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THE USGA

NOTICE

Subject: Spring-Like Effect

Inconsistencies were discovered in the specifications for the Velocity Ratio Test 0.115" Calibration Plate. Revision 0 of the "Procedure for Measuring the Velocity Ratio of a Club Head for Conformance to Rule 4-1e, Appendix II," dated July 6, 1998 has subsequently been revised. Please replace the existing pages in the procedure with the revised pages (cover sheet and pages 5,6.)

All interested persons are reminded that an open forum will be held at Golf House on September 28, 1998 at 9:00 a.m. to discuss, and provide input, regarding the test procedure. Written comments should be forwarded by September 4, 1998.

For scheduling purposes please let me know by September 1 how many members of your organization are planning to attend. Please also notify me of your intent to make a presentation. A lottery system will be used to determine the order of the presentations. We have imposed a time limit of fifteen minutes for each presentation.

Following the September 28th, 1998 open forum, the Executive Committee will evaluate the written materials submitted and the oral presentations made, and determine if the test procedure should be adopted as proposed.

Yours sincerely,

Frank W. Thomas
Technical Director
08/07/98

UNITED STATES GOLF ASSOCIATION

Procedure for Measuring the Velocity Ratio of a Club Head for Conformance to Rule 4-1e, Appendix II

Revision 1

August 4, 1998

Appendix A - Test Equipment

The test to determine conformance of a club head with rule 4-1e uses a Wilson Ultra Ball Launcher to fire Pinnacle Gold golf balls through two ballistic light screens at a stationary club head resting on a support pedestal.

1.0 Launcher

The launcher is positioned so that when the club head is mounted on the pedestal, the club face is approximately 55-in. from the exit of the launcher. The launcher angle is adjusted to launch the balls at an angle approximately 2 degrees below horizontal to minimize the possibility of balls rebounding into the launcher wheels. The speeds of the upper and lower belts are adjusted to provide a ball velocity of 160 ± 0.5 feet per second, as measured by the light screens, and a backspin of approximately 2 rps. (Spin is used to provide stability, accuracy and repeatability.)

2.0 Ballistic Screens

Two ballistic light screens are used to measure the incoming and rebound velocity of the golf ball. The screens are positioned 12.0-in. apart. The second screen (closest to the clubhead) is located 13.0±1.0 in. from the target.

3.0 Golf Balls

A large population of Pinnacle Gold golf balls is used in the testing. Prior to initial testing, each ball is numbered and the initial velocity is measured and recorded. A minimum of fifty dozen balls are selected and sorted by their initial velocity. The mean initial velocity of the fifty dozen balls is 252.4±0.5 fps. The mass of the test balls is also measured and recorded. The mean mass is 45.4±0.4 grams. These ball specifications may change, and appropriate adjustments will be made.

During testing, the balls are kept in a climate-controlled room at 23±1.0 °C. Only five dozen balls are removed from the room for testing at one time. The condition of the golf balls is closely monitored throughout the tests. Balls that become chipped or marred are removed from the test population and replaced. Changes in the initial velocities of the balls are monitored through initial velocity testing of random samples of the ball population once every two weeks.

4.0 Calibration

A cavity-backed plate with a mass of 200.0 ~~210.55~~ grams is used to calibrate the test apparatus to a reference velocity ratio. The plate is constructed of Ti-6Al-4V alloy, ASTM B348 GR. 5 to the dimensions specified in Figure A-1. Rev 1

Calibration is accomplished by firing fifteen shots into the plate in the manner described in Step 4.0. The data points with the two highest and two lowest measured velocity ratios are discarded and the mean is calculated for the remaining eleven data points. When tested using this methodology, the calibration plate has a mean velocity ratio of 0.487 with a standard error of 0.0002 ~~0.502 with a standard error of 0.0003~~. Within the dimensional tolerances specified in Figure A-1, the estimated range of the velocity ratio for the calibration plate is +0.0023. Rev 1

