers will be the last 2 digits of the current year followed by a hyphen and a 5-digit number representing the nth product received in the current year. (i.e. for the 5th product of 2020, the sample number would be 20-00005)

2. Place designated test ball into a ball cup.

3. Apply enough IPA onto the ball surface to clean a 2-inch circle and clean the area in a circular motion using a Kimwipe.

4. Trace a circle around the 1 lb. sample weight on the test balls surface.

5. Place test ball in durometer stand so that the durometer tip will engage the surface of the ball inside the circle.

6. Turn on the durometer by pressing and holding down the green "ON/CLR" key on durometer until a zero reading appears on the screen.

7. Set the durometer to retain its highest measurement by pressing the "hold" key.

8. Press "ON

9. /CLR" key to zero the durometer.

10. Slowly push the durometer stand handle down until it makes full contact with the ball.

11. Record the measurement in the test sheet.

12. Adjust the ball such that the durometer will make contact at different location within the circle.

13. Repeat steps 8 through 11 until a total of ten hardness measurements have been collected.

14. Place test ball into a ball cup.

15. Prepare an additional ball cup by covering it with a piece parafilm on the ball side.

16. Apply Cleaner

    a. **IF LIQUID**
        - Remove the cleaner's lid/applicator and withdraw sample using disposable pipette.
        - Soak a Clarisse Cotton Round with the cleaner and wring out until the cloth is damp, but not dripping.
        - Wipe the area to be tested in a circular motion three times and place the damp pad on the circle.
        - Place the parafilm covered ball cup upside-down on the top of the ball
        - Place the 1 lb. weight on top of the upside-down ball cup
        - Let the cleaner soak for 1 hour. Clarisse Cotton round is to remain moist at the end of the 1 hr. soaking or repeat test and add cleaner as needed to stop evaporation before the end of the 1 hr. soak time.

    b. **IF WIPE**
        - Fold the wipe into a square that will cover the entire circle.
        - Wipe the area to be tested in a circular motion three times and place the folded wipe over the circle.
        - Place the parafilm covered ball cup upside-down on the top of the ball
        - Place the 1 lb. weight on top of the upside-down ball cup
        - Let the cleaner soak for 1 hour. The wipe is to remain moist at the end of the 1 hr. soak or repeat test and replace wipe as needed to ensure moist wipe remains on ball for the full 1 hr. soak time.

17. Remove cleaner wipe or cotton round from the ball taking care not to erase the circle.

18. Let the ball dry for 2.0 hours before testing hardness.

19. Repeat the hardness data collection outlined above in steps 5-11 until ten post-cleaner hardness readings are recorded in the test sheet.

20. Open the Excel file "Cleaner and Polish Products Data".

21. Record the average before and after hardness for the cleaner under the "Results" tab. Make sure all cleaner information is recorded and correct.

22. If the two average hardness values are within 2.0 duros, the ball cleaner passes the hardness test. If the average hardness values differ by 2.0 or greater, ball cleaner fails the hardness test.

If ball results indicate the hardness is below the minimum:

1. Ensure room temperature is within the allowable 70-77 degrees F range.

2. Verify that the durometer is operating correctly by using the test block kit. The results should fall within the range specified with the test block (normally +/-2 of the listed value for the test block).

3. Measure the ball temperature at the location on the ball where the hardness is tested using a Centech infrared thermometer, or similar thermometer device, to ensure ball temperature at test site on the ball is within the allowable 70-77 degrees F range.

4. If durometer passes the calibration block requirements, the hardness value determined in step 20 is the value to be reported in the test sheet.

5. If durometer does not pass the calibration block test, send durometer out for repair/calibration by Rex Gauge Co.

Calibration:

Durometers are to be sent off for professional calibration every 6 months (July/December) to Rex Gauge Co.

If any cleaner presents values outside of the hardness specification, the durometer used must be verified. Please see previous section for instructions.