R&A Rules Limited

and

United States Golf Association

OVERALL DISTANCE STANDARD AND SYMMETRY TEST PROTOCOL

Rev. 4.0

1 October 2025

Revision	Date	Details of Revision
2.0	28-Feb-2011	Updated to include document number and revision date. Removed reference to ITR software. Updated to reflect change in ball labeling wherein only balls 1 and 24 include the USGA lot number. Changed reference from calibration balls to control balls. Removed requirement for which number ball is used in tests. Added sections describing repeatability tests that are part of current quality assurance practice. Number of balls to be identified and marked increased from 6 to 12. Mechanical golfer calibration ball identified as "USGA/R&A Calibration". Description of reference ball speed included. Increased repeat of steps to reflect increase in number of ball samples used for testing. Expanded allowable temperature range for aerodynamic testing from ±2 °F to ±3 °F. Number of balls to be measured increased from 6 to 12. The allowable range of the expected nominal value of the C_L and C_D for the calibration ball is set at 5%. Number of ITR test settings set to 15. Reference to The Indoor Test Range (ITR) Technical Description and Operation Manual, changed to Version 2. Notification to manufacturer and request for corrective action changed from "should" to "shall." Appendix detailing Test club and ball specifications added.
3.0	9-Apr-2019	New major revision based on the adoption of new test hardware by the USGA and R&A Rules Ltd Updated Rules references.
4.0	1-Oct-2025	Update to specify control ball speed and set clubhead speed as for reference only. Minor simplification of calibration driver specifications

1 Scope

This protocol describes the method used to test golf balls for conformance to the Equipment Rules, Part 4, Sections 4 and 6, as administered by R&A Rules Ltd (The R&A) and the United States Golf Association (USGA).

2 Test Protocol

2.1 Determination of Launch Conditions

a. Golf balls shall be maintained at 75 °F ± 1 °F (23.9 °C ± 0.6 °C) for a minimum of three hours prior to testing.

b. Determine the required ball speed (V_{ALC}) of at least six "USGA/R&A Calibration" balls (hereafter referred to as "Control Balls")

   i. Measure the average coefficient of restitution (e) and contact time (t_c) of the control balls at 143.8 ft/s impact speed according to the "Initial Velocity Test Protocol"

   ii. Calculate the appropriate control ball speed:

$$V_{ALC} = 180.13 + 123.712e - 0.04309t_C$$

   where t_c is reported in microseconds and V_{ALC} is calculated in ft/s.

c. Verify proper setup of the mechanical golfer by hitting the control balls and measuring the launch conditions.

   i. The proper setup results are shown in Table 1.

d. For each of 12 balls from the sample:

   i. Strike the golf ball with the conformance driver using the setup described in the Appendix.

   ii. Measure and record the ball speed, launch angle, and spin rate.

e. Ensure that there are no statistical outliers.

f. Report the average ball speed, launch angle, and spin rate.

Table 1: Control ball setup conditions.

Parameter	Expected Value	Acceptable Range
Launch angle (deg.)	10	± 0.5
Spin (rev/min)	2,520	± 120
Clubhead speed (mph)	120	Reference value only
Ball speed (mph)	V_{ALC}	± 0.75 mph

2.2 Determination of Aerodynamic Properties

a. Ensure that the Indoor Test Range ('ITR') temperature is maintained at an average of 75 ± 3 °F (23.9 °C ± 1.7 °C). Measure and record the temperature, barometric pressure and humidity.

b. Golf balls shall be maintained at 75 °F ± 1 °F (23.9 °C ± 0.6 °C) for a minimum of three hours prior to testing.

c. Measure the outside diameter of the balls and calculate the average ball diameter.

d. Set the launcher to produce the desired ball velocity and spin rate (hereafter described as a 'test condition') described in the ITR Manual.

e. For each of 12 balls from the sample:

    i. Launch the ball at the prescribed test condition in both a poles-horizontal ('PH') and pole-over-pole ('PP') orientation (see Figure 1, Figure 2).

        i. Note that the USGA and The R&A retain the right to test the ball in any orientation(s) as likely to result in greater overall distance or to show larger differences between orientations.

    ii. Record the ball spin.

        i. Note that if the ball spin cannot be recorded then a best estimate of the spin may be utilized based on the settings of the test condition

    iii. Record ball position versus time data as the ball passes through the ITR.

    iv. Repeat for each test condition.

f. Calculate the best fit aerodynamic parameters: coefficients of lift and drag (C_L, C_D), the associated Reynolds number and the spin parameter for each ball in each orientation at each test condition.

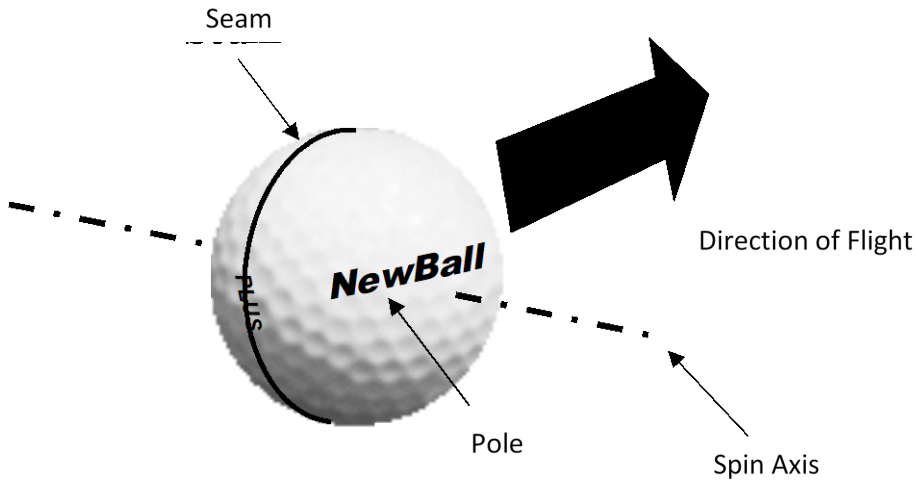

Figure 1: Poles Horizontal ("PH") test orientation. The seam of the ball is in the plane of the trajectory.