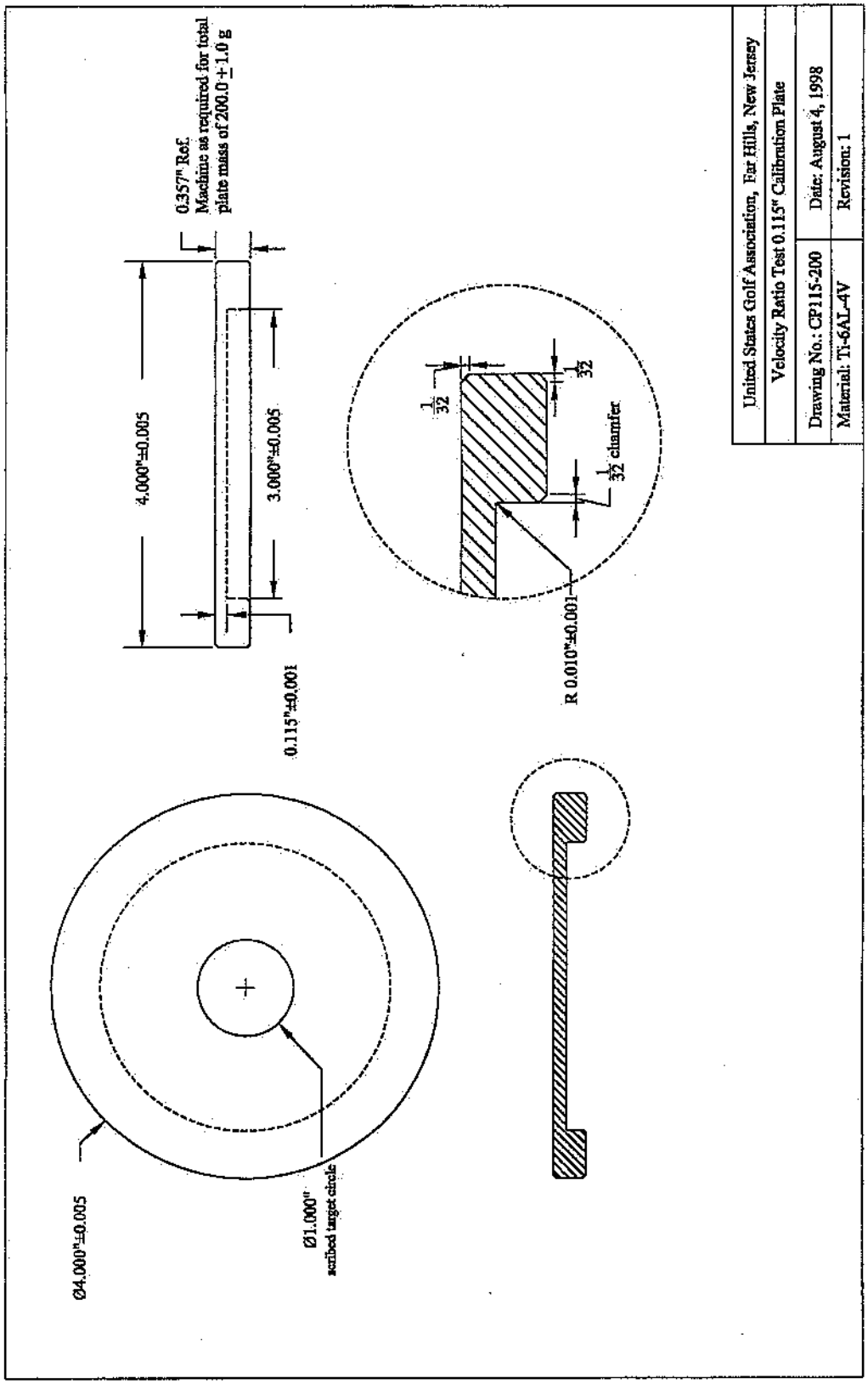

FIGURE A-1 - Titanium Calibration Plate

Rev 1