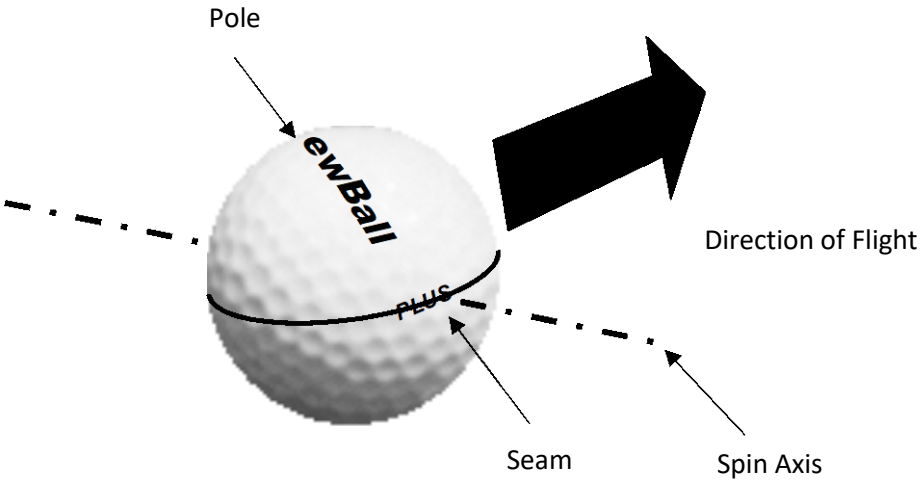

Figure 2: Pole-over-pole ("PP") test orientation. The poles of the ball are in the plane of the trajectory.

3 Determination of Conformance Status

3.1 Overall Distance

a. For each orientation, determine the trimmed mean aerodynamic parameters for each test condition using the data collected for all balls tested.

b. Use the aerodynamic parameters, as well as the launch conditions determined in section 2.1 to determine the total distance (including bounce and roll) for each orientation at the following conditions (Table 2):

Table 2: Environmental conditions for the Overall Distance Standard

Environmental Parameter	ODS Standard Value
Temperature, °F	75
Barometric Pressure, in. Hg	30.0
Humidity, % Relative	50

c. The longer total distance of the two shall be used for conformance evaluation.

d. If the overall distance is found to exceed the limit of 317.0 yards plus a 3.0-yard tolerance, then the sample does not conform to The Equipment Rules, Part 4, Section 6.

3.2 Symmetry

a. For each ball and orientation, determine the carry and flight time using the average launch conditions determined in Section 2.1.

b. Calculate the paired differences of the carry and time of each ball tested. Remove extreme outliers.

c. If the average of the paired differences of the carry of the balls is greater than 4.0 yards and that difference is statistically significant then the sample does not conform to the Equipment Rules, Part 4, Section 4.

d. If the average of the paired differences of the flight time of the balls is greater than 0.40 seconds and that difference is statistically significant then the sample does not conform to the Equipment Rules, Part 4, Section 4.

Appropriate screening methods may be employed

Appendix – Test ball and club specifications:

Test Head Design Specifications

Construction: Titanium
Manufacturer: Fu Sheng Industrial Co., Ltd
Model: TI-360

Parameter	Units	Nominal Value
Face Depth	inches (mm)	2.0 (51)
Face Width	inches (mm)	3.9 (99)
Mass	ounces (grams)	7.0 (198)
Volume	cubic inches (cc)	22.0 (360)
Hosel Diameter	inches (mm)	0.339 (8.61)
Lie	degrees	58
Loft	degrees	9
Bulge	inches (mm)	12.0 (305)
Roll	inches (mm)	10.0 (254)
CG (face centre) up	inches (mm)	0.19 (4.8)
CG (face centre) to heel	inches (mm)	0.06 (1.6)
CG (face centre) back	inches (mm)	1.38 (35.0)
CG (above ground)	inches (mm)	1.38 (35.0)
CG (from shaft axis-toe)	inches (mm)	1.7 (44.0)
CG (shaft axis-back)	inches (mm)	0.63 (16.0)
Moment of Inertia (pitch)	ounce-in^2 (gm-cm^2)	13.1 (2400)
Moment of Inertia (yaw)	ounce-in^2 (gm-cm^2)	23.3 (4250)
Moment of Inertia (roll)	ounce-in^2 (gm-cm^2)	21.9 (4000)
Characteristic Time	microseconds	239

Set-up Ball Specifications

Construction: 2-piece
Manufacturer: Bridgestone
Model: USGA / R&A Calibration

Parameter	Units	Nominal Value
Diameter	inch (mm)	1.682 (42.72)
Weight	ounce (g)	1.590 (45.2)
Core material	n/a	Polybutadiene
Cover material	n/a	Surlyn
Cover hardness	Shore D	60
Cover thickness	inch (mm)	0.083 (2.1)
Core diameter	inch (mm)	1.516 (38.5)
Dimple pattern	n/a	Quasi-Icosahedron 432
Initial velocity	ft/s (m/s)	253.8 (77.4)
COR (rigid barrier), 143.8 ft/s	n/a	0.778